

# Budgets, Batteries, and Barriers

## PDA Implementation Issues for NGOs

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## **Abstract**

What prevents humanitarian non-government organizations (NGOs) from adopting technology that can potentially improve their operations and response time? Global Relief Technologies, a producer of hand-held data collection devices, asked a New York University Capstone Team to research the barriers to NGO PDA adoption. The Capstone Team conducted 17 interviews with nine organizations, from animal welfare to humanitarian relief, to discover the financial, technical, and institutional barriers preventing groups from implementing technology into their field programs. The Team also conducted two case studies of groups currently using PDA technology, one domestic and one international, to explore in depth the factors that went into the decision making processes these groups followed in their technology acquisition decisions.

## **List of Acronyms**

**AIR:** American Institutes for Research

**ASPCA:** American Society for the Prevention of Cruelty to Animals

**DRT:** disaster response team

**GPS:** global positioning system

**GRT:** Global Relief Technologies

**IMC:** International Medical Corps

**IRC:** International Rescue Committee

**IT:** information technology

**NGO:** non-governmental organization

**PC:** personal computer

**PDA:** personal digital assistant

**QAT:** Quick Assessment Team

**UNICEF:** United Nations Children's Fund

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## 1. Executive Summary

Over the past decade, both for-profits and nonprofits alike have had unprecedented access to new technologies to streamline any number of processes. As mobile phones, laptops, and even GPS have entered everyday parlance, field programs still often rely on pen and paper, or a hybrid of cell phones, laptops, and paper to record important findings. With technology readily available, and increasingly affordable, the Capstone Team was contracted to uncover why international emergency relief organizations have been slow to embrace personal digital assistants (PDAs), and other similar devices, in their work.

The Team interviewed domestic and international nonprofit organizations, primarily those with a presence in the field of emergency relief. To the Team's surprise, even those organizations that were very active in PDA use, with one exception, were not using them in emergency programs. Groups working in international relief that use PDAs instead overwhelmingly opted to use them for health and other non-emergency surveys.

While implementation varied by sector with younger relief areas, notably animal welfare, still developing protocols for programs, time and again interviewees cited the same barriers to more widespread use: technology, training, budgets, program fit, and, often unstated yet implicit, organizational culture. In addition, while these same impediments came up in several interviews, groups seemed unaware of one another's efforts to overcome them.

Interviewees who had current or past experience with PDAs seemed relatively well versed on the technology options available to them; it was groups with very limited exposure who expressed greater concern about the usability of different new technologies. Those who had positive outcomes from initial tests were more interested in pursuing technology in future programs and seemed less concerned about overcoming the common barriers in the study.

For those groups with pilots that failed, the technology was often blamed when human error and lack of planning were more often the underlying factors to the outcome. Organizations with positive outcomes supported internal drivers of new technology, better planned survey and questionnaire designs, involved the technology provider at their initial planning stage, and found ways to secure the necessary resources and funding. When the right technology components are used, combined with the other key determinants: funding, technical support, training, and good attitudes, technology can support programs more efficiently and improve program effectiveness significantly.

The technology discovery process can help uncover ways of making existing programs more efficient. The use of new technology can often make organizations reevaluate the way they have always done things. However, the ability to reevaluate existing systems and programs could be hamstrung by keeping data in-country. The international organizations using PDAs in the field are primarily keeping data in-country and either not transmitting it to headquarters, or doing so on an ad hoc basis by emailing Excel spreadsheets to headquarters for longer-term decision making.

Training was a barrier for all groups, regardless of size. People, not technology, seemed at the core of this barrier. Tech-savvy staff are essential for training, and if they are in short supply or the lead staffer on a program is resistant to change, successful pilots and training of others is unlikely. Groups working exclusively in disaster response were most challenged by training, relying on a diverse group of volunteers and conducting training at the site of an emergency. Time constraints posed enormous training barriers. With a limited number of PDAs to go around, training all staff who might benefit from exposure to new technology proved daunting for many interviewees. While one group created new teams specifically to use PDAs and train others on-site in the field, it seemed that creating online training modules would be a benefit to all.

Cost was less of a hurdle than originally expected. Funding was a barrier for smaller groups more often than larger groups, who had greater access to unrestricted budgets or large enough programs that they were able to see the cost of technology purchases as a small percentage of overall program expenses. Technology solutions can be expensive investments and some may be tempted to create ad-hoc systems to work around the barrier of up-front expense. However, if it does not work well, groups may have to spend more time and effort trying to fix it and customize it, in which case the better value proposition is to go with the mature product that has already been tested and improved upon for other organizations.

Interviewees did not see much of an advantage in comparing the costs of traditional survey methods - paper and pencil - with PDAs. Several groups in the sample reported unexpected benefits of PDA use in their programs that could prove harder to quantify in a cost-benefit analysis, such as increasing staff accountability in surveys. One of the best solutions from the research is the additional budget line for innovation, to be used at the discretion of the program director.

Ultimately, all of these aforementioned barriers can be addressed if the organization supports innovation. Without this backing, budgets and new line items will not be approved and technology champions, who the research showed were vital to the promotion of new technology, will not be able to find the support or buy-in they need from headquarters and the field. For those looking to undertake a test with PDAs or any other new technology, the interviews show the importance of advance planning. Taking the time to research options with an eye to long-term program use, planning budget lines for initial and ongoing costs, developing training plans, and reaching out to colleagues for buy-in at headquarters and the field all help build a stronger base of support for the eventual pilot test, and the research showed that the outcome of the initial test is crucial.

## **2. Introduction**

The Capstone Team was originally contracted by Global Relief Technologies (GRT) to research the best practices for the use of PDA technology in non-governmental organization (NGO) field programs, with a focus on emergency relief organizations. However, upon review of the literature, the Team discovered that the actual technology applications were relatively well documented. What was less documented were the underlying root causes of organizations' purchasing paralysis when it came to adopting new hand-held technology. In fact, there are numerous factors that go into an organization's decision process, including the organization's past experiences, the people within the organization, and more traditional constraints like budgets and staff time. Therefore the Team changed focus and instead began to research how organizations make the decision to purchase PDA technology and what barriers they encounter along the way.

Too often new technologies are introduced without full consultation or agreement of staff, and fall into disuse, resulting in loss of investment as well as disillusion among users. New technologies may require significant time and money investments. Additionally, staff accustomed and committed to existing techniques may be resistant to adopting new methods and using the new technology.

Initial research showed a purchasing paralysis, where managers face several dilemmas when deciding whether to implement PDAs. Either they have too many choices and are confused about which product is the best one for their situation, or they see little incentive to adapt technologies that have not been field tested or configured to their missions, and are more comfortable utilizing existing procedures. There are also possible cost concerns, including training and support requirements, but especially with information technology (IT), where a new product improvement is just around the corner and whatever they buy now may be out-dated in six months.

There are two main parts to this research: a qualitative study based on interviews with personnel at selected NGOs, and two case studies, consisting of in-depth interviews. Interview questions were based upon themes identified through a literature review. Based on the interview findings, research, and case studies, the project aims to identify barriers to technology adoption and make recommendations for overcoming purchasing paralysis.

### **3. Research Question**

NGOs and emergency response organizations need information and data immediately when responding to emergency situations, and PDAs have the potential to greatly expedite the process. However when the Team started interviewing organizations, the majority of NGOs are not using the technology in emergency settings. Instead most have decided to trial PDAs in non-emergency settings. Agencies have a variety of options available to them when it comes to data collection, however they face cost barriers in acquiring and configuring technology, problems with training, and technology that is not as user-friendly as needed. As a result, organizations often do not know which technology will best serve their purposes which results in a purchasing paralysis. Agencies also often revert to time-tested methods and are unwilling to utilize new technologies.

The goal of this project is to research the root causes of managerial purchasing paralysis in the NGO community regarding the procurement of new technologies, and to provide recommendations on how decision-makers can overcome this paralysis to implement the right technology that will make their data collection more efficient.

### **4. Literature Review**

From reading the existing literature and speaking with emergency response professionals, the question of which product to use in which situation does not appear to be a primary concern for NGOs considering whether or not to adopt new technology. Field workers have extensive practical experience in extreme heat, extreme cold, floods, and other hardship situations. Thus the assumption is that any device they use in the field will have to meet minimum durability requirements. Most NGOs have a general awareness of the types of existing products on the market, from hand-held PDAs to traditional cell phones. The larger concerns appear to center around training, cost, and usability.

In the last few years, the humanitarian assistance field has begun to organize best practices around the use of technology for data collection during emergencies. The existing literature has attempted to document best practices in this field, the most notable ones being the Global Symposium +5 on Information for Humanitarian Action, which looks at technology as one of the seven main categories of best practices around information management in emergencies, and the United Nations/Vodafone report which is specifically around the use of mobile technology in humanitarian assistance situations.<sup>1</sup> Several international NGOs have also organized amongst themselves to share their experiences and even, in the case of the United Nations project DevInfo, develop their own software. In addition to best practices, these and other existing reports have clues to what some of the barriers are for nonprofits in adopting technology, and may be contributing to their purchasing paralysis.

The temptation to gather too much information appears to be a very real issue when using new technology in the field.<sup>2</sup> The freedom from pen and paper, the novelty of the device, and the desire to get the absolute

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<sup>1</sup> Global Symposium +5 on Information for Humanitarian Action, Final Report. Palais des Nations, Geneva, Switzerland, 22 – 26 October 2007.; United Nations Foundation and Vodafone Group Foundation. Wireless Technology for Social Change: Trends in Mobile Use by NGOs. 2008.

<sup>2</sup> Global Symposium +5 on Information for Humanitarian Action, Final Report. Palais des Nations, Geneva, Switzerland, 22 – 26 October 2007.

most use of a costly new investment can lead workers to incorporate too many variables into their now-digital questionnaires, resulting in collection and back end analysis of data that has no direct bearing on the immediate project at hand. This can lead to delays in decision making when attempting to use the collected data for planning next steps. It is crucial that the data collection objectives are as clearly defined as they would have been with paper surveys. While uploading information potentially frees field workers from the tedious task of manually entering data from paper questionnaires and can cut down on the number of human errors that come from transcribing data, such automation can have its own consequences as data may not be as thoroughly reviewed and scrutinized until later in the analysis. Furthermore, while the PDA's ability to dynamically provide information as it is being recorded enables a level of decision-making for supervisors in real time, if the information being entered is incorrect, the decisions that are made can also have serious consequences.<sup>3</sup>

The growing use of mobile phone technology in even remote developing countries has considerably lowered barriers to the adoption and implementation of technology, but barriers still exist and mobile networks are often compromised during crises events. Moving beyond traditional survey formats necessitates training of both new and existing staff. In international settings, field teams often employ members of the local population to assist with surveys and relief programs; technical proficiency is not a given for all national staff. Additionally, multi-lingual requirements for survey development, collection and reporting are issues when working internationally.<sup>4</sup> Domestic emergency responders face other training barriers, largely related to time constraints.

Organizations need to commit money and time to information preparedness to allow for more effective data collection, management, and analysis to support strategic and operational response, including investing in appropriate technologies, equipment, and training.

## **5. Research Methodology and Normative Framework**

### **5.1. Research Design and Setting**

#### 5.1.1. Research Design

This study was designed using questions developed from the literature review and with input from outside resources. The interviews consisted of 10 main questions, with related sub-questions for several of them. All questions were open-ended, however in the case of four questions, a list of common barriers as discussed in the literature was sometimes used as a prompting aid for the interviewee. The interviews included several domains such as technology features, training issues, export/import status, funding issues, cost effectiveness measurements, and others. (Please see Appendix for entire list of questions). Interviewees were asked for their perspectives on the use and implementation of hand-held technology. At the beginning of the interview, respondents were asked a question about their general experience using PDA technology to gauge their technological savviness.

#### 5.1.2. Interview Procedure

The interviews were conducted mostly in person or via teleconferencing, with two questionnaires administered by email due to time difference constraints. For the teleconferences, the interviewer read (and explained further if necessary) each question to the participant and a recorder took accurate notes of the participant's answer. In-person interviews were tape recorded with permission. For questions 2, 5, 7, and 8 sometimes the interviewer had to prompt the participant by reading out loud the list of possible barriers. The interviews were conducted over a ten week period, and each interview took approximately

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<sup>3</sup> Hartnett, Mike. Global Relief Technologies. Email Correspondence. 31 March 2009.

<sup>4</sup> Ibid.

one hour to complete. A verbal consent script was read to the participant and consent was obtained from them prior to administering the questions. When participants requested anonymity, their preference was duly noted.

### 5.1.3. Sampling and Study Subjects

The interviews were conducted with employees of domestic and international NGOs and the United Nations Children’s Fund (UNICEF). The sampling method used was convenience sampling, and a sample size of 17 people at nine organizations was used due to limitations in time and resources. Participants were selected based on the researcher approaching them and subsequently their willingness to participate. Canvassing emails were sent to leading humanitarian organizations that had emergency relief programs. The cold calls resulted in one positive response; the majority of the study participants were found through personal and professional networks.

### 5.1.4. Piloting the Questions

The questions were piloted in November 2008, in a phone interview with one person who worked in an NGO. During the pilot, length of time to complete the interview was computed, which was one hour. In addition, the participant was asked about the clarity of the questions, and whether or not any topics were not being adequately addressed. The interviewer also asked whether or not the questions were straightforward and if there were any other comments. Feedback and suggestions were noted.

## **5.2. Participants**

<b>Name</b>	<b>Organization</b>
<b>Paul Amendola</b>	International Rescue Committee
<b>Eric Bagdikian</b>	Code 3 Associates
<b>Emmanuel d’Harcourt</b>	International Rescue Committee
<b>Peggy Goetz</b>	Aeras Global TB Vaccine Foundation
<b>Colleen Hardy</b>	International Rescue Committee
<b>Bill Hyde</b>	International Medical Corps
<b>Dara Johnston</b>	UNICEF Indonesia
<b>Debbie Landis</b>	International Rescue Committee
<b>Kelly Bradley</b>	International Medical Corps
<b>Kay Mayfield</b>	Code 3 Associates
<b>Becky McCorry</b>	American Red Cross
<b>Lee Steuber</b>	Save the Children
<b>Greg Tune</b>	American Red Cross
<b>Roy Zimmermann</b>	American Institutes for Research
<b>Anonymous Staff Member</b>	American Society for the Prevention of Cruelty to Animals
<b>Anonymous Former Staff Member</b>	International Medical Corps
<b>Anonymous Staff Member</b>	UNICEF Thailand



## 6. Discussion of Findings

### 6.1. Program Decisions

The use of PDAs for data collection is more efficient in some program areas than others. The organizations interviewed are primarily using PDAs for health, education, and emergency response surveys. All organizations that have used or are using PDAs first pilot tested them. The outcome of the pilot tests was a key determinate for whether or not PDAs were rolled out for field data collection.

#### 6.1.1. Cost, Logistics, and Language in Emergency vs. Non-Emergency Programs:

One of the most interesting findings from the interviews was that the international organizations that conduct emergency response operations are not using PDAs for those activities, but rather using them for country-specific health programs. Since emergencies may be infrequent in any given country, it is often more cost effective to store PDAs in a central location that can be sent out with emergency response teams when the need arises, as in the Red Cross model. As explained in the Red Cross case study below, the Disaster Services Department houses all of the PDAs at headquarters, and sends them out with their Quick Assessment Teams when responding to a large disaster. That way headquarters controls the use of the PDAs, centrally collects and analyzes all of the data, and is responsible for all of the maintenance and support costs.<sup>5</sup>

However, when it comes to international organizations, the logistics of such operations become more complicated, not only because of greater distances but particularly because the surveys would need to be translated and uploaded on the PDAs in whatever the local language(s) of the affected areas are. Concern over survey language came up repeatedly in interviews. Translation can add to the cost and the speed of response, depending on the organization's PDA support capacity. This is a time-consuming process, particularly because of NGO survey guidelines which require surveys to be translated into a language if as few as 5% of the survey population *might* speak that language.<sup>6</sup> "So in a place like Ethiopia, where you are getting refugees from all over it's an even bigger problem."<sup>7</sup> For those organizations currently relying on one in-house support person, like the International Rescue Committee (IRC), it is unlikely the turn-around speed necessary for using PDAs in emergency situations would be sufficient. For those organizations utilizing a vendor such as GRT, the idea is more feasible, albeit at potentially higher costs. Depending on users' familiarity with technology and the user-friendliness of the technology, there may or may not be time to properly train local staff on how to use the PDAs in the middle of an emergency situation.

#### ***Word of Caution:***

While PDAs are helping improve the efficiency of certain programs or units within large organizations, none of the interviewees are using them across the board in a coordinated fashion. As the field moves more in the direction of PDAs, groups should be aware of the potential costs down the road that could emerge if different stand-alone systems need to be integrated. The better approach might be to standardize technologies across programs from the beginning. Greg Tune and Becky McCorry at the Red Cross discussed the difficulties of dealing with so many legacy systems because local chapters organically implemented their own forms of various technologies prior to the effort of headquarters to bring everyone onto the same network. Today, only 40% of chapters are on the main network.

<sup>5</sup> McCorry, Becky and Greg Tune. American Red Cross. Personal Interview. 6 January 2009.

<sup>6</sup> Amendola, Paul. International Rescue Committee. Personal Interview. 20 February 2009.

<sup>7</sup> Landis, Debbie. International Rescue Committee. Personal Interview. 20 February 2009.

In contrast, it can be very cost effective to use PDAs over paper surveys in specific country programs that will routinely use the devices to collect data. PDAs only need to be shipped to a country once, and there is more time to allow for surveys and data to be translated into the necessary languages. The international organizations using PDAs in the field are primarily keeping data in-country and either not transmitting it to headquarters, or doing so on an ad hoc basis by emailing Excel spreadsheets to headquarters for longer-term decision making. Even when data is being sent back to headquarters, it is being kept within the unit and not incorporated into an organization-wide database.

The use of an organizational enterprise system is more important for emergency response situations, since headquarters often needs the data to make decisions about how much assistance to send. Enterprise systems take much more planning and wider institutional buy-in than it takes for one program or unit to implement PDAs to make their own work more efficient. The Red Cross is collecting all national disaster information at headquarters since decisions on emergency response and aid levels come from headquarters. Save the Children, the one international organization interviewed that is considering implementing PDAs for use in emergency response, recognized that real time data transmittal and an enterprise-wide system would be necessary for expanding PDA use into emergency operations.<sup>8</sup> At the time of this writing, Save the Children is in the early stages of investigating PDA use for emergencies and hopes to roll them out within the year.

While transmitting data in real time is more crucial for emergency response, PDAs can also speed delivery of other services, even without wireless connectivity. Save the Children had two examples of this. In the first, their health program in Bolivia uses PDAs to collect data on infant vitamin deficiencies. Prior to implementing PDAs, data was collected by paper in remote villages and then driven up to 8 hours to La Paz, where the information would be analyzed and a diagnosis given. That information would again need to make the long trip back to the village, often a month after the initial visit. Not only did this waste time in treating the infant, but also required the mothers to remember to bring the infant back a month later to receive treatment. Once Save the Children implemented PDAs, data could be entered into the PDA, and the device would provide a diagnosis, allowing treatment to be administered immediately.<sup>9</sup> In another example from Save the Children, a food distribution program in Bangladesh used PDAs equipped with bar code scanners that allowed them to give away food allowances at a much faster rate than would have been possible without them.<sup>10</sup>

#### 6.1.2. Quantitative vs. Qualitative Data Collection

The interviewees generally felt that PDAs are more efficient for surveys with mostly, or all, quantitative questions. For surveys or interviews that are looking for qualitative responses, answers are still easier for users to write on paper than it is for them to type into a PDA with a keypad or stylus. Many health surveys collect more quantitative than qualitative data so therefore PDAs are more efficient for use in health programs than they would be in programs that conduct a lot of qualitative surveys. Also, programs that collect a lot of data would experience more cost and time savings on paper, printing, copying, and data entry than those that deploy shorter surveys, such as mortality surveys.

An interesting question that arose out of the interviews is whether the program should drive the technology or vice versa. At the IRC, their use of PDAs resulted in the alteration of their large health surveys to exclude qualitative questions. According to Emmanuel d'Harcourt, "We've gradually taken away the qualitative questions because nobody analyzes them anyway. The bottom line is...large household surveys are not a great way to do qualitative information...people think it's OK to ask 500 people 'why have you not used your bed net,' when it's really better to ask 15 people that. Have really

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<sup>8</sup> Steuber, Lee. Save the Children. Telephone Interview. 6 February 2009.

<sup>9</sup> Ibid.

<sup>10</sup> Ibid.

good interviewers who know how to probe and can get much richer information than by doing it in a really poor way over a large amount. The effect PDAs have had is to cut those questions out because it's harder to incorporate them."<sup>11</sup> So as a result of implementing PDAs, their surveys have become more efficient in general. While qualitative data is still very important, d'Harcourt believes there are more efficient ways of collecting it, such as gathering impressions of surveyors immediately after they return from collecting data. While it is important to use technology that fits a program's needs, the technology discovery process can potentially highlight ways of making programs more efficient. The use of new technology can often make organizations reevaluate the way they have always done things. One example is with the Red Cross. According to Tune, when they worked with GRT to design the PDA surveys, they did not simply computerize their existing forms; rather GRT worked with them to highlight what information was really needed and to determine the questions and logic for the PDAs.<sup>12</sup>

### 6.1.3. Pilots: Programs, Products, and People

Conducting pilot tests of the PDAs were essential for the adoption of PDAs for those organizations currently using them. Deciding which program to pilot PDAs with can have a large impact on whether or not PDAs are rolled out. Bad experiences in pilot tests, caused either by faulty technology or human error or resistance can have a big influence on whether or not an organization or unit decides to adopt the technology.

If influential programs, or those with influential managers, are chosen as pilot programs, other programs or units might be more inclined to follow upon successful completion of the pilot. As discussed in the section on champions, leaders like Emmanuel d'Harcourt at the IRC are needed to push for the pilots and for larger roll-out, or the projects die. Which department the champion is located in will also influence which, and how many programs adopt PDAs. On the flip side, if there are influential people in a unit that are technology averse, that can seriously stall any roll-out efforts.

Pilots are also important for tweaking the product so that it works in an ideal way for the organization. An extreme example of this is with the Red Cross, who piloted their PDAs with a member of GRT embedded in the Quick Assessment Team over a period of several months, available to make any modifications necessary in the moment. Choosing the right product to pilot is important; if the technology chosen is not appropriate for the program's needs, or is not user-friendly enough, staff resistance can start to build from the outset. That is not to say that organizations can expect to find the perfect solution off-the-shelf, and time and budget for modifications to the software should be planned for. However, organizations should consider the pros and cons of deploying a mature product developed by outside vendors against those of creating their own in-house solution. Organizations might assume that building their own solution will be cheaper to do, but if it does not work well, and they have to spend more time and effort trying to fix it and customize it, then it is possible that the better value proposition is to go with the mature product that has already been tested and improved upon for other clients. However, if a lot of customization is needed and there is someone on staff at the organization with those abilities, then it could be less expensive to do in-

#### ***Import/Export Restrictions:***

Several of the organizations interviewed are still technically in pilot stages. When asked whether or not import/export restrictions were a barrier to wider implementation, many people responded as if the idea had not occurred to them. One exception was Save the Children, who said that it is actually a large barrier. The United States has rules on what can be exported where, and some countries like Sudan have their own sets of restrictions on the importation of technology. This is important for organizations to be aware of if they ever want to expand past pilots, and/or move PDAs between country programs.

<sup>11</sup> d'Harcourt, Emmanuel. International Rescue Committee. Personal Interview. 20 February 2009.

<sup>12</sup> McCorry, Becky and Greg Tune. American Red Cross. Personal Interview. 6 January 2009.

house. If an in-house technical expert is needed to support PDAs, as in the case of Paul Amendola at the IRC, then organizations also need to factor those staff costs into their decision making process.

In the case of the International Medical Corps (IMC), PDAs were piloted in 2004 for a monitoring and evaluation project in Afghanistan.<sup>13</sup> Due to human error, poor survey set up, and training issues, data was lost and resulted in the project being set back. As a result, IMC stopped using the PDAs shortly thereafter and, five years later, is still not using any PDA technology. The negative pilot experience is still brought up as a reason not to implement PDAs at IMC, even by staff who joined the organization well after the pilot was conducted.<sup>14</sup> On the other hand, the other organizations using PDAs today completed successful pilots that showed enough benefit to allow them to expand their use. The importance of a successful pilot for adoption of PDAs suggests that it is worth investing extra time and resources into choosing the right product, the right people, and the right program to participate in the pilot.

#### 6.1.4. Key Findings

The Team expected that more of the organizations using PDAs would be using them for emergency response operations, where time is of the essence and PDAs have the promise of speeding response time. However, due to the logistics involved with international emergency response, it seems that it may be more cost effective to use PDAs over paper surveys in specific country programs that will routinely use the devices. It was widely agreed that PDAs are still better for quantitative data collection, and that for now, paper is still easier to use for pure qualitative research. However, during the interview it did occur to the IRC that having a voice recorder on the PDA might be useful for qualitative research, while not reducing any data entry time or costs. It is important to use technology that fits the needs of the program, but the technology discovery process can also potentially highlight ways of making program surveys more efficient. Regardless of which program will be implementing the PDAs, it is important to plan the pilot test and the roll-out carefully, to ensure that the technology is appropriate for the program and so that both the technology and human components of the implementation go smoothly.

### **6.2. Dollars and Sense: Confronting Budget Barriers**

When it comes to spending decisions in a nonprofit, mission trumps everything else. Allocating more money to core programs and direct service than operations is not only expected by donors and oversight agencies but is central to the organization's purpose for existence. Investing in new technology, software or hardware, can be construed as deciding not to spend that money on direct services. Even when the technology can be used in direct program work, if it is seen as the more expensive option it might be vetoed.

The organizations in the sample that were actively using and testing PDAs funded these pilots and programs in a variety of ways. For the American Institutes for Research (AIR) pilot program in Nicaragua, funding was cobbled together from three other existing grants after the program was underway, while for the program in Honduras the costs of purchase were added to the initial program proposal. Even though the equipment is expensive, because of decreased staff costs it does not prohibitively inflate the grant requests. Another option would be leasing PDAs instead of purchasing them outright or, if purchasing outright, spreading out the purchase costs over several years of a program if applying for a multi-year grant.<sup>15</sup> Several interviewees noted that they would like more flexible purchasing and leasing options from PDA vendors.

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<sup>13</sup> Bradley, Kelly and Bill Hyde. International Medical Corps. Personal Interview. 6 January 2009.

<sup>14</sup> Bradley, Kelly and Bill Hyde. International Medical Corps. Personal Interview. 6 January 2009.

<sup>15</sup> Zimmermann, Roy. American Institutes for Research. Personal Interview. 6 January 2009.

The smaller organizations in the sample seemed to struggle with budget barriers more than larger groups. This might be because these smaller groups have a larger portion of their revenue from fewer restricted grants, smaller overall program budgets, and lack a diverse donor base from which to secure unrestricted funding. Very small groups in the sample often worked with skeleton staffs, relying on volunteers who worked other jobs outside of their program work, and any additional expense was out of reach. Making long-term investment decisions can be harder for any group, not just small ones, when funding is not secure or when the continuation of a program is reliant upon grant renewals. The larger organizations in the sample, such as the IRC, Save the Children, and the American Red Cross, all had access to either unrestricted money within their department, or a budget line dedicated to innovation. They are also used to working with larger program budgets in which the purchase price of PDAs, even if a few thousand dollars, does not take up too large a percentage of program expenses. As d'Harcourt at the IRC said, "Even if you buy the PDA, it's not very costly on the scale of a program."<sup>16</sup>

#### ***Import/Export Expenditures:***

For those groups working in international programs, import and export restrictions may apply to PDAs and other inventory. If programs are short-lived, as they often are in emergency response, and technology is restricted from leaving the country, then that expenditure on PDAs becomes a bigger portion of program costs. Further, the time and effort spent in developing surveys and programming may start to outweigh their usefulness in the field if a new set of devices has to be reset for each use. Organizations working in emergency response might be best served by considering if long-term work is foreseen in a country, and planning for the PDAs to be repurposed for other program needs.

None of the groups interviewed by the Capstone Team had reviewed in-depth their costs of paper and staff hours and salaries compared to data collection on a PDA. The IRC had compared costs in one pilot program in Congo but had thereafter not conducted the comparison again.<sup>17</sup> Roy Zimmermann at AIR found that whether using paper or PDAs, survey materials added up to less than 1% of total program budgets.<sup>18</sup> Uncovering those metrics was not deemed a priority by any organization in the sample. For many, it was considered a given that PDAs would streamline systems and bring added benefit. Decision makers in the sample know that staff time and energy in collecting data on paper surveys, and later entering them into another system, has its own expenses in salaries and energy that could be spent on analysis or problem-solving. Emmanuel d'Harcourt at the IRC summed it by saying, "You have to not value people's time at all" to make the decision to choose paper over technology in most cases.<sup>19</sup> Another IRC staffer expressed a similar sentiment, stating that she was trying to embrace the PDAs in her programs because data entry just takes so long otherwise.<sup>20</sup> Time savings was also brought up by Zimmermann at AIR when describing a program to replace Scantron tests with PDA entries for school exams in Central America. Manually collating and scanning the exams requires upward of one hundred local staff and can take up to eight weeks. Even considering purchase price, the time savings by PDA entry could be a significant advantage.<sup>21</sup>

Of those using PDAs, decision-makers in the sample have determined that the additional benefits the PDAs would bring to their program outweigh concerns of up-front cost. PDAs also have the potential to increase data security, reducing the risk of damage or loss of large numbers of paper surveys. This is more the case for those groups using PDAs that wirelessly transmit data in real time and slightly less so with PDAs that have to be manually connected to computers to transfer data, since there is also the chance of

<sup>16</sup> d'Harcourt, Emmanuel. International Rescue Committee. Personal Interview. 20 February 2009.

<sup>17</sup> Ibid; d'Harcourt, Emmanuel, and F Mulumba. "Using Personal Digital Assistants in post-conflict health surveys: Potential and constraints." *Global Public Health* Volume 3. Issue 3 (2008).

<sup>18</sup> Zimmermann, Roy. American Institutes for Research. Personal Interview. 6 January 2009.

<sup>19</sup> Ibid.

<sup>20</sup> Hardy, Colleen. International Rescue Committee. Telephone Interview. 14 January 2009.

<sup>21</sup> Zimmermann, Roy. American Institutes for Research. Personal Interview. 6 January 2009.

the PDA being lost or damaged before the data transfer occurs. However, most PDAs are made to be very durable and are much easier to transport than large amounts of paper. Interestingly, while the PDA option would seem to provide more security from data loss, the less technologically savvy interviewees seemed to think that having paper backups was safer than using technology which could fail. That sentiment was not shared by groups who have used PDAs extensively.

Several groups in the sample reported unexpected benefits of PDA use in their programs that could prove harder to quantify in a cost-benefit analysis, such as increasing staff accountability in surveys. In the IRC's Congo program, analysis of time spent per interview uncovered some problems with the way in which one interviewer was conducting his surveys; his time spent per interview was dramatically shorter than those of his colleagues.<sup>22</sup> Time and GPS stamps also increase accountability, ensuring that surveyors have actually gone to the locations they claim, and also provide more accurate mapping for organizations that may previously have relied on local directions or informal staff maps.<sup>23</sup> Roy Zimmermann at AIR reported that he found the multiple other benefits of PDAs to be a big selling point for funders, who become more open to the purchase cost when they understand how many purposes a single device can serve.<sup>24</sup>

Still, even if initial purchase and set up costs were not an immediate concern, and other ancillary benefits could be found, funding long-term running costs can be difficult. The Red Cross stated that, for them, funding a one-time capital charge is easy, but building a monthly fixed cost into the budget is harder. Further, while technology saves time, it does not necessarily save on labor. Greg Tune expressed some frustration that, often, senior management thinks that technology can operate independently, not realizing that they need people to work computers.<sup>25</sup> Even if headquarters could manage the running costs, local Red Cross chapters might only be able to come up with the funding for the capital expense, something Tune and his team have to take into consideration when making technology recommendations for the organization.<sup>26</sup> Supporting long-term use of PDAs in field programs was also a concern for Roy Zimmermann at AIR. Program design for PDA use in educational testing and evaluation in Honduras and Nicaragua calls for the PDAs to be left in-country for permanent use by Ministry of Education staff and teachers. The upfront costs of hardware and training could be covered by grants, but certainly drive up program costs and make roll-out of programs in other countries more difficult. Long-term support for maintenance of the devices is another challenge, and either requiring local governments to take on that expense or trying to provide that support through AIR staff is not always feasible or ideal. Zimmermann stated that ongoing support from the international community would be necessary for the Ministry to continue using the PDAs.<sup>27</sup>

### ***Budgets and Contracts***

For many nonprofits, time can be lost trying to find the lowest-cost solution for their program needs. A formal bid period costs staff time and resources, but is often an organizational requirement. For its pilot test, the Red Cross avoided this process by selecting a technology already in use by the U.S. government, and therefore on an approved list of government vendors, along with its stated purchase cost. While this government list may be more applicable for the Red Cross than other groups, it may provide groups with an easy reference point in looking for established vendors and price points.

[https://www.gsaadvantage.gov/advgsa/advantage/main/start\\_page.do](https://www.gsaadvantage.gov/advgsa/advantage/main/start_page.do)

<sup>22</sup> d'Harcourt, Emmanuel, and F Mulumba. "Using Personal Digital Assistants in post-conflict health surveys: Potential and constraints." *Global Public Health* Volume 3. Issue 3 (2008). 339.

<sup>23</sup> Zimmermann, Roy. American Institutes for Research. Personal Interview. 6 January 2009.

<sup>24</sup> Ibid.

<sup>25</sup> McCorry, Becky and Greg Tune. American Red Cross. Personal Interview. 6 January 2009.

<sup>26</sup> Ibid.

<sup>27</sup> Zimmermann, Roy. American Institutes for Research. Personal Interview. 6 January 2009.

All of the groups interviewed work on emergencies and/or programs in various locations. For emergency response groups, where and when technology needs to be deployed is unknown and hardware needs to be deployed along with staff with little notice. For the Red Cross, these unknowns prompted the decision to have headquarters purchase PDAs instead of their chapters. Not only does this keep the deployment decision in the hands of headquarters, it also keeps the operating costs of the technology lower for the chapters, who will have access to them when needed but will not have to pay for maintenance.<sup>28</sup> The vagaries of emergency response also no doubt play into the organizational decisions to get the most out of PDAs by using them in health programs and other areas with ongoing survey needs during calmer times.

### 6.2.1. Key Findings

Budget barriers are not insurmountable, but working around them may require advance planning during budget season. A large factor in overcoming the budget barrier is whether or not the purchase of technology is seen as an investment decision or a straight expense. One of the best solutions from the research is the additional budget line for innovation, to be used at the discretion of the program director. Whether this funding is used for ongoing consulting services to expand pilot tests and knowledge amongst field offices, like it is at Save the Children, or for initial procurement of products as with the Red Cross, having funds year to year allows for expansion into more programs. Similarly, IRC programs have access to some unrestricted funding, though it is open to all programmatic and operational uses, and not set aside for innovation. Once funding for innovation, testing, or a position is built into a budget and approved, barriers are lower for including it in subsequent years. While not an instant fix, these ideas might allow organizations to plan for testing a few years down the road.

Program managers and directors should examine their total program costs to see just how big of an impact the purchase of PDAs or other technology would really have on their overall costs. Most users the Team spoke with described the low total percentage of budget these investments were in their programs while bringing substantial additional benefits to their work. It is possible that the cost of technology is often over-stated, leading to further discussion of its use being immediately tabled by management.

## **6.3. Technology Barriers to PDA Adoption**

Organizations using PDAs for data collection in the field have reported mixed experiences. The Team found that organizations that have success stories know how to use the technology as a tool to improve their business processes, regardless of the types of surveys and programs they conduct. From its research, the Capstone Team found that organizations with positive field experiences took similar initiatives: they have given authority to their decision makers to support technology adoption, carefully formulated their surveys and better formatted their questionnaires, involved technology providers at the survey design stage, were more relaxed with their procurement policies, provided the necessary resources and funding, and conducted pilot testing.<sup>29</sup> More importantly, the organizations allowed the program's needs to drive the technology selection and utilized the technology to support their programs.

### 6.3.1. Adapting PDA Technology for Program Use

PDAs combined with the right software packages can serve multiple purposes, including: “1) cross-sectional quantitative surveys where baseline and follow-up data are collected from a population 2) longitudinal studies where subjects are interviewed multiple times, and 3) true transactional databases...[in which] records can be viewed and updated in real time.”<sup>30</sup> Hence, this technology can be

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<sup>28</sup> McCorry, Becky and Greg Tune. American Red Cross. Personal Interview. 6 January 2009.

<sup>29</sup> Aday, Lou Ann. Designing and Conducting Health Surveys. 2nd Edition. California: Jossey-Bass Inc, 1996. 19.

<sup>30</sup> Apicella, Louis. Innovative Research Strategies: The Use of Handheld Computers to Collect Data. Population Council, 2009.

used as a tool for better communication and information management, accurate monitoring and evaluation, as well as effective program assessment. Depending on the nature of the organizations and programs, PDAs are expected to support various functions. For example, the IRC uses PDAs for health assessments including coverage and mortality surveys.<sup>31</sup> Save the Children and UNICEF use pictures taken with PDA cameras to provide more accurate reports.<sup>32</sup> The Red Cross uses the PDAs for four types of assessments: damage, area, preliminary and detailed damage assessments.<sup>33</sup> Each assessment requires a number of specific outputs, such as historical records, housing profiles, maps, graphs and charts.

PDA software and hardware can be customized to meet specific program needs. By integrating program needs and technological capacity, survey designers can better program software to serve specific purposes. Furthermore, with sufficient resources, including: funding, technical support, user training, appropriate software and hardware packages, as well as the right attitudes, technology can support programs more effectively and improve overall field experience.

### 6.3.2. Justifying Investment

In order to introduce innovation in organizations, champions of new technology are faced with a common challenge: how to convince the decision makers that the use of a certain technology would improve their business processes by allowing them to save time and money. Success stories can help justify the use of technology as an investment with profitable returns and/or additional tools that contribute to fulfilling their missions. Moreover, when these justifications result in more flexible funding for the technology, it becomes more feasible for the technology to be supported with the key resources it requires. Although the organizations interviewed had not performed cost-benefit analyses, decision makers and end users have great expectations for PDA technology to significantly reduce inefficiency and improve program assessment and reporting. Based on the literature review and interviews, the Team identified key features and functions of PDA technology that help surveyors conduct better assessments in the field.

### 6.3.3. Preferred Features

Data collection using PDAs has benefited the organizations interviewed by shortening the time needed to conduct surveys, permitting faster data transmissions, reducing data loss and duplication, increasing data accuracy and consistency of information, and avoiding costs associated with paper copies and manual data entry. The features of the selected software must function in such a way as to help program managers and surveyors achieve those benefits.

Despite the differences in specific program requirements, the organizations interviewed had similar responses when asked about the features they require in the field. Organizations expect to have hand-held technology that will make their job simpler and more efficient. From the interviews conducted, the Capstone Team found that the surveyed organizations look for elements described below vis-à-vis their PDA use.

#### *Easy-to-Use Software Functions*

The interviewees identified that selecting the right software is key to ensuring that the surveyors are getting the right features and functions installed on their PDAs. The IRC's initial purchasing step started with the selection of the software based on peer recommendation, then the operating system required by

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<sup>31</sup> d'Harcourt, Emmanuel, and F Mulumba. "Using Personal Digital Assistants in post-conflict health surveys: Potential and constraints." *Global Public Health* Volume 3. Issue 3 (2008). 329.

<sup>32</sup> Steuber, Lee. Save the Children. Telephone Interview. 6 February 2009.; Johnston, Dara. UNICEF Indonesia. Email Interview. 6 January 2009.

<sup>33</sup> McCorry, Becky and Greg Tune. American Red Cross. Personal Interview. 6 January 2009.



the chosen software, followed by the selection of the hardware that could run the chosen operating system.<sup>34</sup> Preferred software features depend on the requirements of the survey designs and questionnaire formats. Among some the functions mentioned in the interviews and literature review are: easy uploading and downloading to and from the PDAs and personal computers (PCs), compatibility with statistical packages such as SPSS, more space for open-ended text, and GPS systems for more accurate location and mapping.<sup>35</sup> “Time and GPS stamps helped increase accountability and provided some of the best directions UNICEF ever had on where schools were actually located. This allowed them to provide accurate directions to teams who were going out to do field surveys on the schools.”<sup>36</sup> PDAs should also allow users to easily navigate around a survey, and to be able to skip required questions and return to them later. The skip/jump feature can also allow organizations to combine multiple complex surveys into one. A surveyor could select a category of selections using drop down menus instead of manual skip patterns in a paper survey. This would shorten the data entry process time by up to 20%.<sup>37</sup>

In the field, where tech-savvy personnel often are not available, uploading data from PDAs to personal computers can be challenging. Therefore, it is important to have software with mechanisms that allow for simple data transport. Uploading the survey data from a hand-held to a PC might create significant delays for data analysis if the system is not user friendly. Other preferred features mentioned by AIR and IMC interviewees include security and coding functions to protect sensitive data, and the ability to save data on a network so as to provide different security groups access to the data.<sup>38</sup>

All interviewees mentioned that language barriers present a major issue in data collection in the field, especially for programs involving multi-cultural and language backgrounds, such as the IRC international refugee missions. In a situation where English is not the local language, the PDA system might not work efficiently if it is not available in the local language(s). The "0" and "1" coded answers may work for quantitative responses but not with qualitative assessments.<sup>39</sup>

### *Hardware Preferences*

Surveyors in the field prefer to have practical use of their hand-held devices. The interviewees, such as UNICEF, indicated they take pictures during field assessments, and use cell phones to communicate, especially when internet access is not available. Therefore, hand-helds with cameras, PDA functions, and mobile phone capabilities are highly preferred. There are multiple options for transferring data onto computers from a PDA: through a wired USB connection; storing data on removable flash drives; or wireless synchronization using satellite phones, regular cellular lines, or through text messaging systems. When data collection is conducted on PDAs not

### *Operating Systems*

The growing familiarity with PDA smart phones and the Windows Mobile operating system have made it easier for surveyors to use PDA technology. The simplicity of the operating system or the platform should be discussed at the initial stage to ensure that the end users will be able to use the system without excessive training. Another system to look out for is Google's innovative new Android platform, which has the potential to gain traction for many reasons, particularly for its connection with Google Earth.

<sup>34</sup> d'Harcourt, Emmanuel, and F Mulumba. "Using Personal Digital Assistants in post-conflict health surveys: Potential and constraints." *Global Public Health* Volume 3. Issue 3 (2008). 329.

<sup>35</sup> Apicella, Louis. *Innovative Research Strategies: The Use of Handheld Computers to Collect Data*. Population Council, 2009.

<sup>36</sup> Zimmermann, Roy. American Institutes for Research. Personal Interview. 6 January 2009.

<sup>37</sup> Apicella, Louis. *Innovative Research Strategies: The Use of Handheld Computers to Collect Data*. Population Council, 2009.

<sup>38</sup> Zimmermann, Roy. American Institutes for Research. Personal Interview. 6 January 2009.

<sup>39</sup> International Medical Corps. *Afghan Family Health Book Final Report*. 2005.

connected to a cellular or satellite network, data cannot be transmitted until personnel return to their field offices. In regard to health assessments conducted in non-emergency situations, the lack of live data might not serve as a key barrier to data collection since the data is often not as time sensitive and is sometimes analyzed first in-country before being sent to the central database.<sup>40</sup> This technology limitation is being researched and an open source solution is now available through working group sponsored by UNICEF.<sup>41</sup>

For surveyors who need to be on the road for several days or are based at field offices without generators, battery life could become a major barrier to faster data transfer. In emergency relief efforts, extra strong batteries, which last for a maximum of several days, would not be sufficient.<sup>42</sup> Alternatives are available, such as buying extra batteries, but these would cost more. Solar chargers may give sufficient power for cell phones, but not for PDAs, and cannot be used at night.<sup>43</sup> Despite this barrier, most interviewees still find that battery life issues are manageable and in many cases, do not create major problems. Multiple interviewees also mentioned that they can charge PDAs with car batteries. The IRC buys extra batteries for each PDA, allowing users to not charge their batteries for 3-4 days.<sup>44</sup> Subsequently, devices that have a battery hardwired into them are not preferred.<sup>45</sup> In addition, in order to avoid losing data, some organizations, such as Save the Children, have opted to use flash cards.<sup>46</sup>

Most interviewees prefer PDAs over laptops because they do not want to carry extra weight when they are conducting surveys. Aeras Global TB Vaccine Foundation uses laptops instead of PDAs because they are used in field clinics and therefore do not need the mobility associated with PDAs. Save the Children explained that staffers felt safer carrying PDAs in less safe areas because, unlike a laptop, a PDA can easily be hidden or tucked away in a pocket.<sup>47</sup>

PDAs must prove durable in extreme weather conditions and everyday wear and tear. Save the Children indicated it uses ruggedized PDAs to protect the devices from extreme weather, drops, and other demanding environmental factors. However, ruggedized PDAs cost more and are much heavier than their standardized counterparts. There are similar concerns regarding data input devices. Some interviewees reported that entering data using a small or less sensitive stylus are problematic.

#### 6.3.4. What Current PDA Technology Cannot Solve

Without sufficient knowledge about the technology and its functions, program managers and end users can easily confuse human-caused errors with technological problems. Most of the limitations to technology solutions can be traced back to human factors. No matter how sophisticated the technology, without the sufficient support and the right attitudes, it is impossible for it to provide solutions for broken business processes. PDA use can improve the quality and speed up the availability of data but will not be able to prevent delays in analysis if personnel do not take immediate action to analyze the survey data.

Literature reviews and interview responses both confirmed that the available software for PDA data collection use works better for quantitative rather than qualitative assessment.<sup>48</sup> IRC surveyors found that

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<sup>40</sup> d'Harcourt, Emmanuel. International Rescue Committee. Personal Interview. 20 February 2009.

<sup>41</sup> UNICEF. Web4Dev Knowledge Sharing Track Workshop.

<sup>42</sup> d'Harcourt, Emmanuel, and F Mulumba. "Using Personal Digital Assistants in post-conflict health surveys: Potential and constraints." *Global Public Health* Volume 3. Issue 3 (2008). 330.

<sup>43</sup> Tune, Greg. American Red Cross. Personal Interview. 6 January 2009.

<sup>44</sup> d'Harcourt, Emmanuel, and F Mulumba. "Using Personal Digital Assistants in post-conflict health surveys: Potential and constraints." *Global Public Health* Volume 3. Issue 3 (2008). 330.

<sup>45</sup> Apicella, Louis. Innovative Research Strategies: The Use of Handheld Computers to Collect Data. Population Council, 2009.

<sup>46</sup> Steuber, Lee. Save the Children. Telephone Interview. 6 February 2009.

<sup>47</sup> Ibid.

<sup>48</sup> Apicella, Louis. Innovative Research Strategies: The Use of Handheld Computers to Collect Data. Population Council, 2009.; d'Harcourt, Emmanuel. International Rescue Committee. Personal Interview. 20 February 2009.

“writing long answers in the PDA was cumbersome...and progressively reduced the number of open-ended questions in later interviews.”<sup>49</sup> In addition, while available software is able to translate languages it may not be able to interpret cultural meanings of responses during qualitative surveys. Problematically, even these limited features will not run adequately on PDAs.<sup>50</sup>

Organizations like IMC that had difficulties with implementing PDAs in the field have not had the required resources, adequate levels of planning, or positive attitudes towards technological advancement. Without sufficient planning, such as well-thought survey designs and program needs assessments, the PDA technology will not be able to provide adequate solutions.

### 6.3.5. Lessons Learned: Improving the Field Experience

From the analysis of the interviews and literature review, the Team found several key factors that would help program managers install the right functions and features on PDAs.

#### *Better Planning*

Taking time to address the needs of the programs and to design the survey carefully is a critical step to ensure the right PDA software is selected. Investing time to synchronize the client's needs and the requirements and logistics of the system is critical before deploying PDAs in the field. During his interview, Greg Tune of the Red Cross explained that their staff worked with the technology provider, GRT, during the survey design stage to align the software logic with the program expectations.<sup>51</sup>

Pre-testing the questionnaires is important to ensure that only essential questions are programmed into the PDAs. Eliminating unnecessary questions can save significant time and help surveyors reduce skipped questions and data entry errors. Designers of needs assessment surveys must clearly define what they are trying to assess in deciding which health questions to ask in their study.”<sup>52</sup> In Sierra Leone, before the pilot testing, the IRC drew up an analysis plan and eliminated questions that were not essential for decision-making.<sup>53</sup> This process produced more efficient and accurate data collection. In addition, it also reduced the technological limitations of handling open-ended responses. By pre-testing the questionnaire, the IRC was able to “reduce the number of questions for which ‘Other-please specify’ was an answer option.”<sup>54</sup>

On many occasions, technical problems encountered by the interviewees could have been avoided by having the right survey design or questionnaire format. The client and technology provider should discuss the kinds of responses they are anticipating and the logic behind the survey. When the design does not meet data collection needs, or there are doubts regarding the user friendliness of the technology, organizations might choose to switch back to manual data collection or a hybrid model, or use paper surveys as a backup.<sup>55</sup> This would create inefficiencies, making it harder for the champions of technological advancement to justify the use of certain technologies.

Despite their importance, the brain-storming sessions and the synchronization processes to create electronic versions of questionnaires may be time-consuming and thus organizations may not always see

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<sup>49</sup> d'Harcourt , Emmanuel, and F Mulumba. "Using Personal Digital Assistants in post-conflict health surveys: Potential and constraints." *Global Public Health* Volume 3. Issue 3 (2008). 331.

<sup>50</sup> Jadkowsky, Mark. *Global Relief Technologies*. Email Correspondence. 30 March 2009.

<sup>51</sup> McCorry, Becky and Greg Tune. American Red Cross. Personal Interview. 6 January 2009.

<sup>52</sup> Aday, Lou Ann. Designing and Conducting Health Surveys. 2nd Edition. California: Jossey-Bass Inc, 1996. 19. 214.

<sup>53</sup> d'Harcourt , Emmanuel, and F Mulumba. "Using Personal Digital Assistants in post-conflict health surveys: Potential and constraints." *Global Public Health* Volume 3. Issue 3 (2008). 330.

<sup>54</sup> Ibid. 331.

<sup>55</sup> Amendola, Paul and Debbie Landis. International Rescue Committee. Personal Interview. 20 February 2009.

the need nor have time to perform these tasks in emergency situations or where resources are limited. With better planning and experience, the lead time between planning, programming, and the actual deployment can be shortened.

#### *Availability of Back-End Technical Support*

Technical support in the field and headquarters is a key factor that contributes to the efficient use of PDA technology in humanitarian relief. As described by Paul Amendola of the IRC, technical support by phone is not sufficient, especially when dealing with large time differences between countries.<sup>56</sup> In addition, 24-hour phone support also requires staff to stand by. Timing becomes even more urgent during emergency phases. Unfortunately, organizations tend to view IT support as an additional source of expenditure, and therefore it is not prioritized. Organizations with well managed programs and better IT planning functions or IT departments would be able to provide technical solutions easier and faster.

#### *Troubleshooting Technical Issues*

Sorting out technical issues from other issues is key to providing solutions to technological problems in the field. The question is whether the issues encountered in the field can be traced back to human errors, organizational culture, or technological issues.

#### *Document Experience and Lessons Learned*

Documenting the technology outcomes and successes in the field could help organizations find ways to identify the weaknesses or failures of PDA technology implementation and create solutions to those issues. Furthermore, documentation of success stories could provide justification for purchasing PDAs and the diversion of resources to implement their use.

#### ***Looking at the “Total PDA Solution”***

Most organizations interviewed neither had a “full-process” plan on how to implement the PDA technology nor knowledge of all the aspects that are part of a total PDA solution. The various parts of the total solution are: help planning for PDA implementation, assistance with survey design and logic, customized PDA software and hardware, wireless data transmittal capabilities, data hosting, and tools and reports for analyzing data.

#### 6.3.6. Key Findings

While technology has its limitations, its constant and exponential evolution ensures that present limitations will be overcome in the near future. PDA software features continue to be enhanced and are thus now better able to provide solutions in real world settings at a negligible cost. In addition, the growing familiarity of cellular phones, Windows operating system, as well as the game aspect of PDA manipulation, makes it less intimidating for the end users regardless of geographic regions.<sup>57</sup>

Technology is perhaps the easiest of the factors in the field to control and manage. The combination of a better understanding and articulation of program needs and knowledge of PDA technical logic should result in more developed planning and IT support, thus improving surveyors’ experiences in the field.

### **6.4. Training Barriers**

The literature review had shown that quite a few of the barriers to PDA use, such as lack of time to learn, lack of formal training and education, difficulty installing software, and lack of knowledge of PDA uses

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<sup>56</sup> Amendola, Paul. International Rescue Committee. Personal Interview. 20 February 2009.

<sup>57</sup> d'Harcourt, Emmanuel, and F Mulumba. "Using Personal Digital Assistants in post-conflict health surveys: Potential and constraints." *Global Public Health* Volume 3. Issue 3 (2008). 332.

and applications could be addressed by additional training. The interviews showed that most NGOs had training barriers that prevented the use of the PDA to its fullest potential. The four biggest barriers for training can be categorized by time constraints, budgetary cost constraints, institutional constraints, and the issue of an individual's 'learnability' bias.

#### 6.4.1. Time Constraints

NGOs are enthusiastic about the idea that technology can help them achieve their missions more effectively and better serve their constituencies. But often they forget to plan for the time or money it will take to have their staff trained so that they can get the most out of their investment. In budgets that must be constantly reviewed and justified, managers may be under pressure to start using the new technology purchase right away, not allowing time for thorough training and planning.

In other cases, lack of an internal technically savvy staff member to conduct trainings, or remote working conditions can prevent hands on training. A staff member at the American Society for the Prevention of Cruelty to Animals (ASPCA) recalled how GPS technology was being used for emergency animal evacuations during Hurricane Katrina, but "there was nobody who taught me how to use the technology. I had to spend a few hours in the evening figuring stuff out, playing with it...[but I'm] still not sure I am using it to its fullest capability because I didn't get any training."<sup>58</sup>

Some organizations have a perception that training takes time away from mission-driven activities. Groups working in acute stages of emergency response and those who utilize volunteers as part of these relief operations reported not having the luxury to set aside time for in-depth trainings. An ASPCA staff member stated that, "looking at the overall team, all DRT (disaster relief team) members are volunteers and have other full time jobs. It can be hard enough getting people who can get the time off from work to spend a few weeks responding to a disaster."<sup>59</sup> Training on the site of an emergency has to be a five minute review of "here's the radio channel we're working on. Now go."<sup>60</sup> In these situations, staff and volunteers are often highly trained in emergency response procedures so training can afford to be so basic. The introduction of training on technology or equipment would require changes to this model, but a "train the trainer" strategy, as implemented by the Red Cross, could address that particular training barrier.

Like the ASPCA, the Red Cross also had to respond quickly to the challenges of data collection for Hurricane Katrina. However, their approach to training was quite different as they developed an internal "train the trainer" program as part of their larger team restructuring around their new PDA technology. A core response team, stationed at headquarters in Washington, D.C., was provided with training on the usage of PDAs for data collection and then subsequently deployed to the local Red Cross chapter. The core team members were then paired up with local chapter staff and provided training on how to use the technology to staff at the disaster site.<sup>61</sup> This strategy enabled a rapid and effective distribution of knowledge on how to use the PDAs. Thus the Red Cross responded to the demands of their emergency humanitarian work, without having to set aside time for all staff members to attend a training session.

For organizations involved in long-term, non-emergency humanitarian settings, training end users can be handled using other models. Save the Children has a dedicated consultant who flies to those country programs interested in implementing PDAs and provides personalized trainings on how to use the PDAs and how to create data entry forms.<sup>62</sup> The IRC's training format is to set aside half of a day and "gather all

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<sup>58</sup> Staff Member (anonymity requested). American Society for the Prevention of Cruelty to Animals. Telephone Interview. 12 December 2008.

<sup>59</sup> Ibid.

<sup>60</sup> Bagdikian, Eric. Code 3 Associates. Telephone Interview. 31 December 2008.

<sup>61</sup> McCorry, Becky and Greg Tune. American Red Cross. Personal Interview. 6 January 2009.

<sup>62</sup> Steuber, Lee. Save the Children. Telephone Interview. 6 February 2009.

staff around in one place, [and] practice on actual old data. [We provide] more up-front training...now than in the past.”<sup>63</sup> Training strategy for these organizations, because of the non-emergency work that they are involved in, relies on assessing staff training needs which subsequently allows them to deliver more targeted training and helps them secure the appropriate monetary resources with which to train their staff. Longer trainings, though time consuming, were found to greatly improve the quality of the collected data. A longer training is ultimately less expensive in time and resources than having to re-do or fix bad data. However, for some field managers, a lengthy training can present an additional burden on top of existing time constraints around data collection, which can already take up to five days.<sup>64</sup>

#### 6.4.2. Budget and Cost Constraints

Many nonprofits have limited financial resources and struggle to acquire the funding to cover the expense of the initial technology purchase, let alone additional trainings. Roy Zimmermann from AIR noted that from a donor perspective, after providing funding for “large up-front investments in technology... [organizations often faced further challenges in] convincing donors [that] setting aside money for training [would] be money well spent.”<sup>65</sup> Zimmermann acknowledged that while including a budget line item for training certainly increased some up-front costs, AIR’s strategy has been to focus donor attention on maintaining program sustainability, and “it is our long-term goal to build local capacity in education programs, so training is part of program costs.”<sup>66</sup>

While Save the Children currently utilizes one consultant for PDA training and support, Lee Steuber is looking at using the internet in the future, “arranging monthly webinars and broadcasting and share tips, [creating] online education.”<sup>67</sup> The Red Cross interviewees, and several others in our sample, also mentioned that they would like to implement online training in the future. This strategy is a cost-effective measure that would allow the materials to be accessed anywhere in the world, with the adaptability to create customized training programs for remote staff.

#### 6.4.3. Institutional Constraints

Some organizations are more resistant to change than others. Roy Zimmermann at AIR pointed out that, “If an organization has been doing data collection the same way for 60 years, it is not always eager to change.”<sup>68</sup> Staff sometimes resist training because they fear that the efficiencies created by the technology will result in their jobs being eliminated or conversely, the new technology might make their jobs easy enough (or appear easy enough) for almost anyone to do.<sup>69</sup> Previous, unsuccessful IT rollouts also made staff cynical about a new rollout’s chance of success.<sup>70</sup> Emmanuel d’Harcourt at the IRC stated that “lack of enthusiasm is an issue, especially with older employees who have been accustomed to paper and pencil methods. They tend not to want to use new technologies.”<sup>71</sup> In this situation, staff need to be convinced that making time for training will actually help ease their workload in the long run. Convincing staff to rethink and relearn habits can be a difficult task because there is a tendency to slip into habits that are familiar and subsequently there is some reluctance to seeing how new technology can be more beneficial.

Paul Amendola from the IRC noted that it was “critical to have buy-in from the staff and management,” in order for training to make a positive impact.<sup>72</sup> In order to create a learning organization that can surmount

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<sup>63</sup> Amendola, Paul. International Rescue Committee. Personal Interview. 20 February 2009.

<sup>64</sup> Hardy, Colleen. International Rescue Committee. Telephone Interview. 14 January 2009.

<sup>65</sup> Zimmermann, Roy. American Institutes for Research. Personal Interview. 6 January 2009.

<sup>66</sup> Steuber, Lee. Save the Children. Telephone Interview. 6 February 2009.

<sup>67</sup> Ibid.

<sup>68</sup> Zimmermann, Roy. American Institutes for Research. Personal Interview. 6 January 2009.

<sup>69</sup> Steuber, Lee. Save the Children. Telephone Interview. 6 February 2009.

<sup>70</sup> Amendola, Paul. International Rescue Committee. Personal Interview. 20 February 2009.

<sup>71</sup> d’Harcourt, Emmanuel. International Rescue Committee. Personal Interview. 20 February 2009.

<sup>72</sup> Amendola, Paul. International Rescue Committee. Personal Interview. 20 February 2009.

the institutional barriers to training, staff and management need to be convinced that training is a priority for the organization. This institutional constraint for training is twofold as the level of staff expertise changes with new hires, and having a continuous rotation of volunteers would create problems of storing institutional knowledge, especially if volunteers are recruited only for short-term emergencies. Online training seminars are one way to address this. If an organization knows there are times it needs short-term volunteers, it could set into place a learning strategy that would provide training at the right time, at the correct level, and with the appropriate reference materials.

#### 6.4.4. Learnability Bias

Learnability concerns the ease with which one can learn to use a PDA. The interviews uncovered that the barriers for learnability bias seem to be more behavioral for specific individuals than technical in nature. To overcome the learnability bias barrier, the challenge for organizations is to provide the right technical and training support and to ensure that staff members are given time to practice using the technology in a guided training environment. Training documents should provide explanations in an easy to understand manner, avoiding technical jargon as much as possible. Roy Zimmermann at AIR emphasized the importance of providing training and making sure that staff understood the capabilities of the technology that was provided to them. He noted that they could provide the staff with tools such as PDAs, but setting up training sessions helped his staff in understanding how to use those tools correctly.<sup>73</sup>

Training can be a delicate process when dealing with users who are resistant to technology. PDAs have the potential to be accepted by NGO personnel at a faster rate if it can be demonstrated that they meet their needs and are user-friendly. Technology resistant staff often disguise their learnability bias by complaining that PDAs are hard to read or are too expensive, or by saying that there are data security and confidentiality issues. Some interviewees mentioned that certain staff automatically blamed the PDA because they thought it limited their capacity, but that was because they did not know how to use the functions correctly. Therefore any training that is provided needs to ensure that these sorts of complaints are addressed by encouraging users to experiment with the PDA interface so that any usability issues can be fixed. If users can be given tips on how to troubleshoot problems in a manner that empowers them, it is likely that their bias against PDAs will decrease. The more savvy NGOs like Save the Children are quite aware that their staff have accomplished more with PDA utilization as their training empowered users and their staff know they have a dedicated trainer they can brainstorm new ideas with.<sup>74</sup>

While increasing staff's basic comfort with technology may improve receptivity to new types of technology down the road, trainings on PDAs may not need to be as exhaustive as one might initially think. There may be bias from headquarters staff (based in the U.S.) towards what they perceive as the lack of technological know-how by staff based in developing countries. Some interviewees reported that field staff ability on technology varies widely by region, with some developing countries like Pakistan being far ahead of others like Somalia.<sup>75</sup> In fact, this bias might overshadow the technical skill limitations of headquarters staff. While Roy Zimmermann at AIR noted that, "there is a steep learning curve on new technology by staff," Debbie Landis at the IRC pointed out that this learning curve is decreasing quite rapidly, especially in the less developed parts of the world due to the growing familiarity of cellular phones, the Windows operating system, as well as video game consoles.<sup>76</sup> The growing use of technology due to globalization has made it less intimidating for end users regardless of geographic regions. In fact, most local country offices are increasingly "excited and enthusiastic" about the use of technology in the

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<sup>73</sup> Zimmermann, Roy. American Institutes for Research. Personal Interview. 6 January 2009.

<sup>74</sup> Ibid.

<sup>75</sup> Bradley, Kelly and Bill Hyde. International Medical Corps. Personal Interview. 6 January 2009.

<sup>76</sup> Zimmermann, Roy. American Institutes for Research. Personal Interview. 6 January 2009.; Landis, Debbie. International Rescue Committee. Personal Interview. 20 February 2009.

field.<sup>77</sup> While “local staff have some hesitancy to outright resistance [to using a PDA], by the end [of the training session], everyone is more comfortable and wants to go out and try it.”<sup>78</sup>

#### 6.4.5. Key Findings

Organizations need to ensure that they are providing adequate technical support and training on new technology for their staff. Moreover, this support function should be available consistently, so that staff members have a dedicated individual in their organization who can discuss any PDA issues that arise. Training resources that enable staff to practice using the software could also further reduce problems when using a PDA in the field. Most technical problems described by interviewees could easily be solved by familiarity and practicing using the PDA settings more often. To this end, NGOs may also want to consider widening their hiring criteria to include greater adeptness with technology.

Sometimes the issue for training is, in reality, a euphemism for other organizational constraints such as lack of time or money to actually implement adequate training presentations. Organizations should set aside time to flesh out a proper training system that meets not only the needs of the program but also understands any technical limitations of the staff that are being trained. It is a question of not just using the PDA as a tool correctly, but also understanding the barriers or bias for implementation that might psychologically hold back staff and make them afraid of using new technology.

### **6.5. Case Study: American Red Cross**

Greg Tune, Lead Program Manager of the Geospatial Technology, Disaster Services Department, was attending a conference on disaster response when he heard Michael Gray, CEO of Global Relief Technologies (GRT), present on the new PDA technology they had been developing for in-field data collection. As he listened to Gray speak, Tune immediately saw the implications for his Disaster Services unit's work at the American Red Cross. He began informal conversations with Gray and then invited GRT to give a formal presentation at the Red Cross.

The American Red Cross is the nation's leading emergency response organization. Founded in 1881 and headquartered in Washington, D.C., the organization employs over 35,000 people and has over 700 local chapters.<sup>79</sup> The Red Cross responds to approximately 300 national, large-scale emergencies each year, with coordinated responses from the Disaster Services unit at headquarters, while the tens of thousands of smaller emergencies each year, like family home fires, are handled by the chapters.

In any disaster, the first priority for the Red Cross is to move the affected population to safety and provide necessary medical attention as quickly as possible. Once people are secure, Red Cross response teams must begin the arduous task of determining the scale and scope of damage. While this is secondary to making sure people are safe, until damage assessments are done the organization cannot start to provide relief checks to those who have lost their homes and possessions. For years, Red Cross teams conducted damage assessments with paper surveys, returning to the field office every day to collate and enter their findings into a computerized system. Only once this data was collected and manually input could the organization begin helping people get back on their feet.

This lag time was frustrating to Tune and many others. He knew there had to be a better, faster way to collect this information and get relief to the people who needed it. He also knew the barriers he was up against. Prior to joining the national headquarters, Tune served for years as a Red Cross volunteer in the field. He had seen the work from all sides and knew that some of the smaller chapters could not be

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<sup>77</sup> Hardy, Colleen. International Rescue Committee. Telephone Interview. 14 January 2009.

<sup>78</sup> Steuber, Lee. Save the Children. Telephone Interview. 6 February 2009.

<sup>79</sup> About Us. American Red Cross, 2009.



expected to make more technology investments without substantial support from headquarters. In the past 10-15 years, only about 40% of local chapters have been migrated to the Red Cross online network.

While they work closely together on emergencies around the nation, the national headquarters and the regional chapters of the Red Cross are fairly independent when it comes to funding. Diversity and availability of funding have shaped the technological advances of national headquarters and regional chapters. The move to integrate computers into the organization came from the national office, but by the time headquarters was in a position to buy for the entire federation, many chapters had already implemented their own solutions. This has led to the problem of trying to integrate multiple legacy software systems, a constant thorn in Tune's side. A more centralized approach would be needed to capture data on large disasters that headquarters responds to.

#### 6.5.1. Creating a New Vision for Disaster Services

Because of his experience with the organization, Tune knew that rolling out any new technology across the field programs was not realistic, but he also saw the potential for these PDAs in his program area. A pilot program in his program area would be the best of both worlds: costs for the test came from an unrestricted budget line in his department at headquarters, and because of the nature of the work of Disaster Services, the team and PDAs would be constantly out in the field, interacting with chapters.

Tune saw the potential of PDAs in the Red Cross' efforts, and he didn't want to stop with a one-time pilot test. By incorporating PDA use into a larger structural plan, all Tune needed was sign off on the pilot study, which was granted by the Vice President of his department. Once the pilot was approved, the use of GRT technology was signed off on by the Contracting department and the purchase order approved by the Service Center. The Red Cross avoided a lengthy contract review process not only because the program was just in its pilot stages, but because the Red Cross uses government price schedules and lists of approved contractors and products, and the GRT forms had already been vetted by government lawyers for a contract with the military.

Tune prepared a proposal for reconfiguring some of his team's structure in order to take advantage of this new technology in as many emergencies as possible. The new "Quick Assessment Team (QAT)" structure was approved without specifications for any particular PDAs, although Tune already had the technology in mind. Two new teams of highly trained disaster assessment workers would be deployed into a disaster area following any large-scale incident and immediately gather information about areas impacted by the disaster using the new PDAs. Each team would have eight members: one team leader, one team logistician, and six information specialists. They needed to be resourceful, have strong computer skills, be already versed in the field of disaster response, and able to drop everything and report to a disaster with a few hours' notice.

#### 6.5.2. Drilling into the Details

##### *Product Positioning*

There have been five official deployments of the PDA technology in large disasters: the 2008 floods in Maine and the Midwest, and hurricanes Dolly, Gustav, and Ike. Tune thinks that only about half of the 300 disasters that headquarters responds to will be of the scope and magnitude to warrant using the PDAs, but for those that do, he's aiming for 100% coverage.

Every disaster is different, says Tune. While you might see similarities in hurricane damage, the Red Cross has to constantly incorporate real-time information into their planning. "We're working in a business that's not a process-oriented business. We have processes. We have tasks. But you don't do every one, every time, or do them the same way every time. The disaster dictates it... Every disaster is a new

venue for us. We have a toolkit of resources, a toolkit of procedures, and regulations. How we implement them is different from disaster to disaster.”<sup>80</sup> So, although the Red Cross teams might be using the same equipment, they may need to use it in a slightly different way each time. For this reason, it is also difficult for headquarters to come up with metrics on cost-savings by their use of the devices over paper and other data collection methods. According to Tune, it seems to be more an art than a science, “That’s why it’s hard, to tie that direct correlation to the savings or the benefits. Because what we can see is, we *know*, just by how the operation is going, when something’s working.”<sup>81</sup>

As a domestic relief organization, the American Red Cross does not have to worry about import/export restrictions, but deploying the devices in a timely manner is still a challenge. The PDAs are stored in Washington, D.C., and how quickly they can reach a disaster has been a deciding factor in their use so far. Tune had to decide whether to centralize their location or spread them out across various chapters.

As testing continued, Tune realized that national roll-out and positioning of the PDAs might not be necessary. One model Tune considered was that used by headquarters for the positioning of some of its larger capital expenses, such as ambulances. Currently, chapters have custody of ambulances and other large investments, but when an emergency strikes, headquarters can call for their deployment to the disaster site. Since the PDAs are smaller and arguably more mobile, storing the PDAs in a central location where headquarters can decide their next use allows a greater degree of control and keeps costs down, since they can simply be deployed with their team at no extra cost of money or time. It also prevents the need to have expert users in every region at all times, further lowering on-going program costs. Tune has considered pre-positioning some PDAs in the future to increase response time; one of the factors determining their use right now is “Can I get them there fast enough.”

### *Training*

Determining how to position the hardware was one issue, but it pales in comparison with the challenge of training a volunteer network spread across the country. With a database of 60,000 volunteers, training everyone on the new technology was simply impossible. Currently the scope of the PDAs in the program’s work is relatively small, but coordinating training could get more challenging as the footprint grows. Volunteers and program staff are equally excited about the new PDAs; “there’s a buzz.”<sup>82</sup> But Tune has noticed a downside as well. With only a few dozen devices, enthusiasm from the field could wane quickly when expectations for using the devices are not matched with opportunity. “My challenge right now is managing the expectations...they all want to [use the PDAs].”<sup>83</sup>

For his core team of responders, Tune was able to secure funding for an initial, in-depth training for 17 members of the QAT. This training, led by GRT, took place in Austin, TX over two days in November 2007. Participants received classroom training on the PDA hardware and software, as well as instruction on how to view and analyze information in the Virtual Network Operation Center on the backend. The training also included an afternoon of field training.<sup>84</sup> This intense, hands-on training was very beneficial for both the members of the QAT and for GRT, who was able to use the experience to improve upon their products and processes.

Once the QAT members were deployed into the field, Tune had them follow a “train the trainer” method, pairing up team members with field staff to use the devices for data collection during different emergencies. A staff member from GRT has also been embedded with the QAT team on all official

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<sup>80</sup> Tune, Greg. American Red Cross. Personal Interview. 6 January 2009.

<sup>81</sup> Ibid.

<sup>82</sup> Ibid.

<sup>83</sup> Ibid.

<sup>84</sup> Ibid.

deployments to date. This on the ground training not only ensured exposure of the devices to field staff, but also helped the Red Cross and the software developers find holes and problems with the software more quickly. Red Cross teams gained a better idea of what they needed the technology to do, and the developers from GRT had a better idea of the actual conditions on the ground that their devices would be operating under.

In the future, Tune hopes to involve more flexible training options, employing the use of conference calls and webinars to reach more people across the country. GRT is also starting to formalize self-training materials that can be tailored for clients and downloadable for easy access. Tune and GRT have also discussed the possibility of implementing a certification process, but have not yet determined if that is appropriate.

### *Costs and Benefits*

For Tune, finding money for a one-time capital charge for the PDAs was easy; what is more difficult is building the monthly charge into the budget. He has also pointed out the importance of human resources. “What is the people support? What do you need to manage this from a human resources [standpoint]? Having computers is great. Most managers, senior leadership, think it doesn’t take people to run computers. They’re just magically there. But the more sophisticated you are, the more people you need to manage that sophistication.”<sup>85</sup> For now, headquarters would prefer to remain in charge of the PDAs and so has made no push for the chapters to buy the technology as well. Tune thinks the cost is not worth it for field offices, who are unlikely to need to use the devices very often and lack the funding and human resources to support the use of PDAs. However, when it comes to headquarters, Tune’s colleague Becky McCorry noted, “For us it’s the cost of preparedness. It would cost us more *not* to.”<sup>86</sup>

### ***Documentation and M&E***

In both case studies, the champions of PDA use mentioned that they did not do a lot of documentation. None of the groups interviewed had done a true cost-benefit analysis of using PDAs over paper surveys. Lee Steuber at Save the Children did stress the importance she places on updating senior management on the benefits of PDA use, by in-person updates from her PDA consultant. Groups should do a better job at documenting the costs and benefits of PDA use, to gain more internal support, for use in grant proposals, and for institutional knowledge, which would be vital for the continued use of the technology should the champion leave the organization.

As mentioned, the Red Cross has not done a cost-benefit analysis on using PDAs over paper surveys due to the differences inherent in every disaster. However, they are focused less on the specific costs savings and more on how the PDAs are improving their mission-critical activities. In addition to the increased response time that PDAs bring, additional benefits like the ability to bring up instantaneous maps of the disaster area to visualize the problem have really increased the value that the Red Cross places on this new technology. These added benefits may make investment in the PDAs attractive to funders as the Red Cross grows its PDA use.

### 6.5.3. Key Findings

The Red Cross’ testing of PDA technology was the brainchild of an internal champion, Greg Tune, but in such a large and established organization, it takes more than just a good idea to get something from concept to reality. Tune had the advantage of some discretionary budget income and supportive senior management, but his concept of a Quick Assessment Team not only easily integrated the PDAs into

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<sup>85</sup> Ibid.

<sup>86</sup> McCorry, Becky. American Red Cross. Personal Interview. 6 January 2009.

existing Red Cross programs but also brought added benefits. Pulling from existing team members, Tune's new team did not incur additional hiring costs for the Red Cross and their deployment to various disaster sites ensured that the PDAs' impact was felt across the organization in a rather short time, generating buzz and increasing buy-in that eventually enabled him to increase the number of PDAs in use.

## **6.6. Organizational Culture: The Final Barrier?**

### 6.6.1. Learning Organizations

If a device can be modified to technically meet the organization's needs, funding can be found, and training made convenient and effective, what still prevents more organizations from pursuing pilot tests and wider use of PDAs? It turns out not to be that simple, for to even start to tackle how the technology can be formatted or how funding can be found, one often has to first overcome internal hurdles.

Early on in the Team's interviews, Roy Zimmermann of AIR mentioned organizational culture as one of three serious barriers that someone interested in testing PDAs might encounter. If an organization has been doing data collection the same way for 60 years, it may not be eager to change.<sup>87</sup> Resistance to change, if entrenched at higher levels, can be daunting. It can discourage staff from experimenting or even learning new technology for themselves. Zimmermann saw a steep learning curve on new technology by staff, even on his team at AIR.

Organizational culture can be part of the solution or it can be part of the problem. Groups that the Team met that were using technology had many of the characteristics of a typical learning organization. Learning organizations are built on "a supportive learning environment, concrete learning processes and practices, and leadership behavior that provides reinforcement."<sup>88</sup> In learning organizations, staff are allowed to experiment with new ideas and are not simply not reprimanded but are even rewarded for their innovation. There is an openness to new ideas and room for healthy debates. Budgets are built with room to pay for exploration; some unrestricted money is available for testing new ideas. Finally, there is time for reflection; managers can assess what is working, what is not, and devise a plan of action going forward.

The groups successfully testing and integrating PDAs into their programs showed evidence of these traits in their program design and operations. All had some budgetary flexibility to test new ideas. Groups with the most success in testing PDAs worked closely with field staff and had frequent communication about the progress of test programs. Headquarters was able to set requirements for field and chapter offices, but managers actively solicited feedback from the field and made sure there was sufficient support from headquarters in training and implementation so that program staff had the tools they need to succeed.

### 6.6.2. Making the Investment in Innovation

On the surface, budget barriers may seem all about a lack of funding, but allocation of funds can be just as important as the actual amount of funds. Lee Steuber, Senior Director of Systems at Save the Children, faced challenges securing funding for PDAs the first year, but with help from the Chief Information Officer, thereafter her department has included a line item for innovation in their budget. The decision to keep innovation as a line item is an important tactical decision for the organization and deserves to be mentioned in the context of discussion of learning organizations. This money, now a standard part of each budget cycle, is at her discretion, and while at present the budget is spent on a consultant who travels to Save the Children's field offices to train program staff on the technology, in theory it could be used for new tests for other technologies.

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<sup>87</sup> Zimmermann, Roy. American Institutes for Research. Personal Interview. 6 January 2009.

<sup>88</sup> Garvin, David A., Amy C. Edmonson, and Francesca Gino. "Is Yours a Learning Organization?." Harvard Business Review Vol. 86 No.3 (2008).

The American Red Cross headquarters in Washington, D.C., faces different organizational barriers, with 712 autonomous chapters across the country. While the chapters have a good deal of independence with funding, headquarters makes recommendations on technology. This is an ongoing challenge, as many chapters are slow adopters of new technology, and headquarters cannot make technology regulations that would present sizable hardships on smaller chapters. For example, while headquarters is experimenting with PDAs, fax communications have remained long-lived throughout the larger organization.<sup>89</sup> At headquarters, however, and within the Disaster Services program, the financial constraints are less than at some chapter offices. Normally there would have been a contract process to contend with before a purchase, but since the devices were already being used by the military, and therefore on an approved list of vendors, Tune was able to skip over much of the normal procurement process for his initial test. Certainly, this type of contract exemption might not apply to all groups, but for those who regularly receive U.S. government funding or contracts, referencing this schedule might be useful in securing purchase approval.

### 6.6.3. Building Buy-In

“You can't do anything in headquarters without someone who wants it locally.”<sup>90</sup> Securing not only the support, but the enthusiasm, of field staff has been critical to the growth of PDA use by the IRC and Save the Children. If an interest in testing new ideas is present, but not the will to make it happen, then ideas can wither on the vine and never be realized. As Emmanuel d'Harcourt of the IRC stated, “If you don't push something actively, it dies.” Building allies in the field increases buy-in across the organization and ensures more partners with an interest in a program's success. Further, if staff are overworked, juggling too many responsibilities or putting out too many fires, then pursuing new ideas may get pushed off their list of priorities. Having active support in the field may help take some of the burden off of headquarters staff and aid in getting an idea off the ground.

Securing buy-in from the field will take an investment of time, but in the process headquarters will gain a better understanding of program staff's needs, which applications are necessary, and which are superfluous. Kay Mayfield, Director of Emergency Services at Code 3 Associates, voiced frustration over a lack of understanding of the conditions she works in. “Developers need to talk to the boots in the field. Most people have no clue about what we need or the conditions we are working under.”<sup>91</sup>

### 6.6.4. Staff Selection

The Team initially expected that larger organizations with more layers of bureaucracy would have more internal barriers to overcome. To the Team's surprise, organization size did not seem to be a factor. Most of the interviewed organizations did not need to make lengthy appeals to senior management before starting a test. Staff had a fair amount of autonomy in the decision to begin a pilot test of new technology or to incorporate PDAs into their programs. Those groups who were not actively seeking or testing PDA technology, roughly half of the sample, were arguably sidelined more by limitations of organizational culture and management than they were by the barriers they most often cited: training and budgets. Often it turned out that how the decision-maker responded to constraints, and their own feelings about technology, was just as important as the actual challenges encountered.

Poor initial program design and implementation understandably left a bad impression of technology at IMC, but staff members the Team met with were ambivalent to hostile about future testing of different PDA technology in their programs. IMC also expressed a desire to see “someone else go first,” a leader in

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<sup>89</sup> McCorry, Becky and Greg Tune. American Red Cross. Personal Interview. 6 January 2009.

<sup>90</sup> d'Harcourt, Emmanuel. International Rescue Committee. Personal Interview. 20 February 2009.

<sup>91</sup> Mayfield, Kay. Code 3 Associates. Telephone Interview. 31 December 2008.

their field, preferably a large organization like CARE, take the lead and roll-out technology in a similar program.<sup>92</sup> For other organizations, the lack of a strong leader and protocols to follow was equally curtailing. The Team encountered an entire sector, animal welfare, which is still developing its protocols and standardized best practices. With no clear leader in the field, these mostly smaller programs seem somewhat lost with how to proceed. Looking outside their sector for models and ideas might prove helpful for test ideas.

#### 6.6.5. Champions

Every organization knows that its people are its greatest asset. Learning organizations have leaders who reinforce testing, experimentation, and discussion.<sup>93</sup> These leaders promote change from within by embodying the characteristics of such an organization. They are largely responsible for developing the vision, gathering buy-in, overseeing or carrying out the implementation, and keeping up the momentum for these new ventures. In *The Heart of Change*, John Kotter outlined steps for successful large-scale change, but in fact many of these steps were also apparent in the testing of smaller scale programs amongst the interviewees. These champions created a sense of urgency, built their teams, developed a vision, actively communicated with others to secure buy-in, empowered others to take action, kept up momentum, and worked hard to continue innovation in the face of the pull of tradition and the old ways of acting and thinking.<sup>94</sup>

In the course of the interviews, it became very clear that the organizations doing the most with testing technology had one common element: a leader, or champion, within their ranks. The champions saw the bigger picture readily, immediately making connections between the technology, its applications for programs within their organization, and needs within their sector overall. These champions were tech-savvy individuals with an understanding of the needs in the field. AIR, the Red Cross, Save the Children, and the IRC all had at least one staff person who quite actively pushed through PDA use and succeeded, despite facing several of the same barriers faced by the organizations that were *not* pursuing PDA use.

At the IRC, there was no debate over who was responsible for their use of PDAs in the field. All interviewees at IRC immediately identified Emmanuel d'Harcourt as the one behind the IRC's initial testing of, and later implementation of, PDAs in their health surveys. As explained in the IRC case study, the idea of using PDAs in the field was introduced to d'Harcourt by a respected peer working in a child survival program at another organization. Through a working group on child survival, it was easy enough to see how this technology would fit into programs under his supervision at the time, but his thinking went

#### ***Location, Location, Location***

Just like in real estate, location matters. Where a champion sits within an organization may determine how widely PDAs and other technology are adopted. At IRC, the champion serves as head of health programs, and so the health unit has widespread use of PDAs in their surveys. Strong field champions in the Africa programs have also helped spread the use of PDAs in programs in that region. However, some of IRC's other main program other areas, such as emergency response, gender-based violence, and development programs are not as active in PDA pilot testing. At Save the Children, where the champion sits in IT, PDAs are being tested with more geographic and program diversity. Testing and use of PDAs is happening in monitoring and evaluation programs, health, education, and is under consideration for testing in emergency response.

<sup>92</sup> Bradley, Kelly and Bill Hyde. International Medical Corps. Personal Interview. 6 January 2009.

<sup>93</sup> Garvin, David A., Amy C. Edmonson, and Francesca Gino. "Is Yours a Learning Organization?." Harvard Business Review Vol. 86 No.3 (2008). 4.

<sup>94</sup> Kotter, John P. and Dan S. Cohen. *Heart of Change: Real-Life Stories of How People Change Their Organizations*. Boston: Harvard Business School Press, 2002.7.

one step further. Speaking of the larger field of public health and PDA use within it, he said, “We’re going to have to start using them [PDAs] more. In general, I’m just appalled...at how poor the state of data is. The one field where it is so quantitative and how poor the data is and how much underinvestment there is in information systems.” Taking the 10,000 foot view of the problem, Emmanuel sees investment in PDAs and technology as just one part of solving a much larger problem. A similar viewpoint was expressed by Roy Zimmermann at AIR, who originated and promoted the idea of AIR’s use of PDAs in education programs: “It was glaringly clear that our data collection methods were outdated.”<sup>95</sup>

While the IRC has added a full time position within the health unit to oversee their PDAs, develop health surveys for field programs, and trouble-shoot, not all organizations have created full time positions, preferring instead to outsource to consultants, and many admitted to not having looked to hire for this kind of technology expertise within their programs. Every interview within the animal welfare sector, for example, yielded some feedback on hiring for emergency response and rescue skills, not tech skills, and some even stated that this expertise might be incompatible with the skills they need in the field, reporting that the animal field personnel they work with are just not as tech-inclined as firefighters or other first responders.<sup>96</sup> Animal welfare organizations were not the only ones hiring for very specific program-related skills without concern for technological savvyness. Interviewees at IMC also reported seeking staff who are experts in public health and not being very concerned about their understanding or use of new technologies.<sup>97</sup>

However, when an opportunity for testing arises, if program staff directly supervising a PDA pilot are technology-adverse, the test may be set up to fail. A recent pilot of PDAs in additional IRC child survival programs in Ethiopia illustrated this point. Overall, the staff at the IRC seemed interested in technology and incorporating more of it into their programs. However, shortly before the Team’s interview, a recent report from staff involved in a PDA test in Ethiopia had been submitted to headquarters and had negative feedback on the PDAs and their use in the program. During the course of the interviews with other IRC staff that day, the Team learned that the program manager had a track record of pushing back on new technology. Selecting which staff members are in charge of a pilot program may be just as important to its success as the decisions on which technology and which program to pilot it in.

#### 6.6.6. Key Findings

Unlike many of the other barriers we have discussed, organizations cannot plan for a champion, but they can lay the groundwork to promote these visionary thinkers within their ranks. Through hiring with an eye toward technologically minded staff, rewarding new ways of thinking, and demonstrating that investment in new development is supported by senior management all helps to provide incentives to employees looking for an opportunity to take their programs into a new direction.

Since a technology champion cannot be everywhere or everything at once, training and support for other users throughout the organization are critical. In addition, support for the champion is important. Visionary thinkers might not always be the best at compiling a detailed account of how they arrived at a certain technology decision, as d’Harcourt freely offered during the interview. For that reason, bringing in key players from IT or Operations early on in the process, perhaps as part of a new technology working group, might give the process of incorporating PDAs or launching a pilot test more momentum within an organization. Collaboration across sectors would not only help overcome organizational siloing, but would also generate more buy-in and even help spread the use of a new technology into areas that even the initial

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<sup>95</sup> Zimmermann, Roy. American Institutes for Research. Personal Interview. 6 January 2009.

<sup>96</sup> Staff Member (anonymity requested). American Society for the Prevention of Cruelty to Animals. Telephone Interview. 12 December 2008.

<sup>97</sup> Bradley, Kelly and Bill Hyde. International Medical Corps. Personal Interview. 6 January 2009.

champion may not have envisioned. It also ensures the longevity of a good idea should the champion leave the organization.

## **6.7. Case Study: International Rescue Committee**

In 2004, Emmanuel d'Harcourt, Manager of the International Rescue Committee (IRC) Child Survival Program, was sitting in a plane on his way to Rwanda. D'Harcourt had joined the IRC in 1999 with a background in pediatrics. His job was to provide technical support for the IRC's health programs in the Democratic Republic of Congo, Rwanda, Sierra Leone, and Southern Sudan. D'Harcourt was passionate about the work of the IRC, an international NGO that provides emergency relief, medical, educational and self-help programs for refugees and displaced peoples in war-torn countries. Now he was on his way to Rwanda, to meet with the CORE working group comprised of 48 NGOs, to share findings and discuss programs. D'Harcourt found his seat partner to be a highly respected colleague who worked for Concern USA, an international organization with a focus on finding innovative solutions to eliminate extreme poverty. As the plane took off, their conversation ranged over a wide variety of topics including the use of PDAs in health programs. As d'Harcourt recounted, he thought the use of these PDAs was a "lot of hype" but his peer explained how her organization was testing the use of PDAs for their data collection. D'Harcourt was intrigued. He disembarked the plane, inspired by the conversation and thought of initializing a pilot study on PDA use for health assessments in the Child Survival Program in Sierra Leone.<sup>98</sup> His interest piqued, d'Harcourt returned to the IRC headquarters in New York, full of enthusiasm and ideas on how to use PDA technology to improve the program.

### 6.7.1. Overcoming Barriers and Adopting Innovation

In New York, d'Harcourt began planning how to use the PDA data collection technology to improve the Child Survival Program in Sierra Leone. The success stories from CORE members had convinced d'Harcourt that PDAs would allow program managers to analyze data quicker and obtain more accurate data for reporting. However, staff responses were mixed and his enthusiasm was met by the innate conservatism of some of his colleagues, contrasted with the eagerness of others to adopt the technology.

To his surprise, the issue of cost was not an enormous barrier as colleagues understood "the [purchase of a] PDA, it's not very costly on the scale of a program."<sup>99</sup> Managers also recognized that PDAs could save valuable data entry time. However not everyone at the IRC headquarters was convinced. D'Harcourt acknowledged that "champion personalities like mine aren't always the ones who prepare a dossier well." He was aware that despite his enthusiasm, it was "hard to find the time on [my] plate to push things through at all levels. If you don't push something actively, it dies."<sup>100</sup> D'Harcourt pointed out that the biggest resistance towards the adoption of PDA technology came from two sources at the IRC and both were at headquarters, not in the field. Firstly, there were "a few key people in programming who are resistant to technology in general, people generally opposed to technology, the same people who are blocking other IT initiatives." Secondly, there was also some resistance from the IRC's IT Department. D'Harcourt felt that this resistance might have gradually been overcome if he had enough time to "research or prep [them] on the technology."<sup>101</sup>

It has been generally recognized by the scientific community that information technology is a valuable tool for effective assessment and reporting. The impact of IT on humanitarian work in the developing world is significant, where connection issues as well as inaccurate and insufficient data often result in poor decision-making and delays. Despite the needs, organizations wait for the right time to change. The

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<sup>98</sup> d'Harcourt, Emmanuel. International Rescue Committee. Personal Interview. 20 February 2009.

<sup>99</sup> Ibid.

<sup>100</sup> Ibid.

<sup>101</sup> Ibid.



susceptibility of the decision makers is even stronger when documentation of success stories of a particular innovation are not available. At the time when d'Harcourt was adopting PDA technology, there was no documentation on lessons learned on PDA use in humanitarian work.<sup>102</sup> However, the Child Survival Program was already in its fifth year and had matured in such a way that d'Harcourt was able to identify what was lacking from the field data collection and analysis methods. As described in Paul Light's Spiral of Sustainable Excellence theory, organizations undergo stages until they can adopt or tolerate new ideas or concepts in a mature stage.<sup>103</sup> Furthermore, d'Harcourt had earned the trust of his colleagues and had the authority to make key decisions for the program. The combination of these factors made it possible for him to adopt the technology for the program.

#### 6.7.2. Pilot Testing: Purchasing Justification and Selection Process

D'Harcourt decided to pilot test the PDAs with the program in Sierra Leone. He realized the importance of the positive pilot testing outcome to get stronger buy-in for a larger roll-out. The decision to implement a pilot was also beneficial from a research perspective, as d'Harcourt decided to document and share how the IRC piloted the use of PDAs for health care data collection, in the hope that other NGOs could learn from the organization's mistakes and successes.

The Sierra Leone Child Survival Program was ideal for testing the adoption of the PDA technology for assessment tools in the health unit as the problems it suffered from included poor data quality and slow data collection. His evaluation was program driven and focused on how PDA usage could result in improved data quality, faster data analysis processes, and reduced cost of waste from inefficiencies.

After deciding on the pilot test, d'Harcourt next surveyed the field and realized there were a lot of PDA products on the market, with scant documentation or literature on success stories. So he turned to his colleagues at CORE and asked for their input and recommendations. D'Harcourt noted that these recommendations via word of mouth experience sharing were very important when it came to his final decision about deciding which PDAs to use. Having heard recommendations from his peers, and considering the \$300 unit cost was reasonable, d'Harcourt decided to purchase Dell Axim PDAs with the Windows Mobile operating system. The Pocket PC Creation Software on the Windows Mobile operating system was eventually selected, but not through a structured bidding procedure, or by identifying the needed specifications, but rather based on pure recommendations.<sup>104</sup> Furthermore, the product was reasonably priced when compared to other similar models, and it also performed well during initial testing.<sup>105</sup>

During the pilot testing, d'Harcourt discovered some lessons learned that eventually helped the IRC roll-out PDAs for other health programs in other countries. These included:

- 1) Planning: It was very important to invest time in pre-planning the survey design to ensure they were choosing the right questions to ask. The software features also required pre-testing for the questionnaire design, prior to roll-out in the field.
- 2) Technology Features: There were some initial issues regarding the battery life of the PDA. However, these were solved through the purchase of extra long-life batteries that enabled field visits to distant locations. The IRC operations are usually close enough to field offices that have generators, so the bigger

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<sup>102</sup> d'Harcourt, Emmanuel, and F Mulumba. "Using Personal Digital Assistants in post-conflict health surveys: Potential and constraints." *Global Public Health* Volume 3. Issue 3 (2008). 328.

<sup>103</sup> Light, Paul. "The Spiral of Nonprofit Excellence." *Nonprofit Quarterly* Volume 11 Issue 4, (2004): 56-62.

<sup>104</sup> d'Harcourt, Emmanuel, and F Mulumba. "Using Personal Digital Assistants in post-conflict health surveys: Potential and constraints." *Global Public Health* Volume 3. Issue 3 (2008). 329.

<sup>105</sup> *Ibid.* 329.

batteries were sufficient. There was some initial concern about protecting the PDAs from the harsh climate and accidental breakage. But the IRC discovered that this was not a concern as most PDAs are built with an adequate level of ruggedness.

3) Training: The IRC did not find training the PDA end users in the field very difficult. The biggest challenge for less savvy field employees was uploading data from the computer to the PDA and vice versa. Familiarity with the Windows Mobile operating system and the game aspect of the PDA manipulation made it easier for end users to learn the technology. D'Harcourt also noted that "many [IT] problems were overcome by having a tech person in the field. [There is a] need to have a tech person, a tech-savvy person, in the field because you need someone more comfortable with technology to help with common problems, to know when you just need to restart something versus when it is a big problem. Sometimes people will say, 'this PDA doesn't work' and then you'll just plug it in and say 'I don't know, it looks like it works to me.'"<sup>106</sup>

### 6.7.3. Primary Factors Leading to Roll-Out

#### *Champion Personality in Organization*

The most important aspect of PDA usage at the IRC was that it is being driven by a 'champion personality.' D'Harcourt was clearly enthusiastic about the use of PDAs for health sector data collection, and his placement within the IRC's organizational structure enabled him to push through a PDA pilot program. D'Harcourt was based at the IRC's headquarters, but he had also worked in the field and thus could navigate between both headquarters and local country office concerns. D'Harcourt emphasized in his conversations that he would not have been able to "do anything in headquarters without someone who wants it locally" and that while the PDA "exposure came from headquarters, the energy came locally."<sup>107</sup> He mentioned the example of the Rwanda program staff who, upon learning of the PDA opportunity, actively pushed for it, "emailing headquarters roughly once a week to complain about the PDAs not being in the field yet."<sup>108</sup> A champion at an NGO can have a lot of influence and power over decision making when it comes to new ideas, however it is important to remember that the influence differs depending on the size and scope of organizations.

#### *Organizational Culture and Adoption of Technology*

The introduction of new technology will almost always encounter some resistance in organizations. As an example, d'Harcourt mentioned that "when technology failures happen, staff that are resistant to technology will focus on the failure and not mention that the next day everything was working just fine."<sup>109</sup> People's perception of technology and the level of skills they have in using technology influence their level of comfort. This happens especially often with the public health specialists. Therefore, a judicious needs assessment should be undertaken to ensure that the correct blend of hardware and software are decided upon for specific program use. The flexibility of the technology depends on the selection of the right components. While d'Harcourt relied more upon word-of-mouth recommendations for choosing a PDA to pilot at the IRC, his requirements for the business processes that the PDA could help with were not just limited to a PDA's current capacities, but instead he had the foresight to think of others processes that the PDAs could help strengthen.

From a big picture technological perspective, d'Harcourt also noticed that the lack of technology use, not just limited to PDAs, was symptomatic of the larger problem of poor data quality and poor data collection

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<sup>106</sup> d'Harcourt, Emmanuel. International Rescue Committee. Personal Interview. 20 February 2009.

<sup>107</sup> Ibid.

<sup>108</sup> Ibid.

<sup>109</sup> Ibid.

in health programs. According to d'Harcourt, PDAs need to be “part of a broader solution” for improving NGO and public health data in general.<sup>110</sup>

#### *Costs and Budgetary Concerns*

One of the biggest challenges for many organizations is to justify the PDA technology purchase as an investment instead of pure expense. In this regard, as the head of his unit, d'Harcourt was uniquely placed in a position of power to deploy a technology and initiate a new pilot testing initiative. The donation of some of the PDAs also minimized the financial outlay, thus for the IRC, cost was not a major barrier. The Health unit has been able to get some internal non-program money (unrestricted) for general technology investment, and this is quite impressive, as unrestricted money for program is according to d'Harcourt, “rare as hen’s teeth.”<sup>111</sup>

#### *Support Resources*

D'Harcourt, also understood that field and back-end technical support is key to successful implementation of any new technology. Thus, at the end of the pilot program, d'Harcourt created a new technical position within the Health unit at headquarters, employing a dedicated IT staff member whom field employees can send their queries to. D'Harcourt noted that it was important to have someone inside the Health Unit, who can evaluate IT systems and interface with possible vendors, as the uses of the PDA technology grows and encompasses new sectors. Next, d'Harcourt hopes to find funding within his budget to have an IT counterpart standing by in the field which would make the technical issues in the field easier to solve.

#### *Monitoring and Evaluation*

Reading the decision-making steps make it evident that the IRC did not conduct a cost-benefit analysis on PDA use before the adoption of the new technology in the Health Unit. D'Harcourt learned from his initial experiences that any change to a system process needs to be documented to show the dividends. He noted that documenting the experience of piloting the PDA improved the quality of assessments and provided justifications for the expense. On a global scale, while PDA use for data collection by organizations is growing in popularity and familiarity, there is a lack of information-sharing between NGOs.

#### 6.7.4. Key Findings

As noted above, the IRC is very reliant on having a champion who is furthering the use of new technology in their organization. As one of the earlier adopters of PDA technology in their field programs, the IRC was, in many ways, working without a strong model to look to for best practices. As with any organization, their ultimate decision to forge ahead with testing this new technology was based on both internal and external factors. While budget concerns were overcome by the donation of PDAs, training and buy-in from key program staff remain challenges for the IRC as they look to expand the PDA program into more country programs.

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<sup>110</sup> Ibid.

<sup>111</sup> Ibid.

## 6.8. Case Study Comparison

	American Red Cross	International Rescue Committee
<b>Product</b>	Mature product/full solution system	Home-made system with ad hoc reporting
<b>Procurement</b>	<i>No request for proposal</i>	<i>No request for proposal</i>
<b>Funding</b>	Purchased	Partially donated
<b>Program</b>	Disaster relief programs	Health programs
<b>Structure</b>	Restructure of team	Layered on existing teams
<b>Leadership</b>	<i>Champion within program</i>	<i>Champion within program</i>
<b>Training</b>	Team that does training in field	Local staff trained on site by manager
<b>Support</b>	IT support from vendor	IT support in-house
<b>Storage</b>	Devices held at HQ, rotated	Devices held in-country, not rotated
<b>Benefits</b>	Anticipated benefits	Extra, unanticipated benefits
<b>Planning</b>	A lot of advance planning	Little planning before usage

*\*Common factors in italics*

## 7. Conclusion

Several of the main barriers uncovered in the Capstone Team’s research could be addressed through thorough, advance planning. Training, budgeting and technology barriers encountered by NGOs when using PDA technology in the field all often stem from a lack of foresight into just how many resources are required to introduce new technologies effectively into existing programs. In order to efficiently roll-out the use of PDAs, organizations should be careful to make the right decision regarding which PDA to purchase, plan to pilot-test the technology, set up a training program, and decide how to budget for the purchase of the technology.

For senior managers and other staff, the planning process is an investment that pays off. If the new technology can be utilized by more than one program unit, that can spread budget costs, making the technology investment more cost effective. PDAs can also be customized according to the needs of different programs, including the hardware features. Deciding ahead of time what is required by their programs will help NGOs maintain consistency of product and operating system as much as possible. Proper planning will allow NGOs to realize what off the shelf PDAs include and what would require customizations to the software before purchasing an inappropriate product.

Those NGOs that undertook the process of setting up a planning process for pilot-testing PDAs in the field and incorporated lessons learned have been more successful in utilizing the technology in the long run. A pilot test can identify what technical shortcomings and training barriers exist at the NGO that could be counter-productive to successful implementation of PDA technology. Pilot tests help NGOs experience how PDAs would work in real-world situations and help iron out many of the software bugs or survey layout functionality issues. Choosing and assigning the correct staff with the appropriate expertise is critical. A staff member who has an additional technology skill set, apart from their programmatic expertise, can often find unexpected ways in which the PDA can value add to the NGO’s work. An NGO that requires its staff to have multiple skill sets is also in a great position to set itself up as a learning organization.

The appropriate PDA can transform an NGO’s work environment. They can give NGOs the tools they need to take full advantage of the information collected and to more easily measure the effectiveness of their programs. Planning for PDA implementation is not simple, but is a rich and powerful process. In the long term, a planning process, correctly undertaken can reduce an NGO’s headaches tenfold, and help an organization use PDA technology to further their mission objectives in ways they never dreamed of.

## 7.1. Recommendations

NGOs considering the addition of PDA or other technologies to their existing field programs would be best served working with a vendor willing to act as their partner in education of key staff, planning pilot tests, and developing training protocols. Working with a vendor that already has experience rolling out technology for other clients can allow an organization to ‘leap frog’ over problems that otherwise might slow or stall the PDA implementation. During the early planning process, program managers should take a step back and re-examine what information they are currently capturing through their existing methodology and what they really need to capture going forward. This does not mean letting the technology shape the program, but rather examine if data and systems are as effective and efficient as possible under current operations.

Program managers working with technology vendors need to educate senior management, and possibly also funders, about realistic time frames and expectations for initial pilot tests. Ideally, pilots would be conducted across multiple program areas in order to find out how many applications the possible technology could have for the organization. This will also help troubleshoot any obstacles down the road during an organization-wide roll-out. NGOs need to realize that the planning process is neither quick nor simple but it is crucial and the first step they should undertake when they decide to implement the purchase of any new technology.

In addition to managing expectations and advance planning of pilot programs, program managers should work with senior management to plan for long-term budget needs beyond initial purchase of the hardware and software. New staffing needs, maintenance, and additional testing should be added into program budgets before products are rolled out into programs. Ideally, NGOs will find room for an ongoing budget line for technology innovation. Whether this discretionary income falls under IT or program expenses, it positions an NGO closer to top learning organizations and promotes a culture of experimentation and technology advancement from within.

Finally, the best ideas will not get off the ground if internal staff shoot them down time and again. NGOs need to hire with an eye towards bringing in-house not only the best program-specific skilled staffers but also those with an enthusiasm for new technologies.

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## 9. Appendix: Interview Questions

1. What has been your experience using PDA technology?
2. What do you think the barriers are to more widespread use of this technology?
  - costs
  - training
  - technology-reliability/user friendliness, security
  - institutional barriers
3. (If not using) In your experience, what do you think is preventing the use of this tech in your field programs? (If using) What do you think is preventing other organizations from using this technology?
  - a. (If using) Did the idea of using hand-held tech originate in the field or in HQ?
  - b. (If using) Who actually made the final decision to implement?
  - c. If a lot of levels of bureaucracy: do you think your procurement process prevents or slows the implementation of new technologies?
  - d. Can you describe the process of procuring a technological device such as PDA? (If using) Was it time-consuming and inefficient?
  - e. Do you get to select the vendors/suppliers or other units? What would be the qualification criteria of the suppliers?
4. (If using) Can you relate an experience where using PDA technology made your work easier/harder?
5. What do you look for in a hand-held data device?
  - battery life
  - multi-lingual
  - multi-purpose: camera, recorder, telephone
  - compatibility
  - user-friendly
  - durability: heat/cold/chemicals/water resistant
  - memory
  - security
  - back office support: training/tech help desk
  - cost and frequency of software/hardware update
6. (If using) Are there any import/export restrictions for this technology that made implementation difficult?
  - a. (If not using) Were there any import/export restrictions for this technology that were a barrier to implementation?
7. Staff require training on any new technology or data collection method. (If using) How did you approach training?
  - train the trainer
  - one on one

- outside trainer from provider
  - one off/ongoing
- a. (If using) Did your team encounter any problems or challenges training on the hand-held technology?
    - language
    - computer/technical literacy
    - resistance to change
    - time
    - funding (work time lost by staff when attending training)
    - ratio of hardware to users
    - tech availability
    - willingness to implement (or lack thereof) in headquarters vs field office
  - b. (If not using) Were any of the (above) problems part of the reason hand-held technology has not yet been implemented? And which were the most important in making your decision.
8. Sometimes funding is a barrier. Was cost a big issue when deciding whether or not to use hand-held technology?
- a. (If using) Did you purchase or rent the devices?
  - b. (If using) Was it recorded as a program expense or a HQ expense?
  - c. (If using) Is it recorded as capital equipment or does it all come out of one year's budget?
  - d. How did you determine the cost effectiveness of the purchase or rental? Were costs like these factored in:
    - cost of paper surveys
    - cost of transport for paper surveys
    - cost of reproducing changes in surveys
    - data quality assurance
    - time saved in uploading data v. manual entry
9. Of the barriers we discussed today, what was the main barrier in your consideration to (not) implement hand-held technology for your data collection? Please rank.
10. Is there anyone else at your organization who I should speak to?