BENCHMARK

BENCHMARKING OF MOBILE DATA COLLECTION SOLUTIONS

FINDINGS AND RECOMMENDATIONS REPORT

cartong

welt hunger hilfe

CARTONG

Created in 2006, CartONG is a French H2H/support NGO specialised in Information Management. Our goal is to put data at the service of humanitarian, development and social action projects. We are dedicated to improving the quality and accountability of field activities, in particular through better needs assessments and monitoring and evaluation. We act as a multidisciplinary resources and expertise centre, accompanying our partners' strategies and operations. Our staff and volunteers also support the community as a whole by producing documentation, building capacities and raising awareness on the technical, strategic and ethical challenges of digital technologies.

WELTHUNGERHILFE

Welthungerhilfe (WHH) is one of the largest and most prominent Non-Governmental Organisations in Germany operating in the field of Humanitarian Assistance and Development. It was established in 1962, as the German section of the "Freedom from Hunger Campaign", one of the world's first initiatives aimed at the eradication of hunger. With its focus on food security and nutrition, WHH still addresses one of the most pressing issues of international development nowadays and fights towards the goal "zero hunger by 2030".

ACKNOWLEDGMENTS

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ACRONYMS

AD   Active Directory

API   Application Programming Interface

GDPR   General Data Protection Regulation

HHI   Harvard Humanitarian Initiative

IRC   International Rescue Committee

MDC   Mobile Data Collection

MS   Microsoft

OCHA   UN Office for the Coordination of Humanitarian Affairs

ODK   Open Data Kit

PII   Personally Identifiable Information

WHH   Welthungerhilfe

XLS   Microsoft Excel spreadsheet format (newer version XLSX).
We use the term "XLSForm" to refer to a specific survey design form used by ODK based tools. For more information, please refer to the section <u>2.3 Compatibility within the sector: XLSForm</u>.

XML   Extensible Markup Language (open standard format for encoding documents in a human and computer readable format)

Most Mobile Data Collection solutions evolve fast, with new versions often released several times a year. This report is based on tests conducted in December 2020 and January 2021. Readers are strongly advised to verify features and functions of newer releases when interested in a particular tool/platform. This report's aim is to give a general overview and a comparison based on a snapshot in time.

1. WHY A NEW BENCHMARKING?

CartONG, an organisation that has been testing and using MDC since its beginnings in 2009, released a first substantial benchmarking of MDC solutions in 2017[1], focusing on applications and services running on low-cost Android devices, and for contexts where cellular networks can be unreliable. Since then, technologies have evolved quickly and functionalities that were standing out of the crowd are now widespread (see Common features section) – hence it seemed interesting to come out with a new version of the benchmarking focusing more particularly on features that are differentiating factors nowadays.

It was therefore perfect timing when Welthungerhilfe solicited a collaboration with CartONG in order to conduct a benchmarking of solutions for the internal use of the organisation. This led to testing and comparing several Mobile Data Collection tools to see if any of them could be compatible with Welthungerhilfe's strategy to deploy a well-conceived, robust and integrated solution for data collection, processing and analysis for the whole organisation.

1.1. SCOPE OF WORK

This benchmark's aim was to explore more particularly the tools' **user friendliness (of both web platform and app), simplicity of processes and features enhancing data protection and quality**, as these were key aspects for Welthungerhilfe. To this end, the focus was put on the following aspects:

- **Organisational management –** Organisation-wide control available, including centralised management of users and surveys, and the possibility to create a dedicated workspace for country teams, including the promotion of standardisation and organisation learning (use of global template and standards methodologies).
- **User experience –** Intuitive tool that is easy to adopt, and also both as interoperable as possible with partner organisations' data (therefore using humanitarian widely used formats, such as XLS form), as well as with visualisation tools (through an API for instance).
- **Data quality –** Availability of dedicated features such as advanced constraints and skip logics as well as extensive possibilities to test and review the forms and the data, including validation processes and the possibility to monitor any changes.
- **Data protection –** Ensuring data protection and GDPR compliance through dedicated features to flag and limit access to PII[2] and sensitive data, high granularity of roles, and adequate storage location.
- **Case Management –** Availability of features and workflow facilitating case management and/or longitudinal data collection.

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[1] See this publication: "Benchmarking of Mobile Data Collection Solutions – What aspects to consider when choosing a tool/platform", CartONG, 2017

[2] Personal Identifiable Information, in colloquial language referred to as "personal data"

It should be noted that features concerning data visualisation on the platform itself were not assessed, since many organisations use external tools for analysis and reporting, be it by exporting the data or connecting it through an API (e.g., Excel, PowerBi, Tableau, R, Stata, SPSS, etc.).

This benchmark covers a reduced number of solutions as it focuses on the solutions that were most likely to meet the needs of Welthungerhilfe. To that end, 18 solutions were pre-assessed and 8 solutions were compared in depth. The initial list was composed of: ActivityInfo, AkvoFlow, CommCare, DeviceMagic, Dharma, Fulcrum, iFormbuilder, KoBoToolbox, Magpi, Mobenzi Researcher, ODK, ONA, Poimapper, Survey 123, Survey CTO, SDK, SMAP, Taroworks. A pre-assessment focusing on 20 specific requirements based on WHH needs allowed us to reduce the list to the 8 solutions presented in this benchmark. This benchmark presents the result of the in-depth assessment only.

1.2. ASSESSED FEATURES

In this benchmark report, information about 39 technical features is being presented, and all features were clustered according to the overall objectives or categories they contribute to.

The first category investigates the overall **organisation (ORG)** of the platform. Ideally, the tool should have:

- A comprehensive and organisation-wide control of the platform, including a centralised user management system, possibility to monitor the platform's use and the field teams,
- Efficient role management system allowing for high granularity,
- A folder system for filing surveys into folders,
- Compatibility with a central Active Directory,
- The possibility to create a template library to promote standardisation of surveys across the organisation.

The second category covers features that support the user **experience (UX)**. It looks at:

- The intuitiveness of the software, including the availability of a form-builder (and its compatibility with XLSForms),
- The possibility to access the platform and the mobile in multiple languages,
- The different possibilities to access data (on the platform and through data export).

The third category revolves around features that help users to enhance **data quality (DQ)**, that can be set up at the questionnaire design stage or once the data is already collected, including:

- Constraints and logical skip patterns set up at form design stage,
- Calculated questions,

- Data validation possibilities,
- Different possibilities to view and clean data, including the possibilities to clean data offline and online, reimport data that was cleaned, and monitor changes made on the data.

The fourth category looks into the **data protection (DP)** aspect of the tool. The best scenario would be a tool that would support an organisation to be compliant with data protection and security standards such as the GDPR, but also sector standards for the responsible use of sensitive and personal data. Technical features can really support an organisational effort to protect data, hence tools were assessed on:

- Form encryption,
- Possibilities to flag specific surveys or data fields as containing sensitive or personal data,
- Possibilities to control user access based on these characteristics,
- Possibilities to pseudonymise sensitive and/or personal data (in bulk) directly on the platform,
- Possibility to set expiry dates for datasets, or to delete data in bulk,
- Encryption on the mobile app,
- Data storage location.

The last category explores the possibility to conduct **case management (CM)**, or at least longitudinal data collection: to what extent it is possible and how it can be done.

Methodology

The assessment of the solutions was conducted through several steps.

- **Request sent to the solution providers to self-assess the availability of each feature identified for the benchmark.**

The suppliers had to indicate, whether they met the requirements presented fully, partially or not at all. They also had to provide precise narrative explanations for requirements that were partially met and also for some requirements pre-identified by CartONG. This was intended to facilitate the next step, namely the testing of these requirements.

- **Testing each feature**, using a similar methodology for each of the solutions and identified testing steps, to verify the way each feature was implemented.
- **Comparison between the outcome of the test and providers' self-assessment.** When dissimilar answers were encountered, contact was established with the solution provider to request clarification in order to have the most accurate information possible.

At the end of this process, each feature was granted a status: fully available, partially available or not available. This was evened out for each of the solutions, where similar functionalities were found, to ensure that the availability of each feature was rated consistently across all tools.

The results of the benchmark were then analysed through qualitative and quantitative methods. CartONG was able to compare strengths and weaknesses for each solution, as well as attribute a **use case scenario** for each. This method of operating ensured that each organisation reading the benchmark can ask the right questions and position itself to select a solution adapted to its needs.

## 2. HOW TO CHOOSE A SOLUTION FOR YOUR ORGANISATION?

2.1. VARIOUS APPROACHES: SINGLE PLATFORM, MULTIPLE PLATFORMS, OR PREFERRED SOLUTION[3]

Selecting a single MDC platform to be the solution for the entire organisation is an aspiration for many International Organisations and NGOs. There are some definitive arguments in favor of getting one solution for MDC. Among them, we can mention a **better integration of the data**, a **better knowledge of the tool from the staff**, a **compliance with the organisation's standards** and a **bargaining power** with the service provider.

Nonetheless, some organisations can find it more relevant to use several solutions. This can be due to **varying needs** among the organisation, which can cause **staff frustration** if the tool does not meet their needs. Additionally, while using one solution it can be **harder to keep pace with new developments in the sector**, as different solutions improve or decline over years, and **organisational inertia** makes it harder to change a solution already firmly in place.

Whether or not a single platform is the best approach will vary from an organisation to another, and there is generally no black and white answer. It can be possible to recommend a preferred solution but embrace other solutions for certain projects or thematics. Another possibility is to let teams choose from a pool of pre-approved options.

Figure 1 – Example of a decision-tree for Terre des Hommes teams to identify the most appropriate data collection tool using a mobile device

How to choose the MDC tool most suited for your project:

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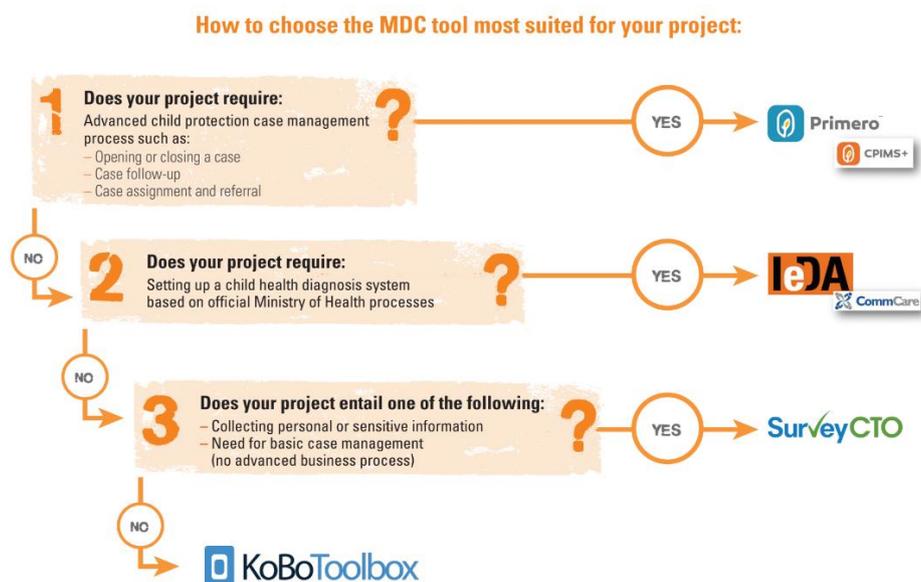
[3] A more detailed argumentation can be found in the document "Benchmarking of Mobile Data Collection Solutions – What aspects to consider when choosing a tool/platform", CartONG, 2017

2.2. KEY ASPECTS TO CONSIDER WHILE CHOOSING A SOLUTION

To make the best use of this benchmark, organisations looking for an MDC tool, should consider the following five key factors when attempting to find a solution that can serve as the preferred solution. The following table provides few non-exhaustive questions to have in mind when reading the benchmarking; the organisation should look for the solution which complies with their constraints and needs.

Factor	Key questions to ask yourself	What to look for
Organisational management	1. Which levels of management are required? Organisation, Region, Country, Project, etc.	1. The tool has a central management of users and permissions, it allows to associate dedicated work space for specific teams.
	2. How strictly do tasks need to be attributed to certain roles? *Viewer, Enumerator, Administrator, Project Manager can do X, Y or Z in the system.*	2. The tool allows for various roles and the granularity of permissions is adapted; you can create your own roles.
	3. How strictly do projects need to be separated from each other? *Access to folders/projects can be set independently of roles.*	3. The tool offers a platform where surveys are organised in folders/projects. Extra: the tool allows for partial deployment.
User experience	1. How familiar is the staff with form building?	1. The tool has a form builder (beginners). The tool is compatible with XLSform (experts).
	2. What are the language requirements? Application and online platform languages (especially if non-Latin characters).	2. The tool allows for multiple languages surveys. The tool offers various languages (mobile app and platform).
	3. What are the functionalities needed for the staff to handle data on the platform? *Import, export, review, edits, etc.*	3. The tool offers a data view and monitor (bulk or single edit) directly on the platform. Extra: it's possible to export a filtered dataset.

	4. Do you need to exchange surveys with other organisations?	>	**4.** Does the tool allow you to export your forms in format other tools can use (e.g., XLSForm).	

Data Quality	**1.** You want to reduce data cleaning effort?	>	**1.** The tool should allow for advanced constraints for submission and other features enhancing data quality (calculation, groups, skip logic).
	2. Do you need clean data to be hosted on the server (for publication purposes)? – or is it fine to clean the data outside of the platform?	>	**2.** The tool should allow online data cleaning or reimportation of clean data.
	3. A lot of different people are modifying the submitted data and you need to monitor changes?	>	**3.** The tool should have a strong component to monitor the data.
Data Protection	**1.** How sensitive is the data collected?	>	**1.** The software supplier doesn't have access to the data on the platform (sensitive).
	2. When do you need to protect PII? *During data collection, when downloading the dataset, on the platform, etc.*	>	**2.** The tool offers certain forms of encryption.
	3. Are there organisational standards where and how such data is stored? *Cloud, encryption, etc.*	>	**3.** The servers are located in the EU or in a country with full adequation to GDPR.
	4. How familiar is the staff with form encryption?	>	**4.** The tool allows for a simplified version of form encryption (unfamiliar). The tool is compatible with XLSform, which enables form encryption and decryption is possible via ODK Briefcase (familiar).

Case management	1. Is tracking subjects over time needed? On the mobile app? On the platform? By different enumerators?	>	1. The tool allows for case management.
	2. What type of subjects are being monitored over time? *Person, household, object, place, etc.*	>	2. The workflows are adapted to the organisation.
	3. Is it necessary to pull data from one form to another dynamically and/or make data collected by one enumerator accessible to all your enumerators?	>	3. The tool allows for two-way synchronisation of data between server and mobile app.

2.3. COMPATIBILITY WITHIN THE SECTOR: XLSFORM

XLSForm is a widely used standard by Mobile Data Collection tools for designing surveys, though not all the tools assessed in the benchmark are using this standard.

It is a "standard created to help simplify the authoring of forms in Excel. XLSForm provide a practical standard for sharing and collaborating on authoring forms"[4]. It means that a survey created through XLSForm can be easily shared and imported in all the tools using this standard. This standard is mostly used by solutions built on the ODK open-source project. To be read and used by the Mobile Data Collection tool the XLSForm is converted on the back-end to an XForm (XML language/format). If a developer would like to access the form, they can extract the XForm version from any of the platform.

To sum up:

1. Some tools only allow users to design forms through their form builder,

2. Some tools allow form design through XLSForm and their form builder (converting to XForm in the back-end),

3. Some tools only allow form design through the upload of XLSForm (converting to XForm in the back-end),

4. Some tools allow users to upload XForms, hence one can design a survey through XLSForm, then using a converter to change forms from XLSForm to XForms before uploading to their platform.

Designing surveys in XForm format is ideal for the developer type of users, that might want to customise forms in an advanced whereas XLSForm designing is much more appropriate for standard users that want to design forms in an efficient way outside of a form builder.

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[4] Check this page

3. BENCHMARK OUTCOME

The evaluation of the eight final products is the result of the assessment of 39 key features. For each solution, a presentation of the tool is given, highlighting the strengths and weaknesses. Finally, the pros and cons table summarises the assessment while giving indication on the key features a reader can search for in a Mobile Data Collection solution.

3.1. COMMON FEATURES

The results of this evaluation allow to compare solutions with each other, however not all features made a difference between solutions. Indeed, it is worthy to note that a **certain number of requirements are fulfilled** by all the assessed solutions, since they are part of the basic functionalities of any Mobile Data Collection tool.

Among those functionalities, there are the **mobile application available on Android** closely related to the capacity of the tool to provide offline data collection.

To be noted as well is the **availability of most of the standard question** types including free-text fields, numbers, date, single and multiple choice, media, GPS coordinates, barcode, notes, likert scale or rating, grid questions, signature or free drawing.

On top of the question's types, the functionalities such as **logical sequence of questions** (setting up the question flow based on the answers given allows the enumerator to ask questions only relevant throughout the survey), **simple data validation features** (validating an answer based on a specific format or numerical conditions) and **features to guide the enumerators** (such as notes to read for himself or out loud, hints and making questions mandatory) are widespread among the solutions.

Almost all solutions offer the ability to conduct **surveys in multiple languages**[5]. This means that, when deployed, a data collector can choose which language is most suitable, by selecting the language at the beginning of the data collection.

Finally, all solutions also have an **API**, allowing other programs to request the data they contain.

3.2. MISSING FEATURES

At the same time, the benchmark also revealed **some weaknesses among the solutions**, which all failed to meet expectations regarding specific requirements especially the one that would enhance responsible data management and data protection.

For instance, none of the solutions allows, at form building stage, to **predefine a field as containing personal or sensitive information**, which prevents any form of user rights control based on this variable[6]. Additionally, none of the tools would allow a user to pre-set an expiration date for the entire dataset.

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[5] One of the solutions does not fully possess this feature, it will be highlighted in the presentation of the solution.

[6] AkvoFlow offers the possibility to flag fields as "holds personal data". But these flags can only be used while publishing data externally through the API, to not publish these specific fields.

Considering that some solutions had a workaround, the requirement for flagging questions with customised categories or predefined categories (e.g., personal data, sensitive data, non-sensitive data) was not possible on most of the solutions tested. The great learning from this is that there is still a space for improvement on most of the solutions to meet the sector's needs.

Additionally, none of the solutions would allow to **lock a specific question and prevent modifications** for all or some users (depending on access rights)[7]. In most cases, it is also not possible to **give attributes to surveys** (e.g., category, sector, region, project ID, tags such as "contains PII") or capture metadata at the survey level (created by, modified by, modification date.

3.3. MOST DIFFERENTIATING FEATURES

MDC solutions evolve over time, and the differentiating factors between solutions also evolve based on the requirements of the user community and the technical constraints of the moment. However, at the time of the benchmarking, some features really differentiate the assessed solutions:

- **Organisational and user management features** are the one that differentiate the most in between solutions. The range of possibilities goes from not having any central management and assigning specific users to surveys to defining groups of users, deploy surveys to certain groups and monitor the users via a central page,
- **Possibilities for follow up over time and for case management**. Some solutions allow for manual "case management" where it's possible to pull data from an external survey loaded as a database, but there is no two-way synchronisation with this workaround. On the other hand, some solutions have specific workflows to collect longitudinal data, and are very well-suited for case management,
- **Features related to encryption**. Here as well, very different options are available among the tested solutions. It goes from no encryption on data during transfer to encryption of the whole survey or specific questions only, to allow for partial visualisation on the platform.

The following presentation of the solutions will therefore focus on the decisive features, the strengths and weaknesses of each solution in comparison to the others, and will not repeat the points mentioned above.

3.4. PRESENTATION PER SOLUTION

The section below provides a short description of the benchmark findings per solution and contains:

1. **A detailed product evaluation** including, for each solution, a short presentation of the tool, the pros and cons per objective and the detail of strengths and weaknesses,

2. **A use case scenario** for readers to know in which case it can be recommended to select the solution,

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[7] A question lock feature is available as a prototype functionality in AkvoFlow. However, the feature is still in a test stage and cannot be used without involving the Akvo support.

3. **The pros and cons per objective table** shows their strengths which include features that few other solutions possess and hence considered outstanding. It is also showing crucial gaps for each of them, which includes features that are to be found quite widely in other solutions.

For the exhaustive benchmark information, please refer to the herewith Excel document entitled "Benchmarking of MDC solutions – Outcome overview".

3.4.1.   AKVOFLOW

Assessment based on software version of December 2020.

AkvoFlow was created in 2008, as a data collection tool, specialised in the water sector. Since then, they have evolved to provide services and methodologies for partners. They also added smallholder farming, sustainable energy and other sectors to their expertise. The company is based in all five continents with offices in Amsterdam, Bali, Nairobi, New-Delhi, Ouagadougou and Washington DC and the team is composed of more than 100 staff. They worked with over 200 organisations, in more than 70 countries.

AkvoFlow is an open-source data platform, which means that they release under open source, open content and open data licenses – when the privacy of the beneficiaries is not involved. They have their own mobile application for data collection.

AkvoFlow is complemented by the cloud-based data visualisation and dashboard tool AkvoLumen. While AkvoLumen is still a separate platform, Akvo Foundation has the mid-term goal to seamlessly integrate both tools into one software product. However, AkvoLumen was not part of this assessment as the benchmarking was clearly focusing on data collection tools and their capabilities.

Strengths and weaknesses

AkvoFlow has a granular and advanced role and access management and the clear survey management in a folder-like structure, while possible to combine the two.

As some other tools, AkvoFlow meets most of the requirements related to User Experience, or having a workaround for those not met. The tool offers a wide variety of languages for the mobile application, and its online platform is available in French, both being a good strength in the sector.

Compatibility with other organisations is not one of its strong points mainly because it's not possible to exchange surveys with other organisations using a different tool, and the tool is not compatible with XLSForm and the only possibility to create a form is via the online form builder.

The solution also has some deficiencies regarding Data Quality features: amongst other requirements, it's not possible to set up basic questions such as notes for the data collector, nor is it possible to set up a character limit. Only a very simple logical skip is available and testing of surveys on the platform before publishing is not possible. Finally, it's not possible to inspect data in a tabular view on the platform and there is no way to check the date and user for any data transformation made[8]. The solution also lacks calculated questions, which is a major drawback as compared to other solutions.

Use cases where the solution is the most recommended

AkvoFlow is mostly recommended in case where:

- The organisation wants/needs to have a very structured organisation of its users and surveys: Teams can be set at one level across the organisation, sub groups can be organised through survey access,
- There are mixed needs for one-shot data collection survey, longitudinal data collection using cross-reference between surveys,

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[8] It has to be done through AkvoLumen.

- The organisation is aware that the software supplier has access to all PII data on the platform. Data is encrypted on the platform but it is not possible to restrict their access to the supplier (via form encryption as other solutions would),
- Surveys do not need to share surveys with partner organisation that are not using AkvoFlow.

Pros & Cons

Pros	Cons
ORGANISATION	
Centralised management of users, roles, and surveys. Surveys can be organised in folders and sub-folders. Variety of roles and possibility to create custom roles.	*No distinctive features.*
USER EXPERIENCE	
Multiple languages in platform and the mobile app. Data can be filtered before export according to date of submission.	Not XLSForm compatible. **No table view to see submitted data** (need to use AkvoLumen).
DATA QUALITY	
(Re-)**importing data is possible**.	**Basic validation settings, skipping questions based on multiple conditions**, or more advanced options such as the **regular expression** are **not available**. Not possible to **test the survey on the platform** before publishing. Advanced questions such as the **calculation question** are **not available**. Bulk edit of data is not available.

DATA PROTECTION	
Questions can be flagged as 'Holds personal data', standing for PII. Users' access is controlled by the combination of a user role and a folder, subfolder or survey. Data encrypted at rest on the server.	It's **not possible to bulk edit or delete the dataset on the platform**. Not possible to encrypt specific forms with private pair of keys.

CASE MANAGEMENT	
There is **a workflow called "monitoring form"**. The feature works with a 'mother form', to which multiple forms can be linked. The user can edit data previously entered. Finally, it's possible to see data collected for a specific field overtime (over time) on the app as well.	No visualisation over time on the platform.

3.4.2. COMMCARE

Tested version: v.2.50 (app), on December 2020.

<u>CommCare</u> is owned by the Dimagi company. It was founded in 2002, by a group from MIT and Harvard. They are specialised in the health sector with various forms of patient and clinical follow up scenarios. They have four offices, in Cambridge and Washington, as well as in New Delhi and Cape Town. The team is composed of 189 staff. The solution is used in more than 80 countries in Africa, Asia and South America.

CommCare is an open-source software specifically made for low-resource settings in developing countries and it has its own mobile application. They offer four paid plans: standard, pro, advanced and enterprise.

Strengths and weaknesses

The solution comes strong in the organisation category for the following aspects. The organisation account allows for tracking projects, users and data; it's possible to partition projects and restrict which data different users are allowed to view and edit. It has very granular and advanced role management.

CommCare meets all of the requirements regarding the offline capacity because the solution supports the X-form standard, compatible with the XLSform standard. Hence it is possible to design forms in XLS format and convert it to XForm. However, this requires an extra step of conversion as compared to XLSForm compatible tools and has some limitation of compatibility when one wants to share surveys in between different tools.

Case management is a powerful component among the solutions, since CommCare offers a strong case management environment, on both the platform and the mobile application. It's possible to select a case and view the evolution of the same field over time. The tool allows you as well to share responsibilities of a case load and connect parent forms with subforms.

Another major strength relies on the possibility to filter and export part of the dataset, based on various requirements.

Use cases where the solution is the most recommended

CommCare is mostly recommended in case where:

- The organisation is willing to dedicate some time to set up the whole organisational system, and there is a really high need for very granular and organised users and role management. However, this is not the simplest interface to set up and deploy,
- Case management, especially of people, is widely used across the organisation. The tools for case management, rather complex to use, should not only be used to monitor instances over time. It needs a dedicated resource in a country that is able to set an efficient dataflow for case management. Even if it remains possible to do simple, one shot surveys, it might not be worth using CommCare, as a main tool for this purpose,
- The organisation agrees that CommCare has access to all PII data on the platform, as it is not possible to restrict their access to the supplier (via form encryption as other solutions would).

Pros & Cons

Pros	Cons
ORGANISATION	
Centralised management of users, roles, and surveys. Surveys can be organised in folders and sub-folders. Variety of roles and possibility to create custom roles. Strong monitoring of form modification.	*No distinctive features.*
USER EXPERIENCE	
Multiple languages in platform and the mobile app. Data can be filtered before export on various criteria.	**CommCare does not use XLSForm** but can use Xforms.
DATA QUALITY	
Possible to bulk edit/clean data online (in bulk). (Re-)**importing data is easily possible**.	*No distinctive features.*
DATA PROTECTION	
Possible to select field to de-identify data before export. Possible to delete submission in bulk. Possible to have date of closure for a specific case. Data encrypted on the mobile app, at rest on the server.	**Dimagi cloud is hosted in USA.** Possible to encrypt specific forms with a pair of keys, but shared with the service provider.
CASE MANAGEMENT	
Advanced possibilities for case management: It's possible to track subjects over time, on both the platform and the mobile app. It's possible to have data synchronising the two ways (server to mobile app and vice versa).	*No distinctive features.*

3.4.3. KOBOTOOLBOX

Tested version: 2.020.51 (server) & v1.29.0 (app), on December 2020.

KoBoToolbox is a data collection platform created by the company KoBo Inc. The solution emerged from a joint initiative between OCHA, Harvard Humanitarian Initiative (HHI) and the International Rescue Committee (IRC). It is particularly developed for humanitarian actors in emergencies and difficult field environments, although not specialised in any sector, it can be used for various assessments, monitoring and other data collection activities. The company is based in Cambridge (USA) and has 15 staff. They support 58 projects in Africa, 12 in South America (plus all countries and territories of Central and North America) and 51 in Asia.

It's a free open-source tool, available to all, with a worldwide community supporting via a forum and raising issues to the developing team. The solution has its own mobile application named "Kobo Collect". Organisations can decide to use the OCHA server or to host their own Kobo server.

Strengths and weaknesses

Having interesting features and being able to adapt and develop new ones quite quickly is the overall strength of KoBoToolbox.

KoBoToolbox stands out in the user experience section. The interface is quite user friendly, as each survey is one project and all elements (form, dataset, report and users) are stored within each project. The second core strength for this solution is the standardisation, for having a question library. This feature allows the user to set questions as "template" and then pick existing – more or less – complex questions among them, probably the most advanced solution on that feature. The tool is also based on the XLSForm standard, which makes it compatible with all other tools using the same standards.

KoBoToolbox has some way to go regarding the organisation aspect, missing to meet key requirements. There is no organisational layer for survey administration and no way to group surveys into folders, and there is no centralised view of all users' access settings. The only way to manage users and roles is by project, which means that the settings for user access on two different projects allocated to the same users must be configured twice, once per project page. Progress could be made as well on the case management side, on the benefits for interviewees category. As for now, it's not possible to cross reference data between forms hence follow up of data over time is manual and requires quite an intense manual workaround. Case management is not possible.

Use cases where the solution is the most recommended

KoboToolBox is mostly recommended in a case where:

- The organisation wants to give priority to a tool that is used by almost all major organisations in the humanitarian sector. It would ensure maximum ability to cooperate with partners, e.g., in case of joint assessments,
- The organisation is ready to follow up on roles and central management of surveys outside of the platform. Indeed, users can be managed in a central manner when the server is self-hosted, however there is no central management of roles and they cannot be synced from MS Active Directory,

- The organisation is mostly conducting simple, or one-shot surveys that does not require longitudinal data collection, which requires dynamically pulling data from one survey to another,
- Considering that PII is by default not encrypted at rest, and that form encryption in general implies severe limitations to the use of data online, the organisation would be willing to use a self-hosted set up to apply protection measures (such as encryption) to its own server.

Pros & Cons

Pros	Cons
ORGANISATION	
Well **designed, easy-to-use survey template library**.	Except when self-hosting the server, **no central management of users**. **No organisational approach to manage user permissions and access**: permissions are attributed to single surveys and can vary from one survey to another. No folder organisation. No predefined roles, only permission attributed to each user. Cannot group field users in teams for partial field deployment.
USER EXPERIENCE	
Multiple languages in platform and the mobile app. **Uses the XLSForm standard.**	Data cannot be filtered before export.
DATA QUALITY	
Possible to bulk edit/clean data online (in bulk).	(Re-)**importing data is not possible**.
DATA PROTECTION	
Possible to delete submission in bulk. Possible to encrypt forms with a private set of keys.	*No distinctive features.*

CASE MANAGEMENT	
No distinctive features.	**Longitudinal data collection or case management is not yet available**; it is not possible to link two surveys together.

3.4.4. MAGPI

Tested version: v.6.2.5 (app), on December 2020.

Magpi is a data collection tool developed by The DataDyne Group, LLC since 2003. Its applications are in various sectors such as microfinance, energy, education, governance, health, and supply chain. The team is composed of 10 to 15 staff spread between the United States and Kenya. Since the beginning, Magpi has been used in over 170 countries worldwide.

The DataDyne Group solution is not open source and they have three plans available: a free basic plan, and two paid plans Pro and Enterprise. They have their own mobile application called "Magpi+".

Strengths and weaknesses

Magpi tool has some strong key features that makes it an interesting tool, including for instance the advanced search function across surveys (scanning form names, date, owner and tags). Although case management is not really possible in Magpi, it is possible to embed surveys within each other and link simple mother and sub-forms.

However, the solution did not come through in the following categories:

- Magpi software has progress to make in the data quality category. Basic requirements, such as limits of characters to ensure data quality were not met. The solution met only partially some requirements regarding the integration of the tool, such as export formats and the ability to export filtered dataset,
- In parallel Magpi does not allow the use of the XLSForm for questionnaires, probably limiting cooperation with other organisations.

Use cases where the solution is the most recommended

Magpi is mostly recommended in case where:

- The organisation is aware that the tool is not compatible with other tools, meaning it would be quite a drawback when needing to cooperate with partners, e.g., in case of joint assessments,
- Teams can be set at one level across the organisation, sub groups can be organised through survey access,
- The organisation is mostly conducting simple, or one-shot surveys that does not require longitudinal data collection, but needs to link several forms together,
- The organisation agrees that Magpi has access to all PII data on the platform, as it is not possible to restrict their access to the supplier (via form encryption as other solutions would),
- There is a necessity to have granular control of roles (e.g., related to the collection of PII data). However, the organisation is aware that there are only three predefined roles.

Pros & Cons

Pros	Cons
ORGANISATION	
Centralised management of users, roles, and surveys. Compatible with a central active directory, such as Microsoft AD. Variety of roles and possibility to create custom roles. Advanced search bar across surveys. Strong monitoring of forms modifications. It's possible to set forms as templates and share across specified users. (but not in a specific folder).	**No folder organisation** for surveys but tag system that can be quite efficient to replace the folders system.
USER EXPERIENCE	
Multiple languages in platform and the mobile app. Individual or group of questions can be uploaded from Excel, but **not the full form**. Data can be filtered before export according to some metadata or selected manually.	Not possible to run a multi-language survey. **Not compatible with the XLSForm standard.**
DATA QUALITY	
(Re-)**importing data is easily possible**.	**Basic validation settings**, having a question appear based on previous answers, are **not available**. Nevertheless, skipping a question is possible. Regular expression (REGEX) constraint is not available. **Not possible to test and preview surveys.** **Surveys are automatically deployed.** Bulk edit of data is not available.

DATA PROTECTION	
Possible to delete submission in bulk.	**No Form encryption.**

CASE MANAGEMENT	
Possibilities for longitudinal data collection. (Limited). There is a functionality of embedded forms: mother form to which subforms can be attached, but works only if collected on the same device.	No 2-way synchronisation, for dynamic update of case list on the mobile app. No visualisation over time on the platform.

3.4.5. MOBENZI RESEARCHER

Tested version: v A-1.8.2-i (82) (App), January 2021.

The Mobenzi platform is owned by the Mobenzi company that was created in 2007. Their offices are located in the Netherlands and in South Africa and their team is composed of 28 staff. They support organisations in 40 countries.

Mobenzi is not an open-source platform but they provide the XLSform compatibility for paid plans. Their plan comes in three: the basic plan that is free, essential and standard that are paid plans. They have their own mobile application.

Strengths and weaknesses

Mobenzi solution has some advanced features that make the solution very interesting to look into. For instance, it has a very granular and advanced role management system, and XLSform compatibility. Though case management is not really possible in Mobenzi, it is possible to embed surveys within each other and link simple mother and sub-forms.

However, key elements of the assessments were not found, such as the platform being available only in English.

Standing out of the crowd for its strong data quality attributes, Mobenzi offers very detailed logging changes made to the dataset. The actual change, made by whom and when are the information available to check any edits. The user can also insert a comment as well. Regarding the data protection aspect, Mobenzi has some weaknesses, mostly for not meeting the requirements, such as the bulk deletion of data for instance.

Use cases where the solution is the most recommended

Mobenzi is mostly recommended in case where:

- The organisation is willing to dedicate some time to set up the whole organisational system, and there is a really high need for very granular and organised users and role management. However, they cannot be synced from MS Active Directory,
- Teams and their dedicated space can be set at one level across the organisation, sub groups can only be organised through folder access. However, this is not the simplest interface to set up and deploy,
- The organisation mainly conducts simple or one-off surveys that do not require longitudinal data collection, but needs to link several forms together.
- There is a need to follow up on users, devices and activity log (e.g., for complex and very autonomous teams),
- The organisation agrees that Mobenzi has access to all PII data on the platform, as it is not possible to restrict their access to the supplier (via form encryption as other solutions would).

Pros & Cons

Pros	Cons
ORGANISATION	
Centralised management of users, roles, and surveys. Possible to group users in teams for partial deployment. Variety of permissions. Strong monitoring of forms modifications.	Surveys are organised by project with no sublayers. No predefined roles, only permission attributed to each user.
USER EXPERIENCE	
Uses XLF Form (only for enterprise account). Data can be filtered before export according to metadata (date status, field workers, languages and sources).	**Platform and mobile app only available in English.**
DATA QUALITY	
Strong tracking/monitoring of changes made into the data submitted.	(Re-)**importing data is not possible.** Bulk edit is not available.
DATA PROTECTION	
No distinctive features.	*No distinctive features.*
CASE MANAGEMENT	
Possibilities for longitudinal data collection. (Limited). There is a functionality of embedded forms: mother form to which subforms can be attached, but works only if collected on the same device.	No 2-way synchronisation, for dynamic update of case list on the mobile app. No visualisation over time on the platform.

3.4.6. ODK

Based in the United States, Get ODK Inc is the company behind the Open Data Kit solution. The solution is used in 195 countries. The team is composed of 8 staff. ODK is an open-source tool which means anyone can contribute to the code and there is a mobile application associated with: "ODK Collect". The plans are all paid ones (basic, professional and enterprise) but by choosing to self-host it, it's free.

Strengths and weaknesses

A strength for the solution is the organisational aspect, with projects and forms organized within them.

The ODK software allows for flexibility in data encryption, as it is possible to encrypt both forms (with a private pair of keys for the organisation) and entire projects, where the encryption is managed by the software provider.

The tool is also based on the XLSForm standards, which makes it compatible with all other tools using the same standards.

Despite its wide distribution and high popularity across all sectors Open Data Kit solution did not provide all the key features expected.

ODK does not meet requirements linked to case management since it does not provide a viable solution for case management. It currently requires some manual steps and two-way synchronisation is not available. For instance, it is possible to do a baseline/endline survey with the preload of a csv file. In terms of user experience, the only export format available is csv, and filtering is only available on the metadata of submitted forms, not the form content.

Finally, it is to be noted that ODK central does not come with a form builder, in the central platform. Forms must either be designed in XLSForm or through an external tool (ODK Build).

Use cases where the solution is the most recommended

ODK is mostly recommended in case where:

- The organisation is willing to set up the whole organisational system, and there is a really high need for very granular and organised users and role management. However, they cannot be synced from MS Active Directory,
- Teams and their dedicated space can be set at one level across the organisation, sub groups can only be organised through folder access,
- The organisation is mostly conducting simple, or one-shot surveys that does not require longitudinal data collection, which requires dynamically pulling data from one survey to another,
- The organisation is ready to follow up on surveys design and templates outside of the platform as there is no folder-like structure on the platform,
- The organisation needs flexibility with regard to encryption of projects and forms. Indeed, the solution offers several encryption possibilities: encryption of forms via a private key pair (limiting access to the data from the platform) and encryption of certain sensitive projects managed by the supplier.

Pros & Cons

Pros	Cons
ORGANISATION	
Centralised management of users, roles, and surveys. Variety of roles and possibility to attribute custom permissions to users.	Surveys are organised by project with no sublayers.
USER EXPERIENCE	
Multiple languages in platform and the mobile app. Uses **XLSForm standard**. Data can be filtered before export based **on metadata only**.	**No form builder on the platform** (possible to use the external app ODKBuild). **No table view to see submitted data.**
DATA QUALITY	
No distinctive features.	(Re-)**importing data is not possible.** Bulk edit is not available.
DATA PROTECTION	
Data can be encrypted at rest on the platform at project level (key shared with supplier) **or at form level** (encryption end to end by the organisation).	**Not possible to delete** submission in bulk.
CASE MANAGEMENT	
No distinctive features.	**Longitudinal data collection or case management is not yet available**; it is not possible to link two surveys together.

3.4.7. ONA

Tested version: v2.4.9 (onadata), in January 2021.

ONΛ

<u>Ona Data</u> is the data collection tool from the Ona Systems LLC company. Its team is composed of 67 staff spread between Kenya, South Africa and the United States. Users and organisations from all over the globe have used the tool.

Ona is not an open-source platform, but is compatible with the XLSform standard and can be used with the ODK collect mobile application. Ona data offers a free plan, and three paid plans (standard, pro and enterprise).

Strengths and weaknesses

Ona's strength lies in unique features as well as being compatible with the XLSform standard. The category compatibility with partners meets all the requirements. Especially, the tool allows a dataset to be imported via csv. The user chooses between adding new or editing existing records, or overwriting and replacing all records. The platform also allows for central management of users and surveys are organised by project, but it is not possible to add more organisational layers to the structure.

On the down side, the online platform is not available in French. An important drawback is also to be reported in terms of Data Quality: publishing a survey is not a specific action, surveys are automatically deployed by default (although it is possible to change them to "draft" afterwards).

Regarding the benefits for interviewees, the tool did not either meet all requirements. As many other tools, it is not able to provide case management, although the "pulldata" function can be used as a work around. This will not work dynamically since two-way data synchronisation is not available.

Use cases where the solution is the most recommended

Ona is mostly recommended in case where:

- Teams can be set at one level across the organisation, sub groups can be organized through project access,
- The organisation wants to give priority to a tool that is used by major organisations in the humanitarian sector. It would ensure maximum ability to cooperate with partners, e.g., in case of joint assessments,
- The organisation is mostly conducting simple, or one-shot surveys that does not require longitudinal data collection, which requires dynamically pulling data from one survey to another,
- Considering that PII is by default not encrypted at rest, and that form encryption in general implies severe limitations to the use of data online, the organisation would be willing to dedicate time and resources of capacity building to set up protection measures (such as encryption) to surveys. All work on the dataset will not be possible through the platform when enabled,
- There is a necessity to have granular control of roles (e.g., related to the collection of PII data). Defining custom roles for specific surveys would require the technical assistance from the supplier.

Pros & Cons

Pros	Cons
ORGANISATION	
Centralised management of users, roles, and surveys. Variety of roles and possibility to attribute custom permissions to users.	Surveys are organised by project with no sublayers.
USER EXPERIENCE	
Multiple languages in platform and the mobile app. Uses **XLSForm standard**. Data can be filtered before export based on submission dates.	**Web platform only in English.**
DATA QUALITY	
(Re-)**importing data is possible**.	Publishing a survey is not a specific action, **survey is automatically deployed by default**. (but can be set in draft afterward). Bulk edit of data is not available.
DATA PROTECTION	
Possible to delete submissions in bulk.	*No distinctive features.*
CASE MANAGEMENT	
No distinctive features.	**Longitudinal data collection or case management is not yet available**; it is not possible to link two surveys together.

3.4.8. SURVEYCTO

Tested version: v2.70, in January 2021.

Dobility, Inc is the company behind the data collection solution <u>SurveyCTO</u>. The data collection tool has recently developed a case management feature. The team is composed of 15 staff in offices in the United States (Washington DC, Cambridge, and New York), India, Zambia, South Africa, Portugal, and Ukraine. SurveyCTO is used in 165 countries globally.

Funded by users via plan pricing, SurveyCTO is a custom source, based on the open source OpenDataKit. They complemented the ODK platform by adding their own features and mobile application called "SurveyCTO Collect".

Strengths and weaknesses

In this assessment, SurveyCTO is the solution that shows a very qualitative overall strength. It lies in the organisational and user management thanks to a very granular role management, the possibility to designate teams with shared space and organised surveys into folders.

Another aspect is the compatibility with partners, with its full integration of the XLSForm standard.

SurveyCTO meets key requirements in the benefits for interviewees category, regarding their case management feature. It's possible to enroll participants into a project which automatically assigns them unique case IDs, which can be used to track any case over time. The case list is not static: any form can update or add a case.

Data protection is also a strong component of Dobility's solution. Personal Identifiable Information and sensitive data can be anonymised or pseudonymised by the user using a hash function. Encryption is available in the system with public/private keys. By default, the entire form is selected to receive this treatment, but it's possible to uncheck encryption for questions manually.

The software has an easy and reliable integration to allow automated processing with its ability to export a filtered dataset based on various requirements.

The tool's main weaknesses are not being available in French and not having the possibility to inspect data in a tabular view directly on the platform.

Use cases where the solution is the most recommended

SurveyCTO is mostly recommended in cases where:
- Teams and their dedicated space can be set at one level across the organisation, sub groups can only be organised through folder access,
- There are mixed needs for one-shot data collection survey, longitudinal data collection using cross-reference between surveys and case management,
- There are regular needs for either longitudinal data collection or simple case management, and where there is a dedicated resource in a country that is able to set an efficient dataflow for case management,
- PII & sensitive data are often collected and hence need to be encrypted, while other fields of the same survey need to be accessible in the platform or in external tools for visualisation,

- There is a necessity to have granular control of roles and to define custom roles for specific surveys (e.g., related to the collection of PII data).

Pros & Cons

Pros	Cons
ORGANISATION	
Centralised management of users, roles, and surveys. SurveyCTO is compatible with a central active directory, such as Microsoft AD. Surveys can be organised in folders and sub-folders. Variety of roles and possibility to create custom roles.	*No distinctive features.*
USER EXPERIENCE	
Uses the **XLSForm standard**. Data can be filtered before export on various criteria.	**Web platform only in English.** The **data cannot be viewed on the platform via a tabular view**, it's not a full table.
DATA QUALITY	
(Re-)**importing data is possible**. Strong tracking/monitoring of changes made into the data submitted.	Bulk edit of data is not available.
DATA PROTECTION	
Users' access is controlled by the combination of a user role and a folder – subfolder or survey. **It is possible to encrypt even only specific fields in one survey, through form encryption.** Possible to use the hash function to do that while designing a form to pseudonymise fields. Possible to delete data in bulk.	*No distinctive features.*

CASE MANAGEMENT

There are **case management possibilities**. Forms can be linked together. Registration forms are used to open a case and users can select a case from a list to access the forms associated with each case. The case list is not static: any form can update or add a case.	*No distinctive features.*

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