



Mobile Research Systems

by EACOMM Corporation

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Introduction

Mobile Research or Mobile Market Research refers to the **utilization of Mobile/Smart Phone technologies as a means of data collection**. Using mobile-based applications for field research provides field personnel a powerful yet affordable tool to collect and analyze data in real time and provide immediate feedback on data accuracy and relevance. Mobile research also provides an efficient means of injecting geographical data to any research project due to the built in GPS transponders available in most smart phone devices.

In addition, dropping rates for mobile Internet usage has made it feasible for ‘always connected’ devices to utilize the cloud to not only connect to powerful web services but to communicate and share data with other smartphones, creating a potentially large and geographically dispersed real time data collection system.

In this white paper, EACOMM Corporation highlights recent projects that use Android-based smart phones to conduct various types of research and surveys with a high degree of efficiency, accuracy, and speed at an affordable cost.

Advantages of Mobile Research Systems

Geolocation

Perhaps the key competitive advantage of utilizing smart phones in conducting field research is the immediate availability of geographical data to each and every data point collected. This provides researchers a new dimension in analyzing the data collected with results that can be segmented not only demographically but geographically as well.

Geolocation also provides supervisors a much easier means to monitor their field workers and helps ensure that their staff are where they are supposed to be and that the correct sampling methodology is being followed.

Real Time Data

With mobile research systems, the data can be made available in real time as it is being collected. Dropping mobile data charges coupled with improving bandwidth has made it feasible for always-on devices to transfer data back to the central server continuously.

Real time data means that project supervisors can correct potentially serious issues in data accuracy as they happen. It also provides the project team a means of real time communication with each other over a wide geographical area.

Crowdsourcing

Crowdsourcing is defined as “the practice of obtaining needed services, ideas, or content by soliciting contributions from a large group of people and especially from the online community rather than from traditional employees or suppliersⁱ.” With 1.5 million Android Phones activated every day (as of July 2013)ⁱⁱ, researchers are in a position to design apps that can be used by “volunteers” to gather data that they need. This provides not only large cost savings in data gathering but also gives the researchers a large base of field surveyors to recruit. Social game elements or real world prizes can be used to encourage hundreds, if not thousands of people, to collect data in potentially a global setting.

Improved Data Accuracy

By designing purpose-built applications for data collection, improvements in data accuracy and adherence to collection methodologies can be assured. For example, phone number data accuracy can be assured by automatically checking the number format or by automatically calling the number to check the validity on-site. Another possibility is for an application to dictate on a random basis which respondent to approach to assure that proper data sampling is being followed. Add to this the improvements in accuracy that geolocation and real time data introduces and the result is a far more reliable and efficient survey team.

Common Caveats of Mobile Research Systems

Cost

The migration from ‘pen and paper’ research methods to a fully digital solution entail capital and operational costs. Therefore, it is advisable to conduct a cost-benefit analysis when deciding to utilize mobile research methods for a project. Some key considerations include:

- Savings in terms of faster data collection and analysis vs. the upfront capital and added operational costs
- Need for geolocated data points
- Scale and scope of the research and whether the project can be crowdsourced

At the same time, costs can also be kept down by limiting real time data features and using lower-end Android phones instead of top of the line tablets and branded smart phones.

Despite an initial perception of higher costs, EACOMM's experience in data collecting using purpose built mobile research systems proved to be competitive, if not cheaper, than traditional research methods. The price savings are achieved mainly through faster and more accurate data collection and the need for less staff due to automation of various processes.

Training and User Apprehension

There is often an apprehension when technology is introduced to replace 'tried and tested' methods. No matter how efficient the mobile research system may be, if the end users are not comfortable or even scared to use the system, it will eventually fail to deliver its promised advantages. Thus, it is critical to brief and train users thoroughly in a way that they are fully comfortable with the new system.

In the mobile research systems that EACOMM deploys, user apprehension is a key factor in designing both the mobile and web applications. Simplicity and usability are designed into the user interface from the start to make sure that the target users will adapt easily to the new system.

Surveyor Safety

While this may not be an issue in developed countries or more affluent neighborhoods, market researchers oftentimes are tasked to conduct their studies in less 'desirable' parts of town. Given this scenario, utilization of tablets or smart phones in data gathering may pose a real danger to the safety of the surveyor.

In EACOMM Corporation's more than three years of experience in conducting mobile research, we find that this can be a serious concern, but not without a solution:

- Surveyors are deployed on a buddy-system so they can look after each other's safety.
- Utilization of entry level and smaller Android phones as oppose to using tablets or high end smart phones has proved to be a viable solution in making surveyors less conspicuous to strangers.

EACOMM Mobile Research System

Since 2010, EACOMM has been involved in a number of projects that require the use of a Mobile Research System. Over the years, the system specifications have been tweaked and refined to maximize the advantages of using a mobile research system while minimizing the issues that come up when using this

type of technology. While the various systems that EACOMM has deployed are stand-alone systems custom-built to each project, all are built around two main modules:

- a.) A purpose built Android application to conduct field data collection efficiently and easily.
- b.) A centralized web-based repository where data is stored, edited and analyzed.

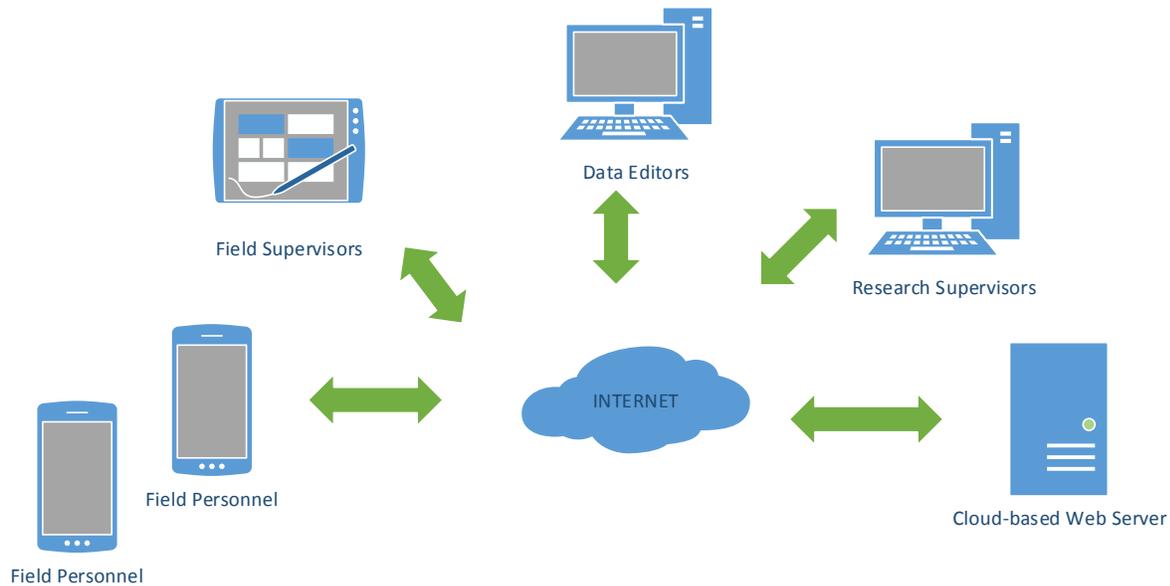


Figure 1: Base System Diagram

Mobile Application

The mobile application is designed to be as simple and robust as possible to facilitate fast data collection and to minimize user mistakes during field operation. Optionally, a field supervisor mode is available for the application wherein the supervisor is privy to real time data on the performance of his field personnel. Key metrics such as number of respondents tackled, tasks achieved, etc. can be presented to users to allow them to know their performance on the field. Some variants are designed to playback various media such as slide shows and videos that can be presented to the target respondents. The mobile application is designed to store data in-device and to sync its data to a web server either on-demand or automatically as Internet access becomes available to the mobile phone.

Android was selected as the preferred platform for the mobile application due to the large number of android-based smart phone and tablet models around, this gives the project managers a broad choice on cost and performance when selecting appropriate hardware.

Web Management

Leveraging EACOMM Corporation’s decade-long expertise in web-based content management systemsⁱⁱⁱ, utilizing a centralized server for data management, editing and storage was the best solution for a mobile research system. The web application, developed in the industry standard **LAMP** platform (**L**inux, **A**pache, **M**ySQL, **P**HP), is designed to accept data from smart phones and store them in a database. Data editors can then scour through the data collected to improve its quality or add additional information to the dataset. The web application can also be a media repository that can send data to the mobile applications such as survey forms and short video presentations.

Finally the web application is designed to automatically collate, format and analyze the data and produce a variety of reports such as XML dumps of the collected data, geographic reports, and detailed statistical analysis of the respondent’s answers.

Case Studies

Business Census

EACOMM Corporation owns and operates one of the largest online business directories in the Philippines: www.PhilippineCompanies.com. In the past, data has been collected through user submissions and via uploading of publicly available business data such as municipal business registrations and other government databases. While these data are inexpensive to collect, the data are often outdated and inaccurate.

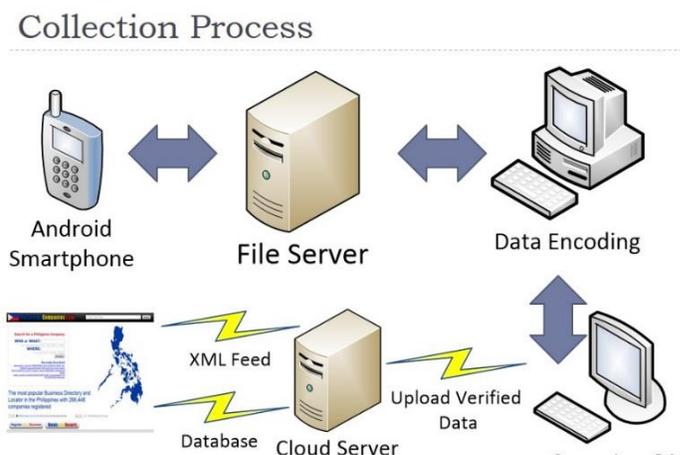


Figure 2: Data Collection Process for PhilippineCompanies.com Business Census

In early 2013, EACOMM conducted a pilot program of an *on the ground census* of business establishments in the cities of Quezon and Taguig in Metro Manila with the objective of improving the accuracy of the business listings. Over a 6 month period, a team of surveyors were deployed across the two cities to collect information on various commercial establishments. Key data collected included business names, category, phone and geolocation. Data collected by the surveyors were sent to a central

repository where data editors reviewed each listing and improved and added data to each. Using smart phones, the surveyors achieved accurate data collection of over a hundred businesses per day (roughly 5 minutes per business). On completion, the more than 30,000 business listings collected were converted to an xml stream used to display them in www.philippinecompanies.com as well as major search engines globally. As a result, a far more accurate data set was collected to represent business in these two cities, with up-to-date phone information and geolocation accurate to within a 10 meter radius.

Transit Planning

In 2012, EACOMM Corporation was approached by Google Southeast Asia to assist them in collecting *Metro Manila mass transit data for Google Maps*^{iv}. To accurately and quickly gather data on the multiple bus and rail routes across the metropolis, EACOMM developed a custom Android Application to log and trace trips in real time while riding in various transit modes. The application was designed to be quick and simple to use with a feature for taking photos of key stops and station information. These trip logs were then uploaded to a web application where they were translated to GTFS Format. GTFS or General Transit Feed Specification is an open standard for representing public transportation schedules, fares and geographical information^v. The GTFS Feed data was in turn submitted to Google to be included in Google Maps. Through the utilization of mobile research technologies, it is estimated that as much as 3 months was cut from the project schedule and the project was delivered using far less man-power than initially anticipated.

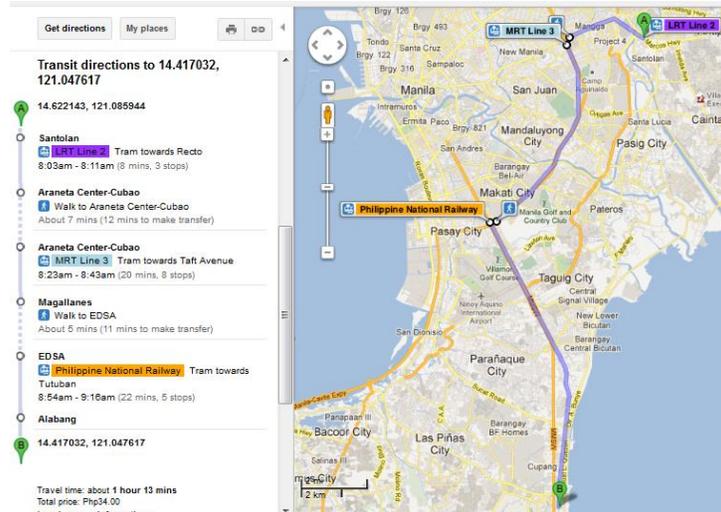


Figure 3: Philippine Mass Transit Data as seen in Google Maps.

Currently, the following information are available via maps.google.com.ph:

- Train data for MRT, LRT1, LRT2, and PNR
- Train data for PNR from Manila to Ligao.
- Intercity bus data for over 20 routes from Manila to neighboring provinces

- Metro Manila bus data for over 20 routes within the metropolis
- Intercity ferry data for 3 routes

Agent Presentation Tool

In 2010, EACOMM was approached to develop a content managed Android Application that can be utilized by field sales agents to present new products and conduct market research. Via a centralized web application, marketing managers can upload survey forms, videos, slide shows and documents and assign these to various field agents. The agents then logs into an Android application and synchronizes with the central server to download content assigned to them. The agent can then proceed to present the various multimedia presentations and request the respondents to fill up survey forms. On completion, these survey forms are uploaded to the central server where they are collated, analyzed and summary reports are automatically generated.

This system was groundbreaking in its utilization of fully customizable survey forms, its flexibility in displaying multiple media formats and its ability to generate detailed usage logs.

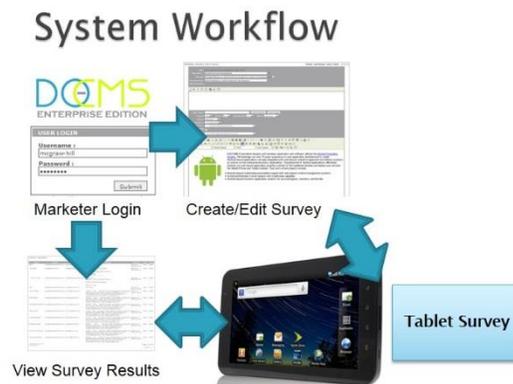


Figure 4: Android Survey Workflow

Future of Mobile Research

Over the next few years, mobile computing and Internet access will become even more ubiquitous than they are now. As desktop computers took away interest from traditional media such as newspapers and television, so will smartphones and tablets eat up the time spent on desktops. As such, location awareness and “always available” Internet connectivity will be the norm.

With this scenario, EACOMM Corporation posits that most if not all forms of market and field research will become mobile-based or mobile-assisted. We also foresee that crowdsourced data gathering has the potential to overtake the more traditional research methodologies in the coming years. Already, we volunteer large aspects of our social, political and consumer behavior through social media and various mobile apps and these are all analyzed by marketers and researchers.

Governments, on the other hand, can take advantage of these applications to improve its services to its populace. For example, traffic, demographic and geolocation data gathered through mobile or crowdsourced research can be used to rationalize infrastructure planning.

For More Information

Find out how EACOMM Corporation can help your organization setup your own **Mobile Research System**.
Contact us at:

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ⁱ <http://www.merriam-webster.com/dictionary/crowdsourcing>

ⁱⁱ <http://www.androidcentral.com/larry-page-15-million-android-devices-activated-every-day>

ⁱⁱⁱ <http://www.do-cms.com>

^{iv} <http://blog.eacomm.com/archives/583/metro-manila-train-schedules-now-available-in-google-maps>

^v <https://developers.google.com/transit/>