

NEW TECHNOLOGIES IN CASH TRANSFER PROGRAMMING AND HUMANITARIAN ASSISTANCE

A study by Concern Worldwide, Oxford Policy Management (OPM) and the Partnership for Research in International Affairs and Development (PRIAD)



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THE CASH LEARNING PARTNERSHIP

NEW TECHNOLOGIES IN CASH TRANSFER PROGRAMMING AND HUMANITARIAN ASSISTANCE

A REPORT FOR THE CASH
LEARNING PARTNERSHIP – CALP

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The Cash Learning Partnership (CaLP) aims to promote appropriate, timely and quality cash and voucher programming as a tool in humanitarian response and preparedness.

Originating from the will to gather the lessons learnt from the Tsunami emergency response in 2005, the CaLP is today composed by Oxfam GB, the British Red Cross, Save the Children, the Norwegian Refugee Council and Action Against Hunger / ACF International. The five steering committee organisations have come together to support capacity building, research and information-sharing on cash transfer programming as an effective tool to support populations affected by disasters in a way that maintains dignity and choice for beneficiaries while stimulating local economies and markets.

In 2010, the CaLP partnered with the International Federation of the Red Cross and Red Crescent societies (IFRC), with support from ECHO and Visa Inc.

For more information, visit: www.cashlearning.org

Research by Concern Worldwide, the Partnership for Research in International Affairs and Development (PRIAD) and Oxford Policy Management (OPM)

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ACRONYMS AND ABBREVIATIONS

ACF	Action Against Hunger / Action Contre la Faim International
API	Application Programming Interface
ATM	Automated Teller Machine
BISP	Benazir Income Support Program
CaLP	Cash Learning Partnership
CAR	Central African Republic
CBA	Cost Benefit Analysis
CGAP	Consultative Group to Assist the Poor
CRS	Catholic Relief Services
CSR	Corporate Social Responsibility
DDG	Digital Data Gathering
DFID	UK Department for International Development
DRC	Democratic Republic of Congo
ECHO	European Community Humanitarian Office
FAO	Food and Agriculture Organization of the United Nations
G2P	Government to Person
GIS	Geographic Information System
GPS	Global Positioning System
GSM	Global System for Mobile Communications
GSMA	The GSM Association
HAP	Humanitarian Accountability Partnership
HIFIVE	Haiti Integrated Finance for Value Chains and Enterprises Project
HMMI	Haiti Mobile Money Initiative
HSNP	Hunger Safety Net Program
ICT	Information Communication Technology
IDS	Institute for Development Studies, University of Sussex
IFRC	International Federation of Red Cross and Red Crescent Societies
KYC	Know Your Customer
LMMS	Last Mile Mobile Solutions
MNO	Mobile Network Operator
NADRA	National Database and Registration Authority of Pakistan
NGO	Non-Governmental Organization

OPM	Oxford Policy Management
PDA	Personal Digital Assistant
PIN	Personal Identification Number
POS	Point of Sale device
PRIAD	Partnership for Research in International Affairs and Development
SMS	Short Message Service
SPLASH	Sustainable Program for Livelihoods and Solutions for Hunger
OCHA	UN Office for the Coordination of Humanitarian Affairs
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children’s Fund
UNOPS	United Nations Office for Project Services
USAID	United States Agency for International Development
WFP	World Food Program of the United Nations

EXECUTIVE SUMMARY

Technology today is evolving at an extraordinary pace, changing the way we live and work. In recent years, advances in new technology in low-income countries mean there is growing interest from donors, practitioners and governments as to how technology can best serve humanitarian responses. Technology is felt to have potential to detect needs earlier, enable greater scale and speed of responses, enhance specificity of resource transfers to match needs and increase accountability while reducing opportunities for corruption and diversion. However, despite overall positive experiences with these technologies, they are not being adopted systematically in humanitarian programming in areas where systems and solutions do exist.

The humanitarian sector has also experienced rapid uptake in the use of cash transfers as a tool for humanitarian response in recent years. This has been in part enabled by to the rapid spread of branchless banking and electronic payments technologies. The demands of transferring money to large numbers of recipients as well as the level of accountability required of cash transfer programmes have also led humanitarian actors to adopt other technological innovations that have potential to benefit humanitarian programming more broadly.

This study was commissioned by the Cash Learning Partnership (CaLP) in 2011, to review the current use of new technology in humanitarian cash and voucher programming and the broader implications for humanitarian practice. The research was undertaken to explore (i) preconditions for the use of technological mechanisms identified; (ii) user-friendliness of the technology for the recipient and for the agency; (iii) issues concerning accountability; and (iv) potential for wider impacts.

The research discusses in detail three types of technology currently being used in aid programming: electronic payment systems, the use of mobile phones for text and voice communication, and digital data gathering tools. For each, the study outlines current use, examines benefits experienced and issues faced by the recipient and the agency and highlights key lessons learned. The study also looks briefly at new emerging used of technology in aid programming including recipient management and crisis mapping. The report then looks at the potential benefits and risks of using new technologies in the cross-cutting areas of cost-effectiveness and accountability.

The research examines the constraints to the uptake of these technologies in humanitarian programming, and has identified barriers to wider adoption of new technology that can be broadly grouped under seven themes: technological, financial, institutional, operational, attitudinal, political and legislative.

Finally, the report outlines suggested actions to move towards more systematic adoption of effective and accountable technological solutions in humanitarian aid and concludes by making recommendations for humanitarian actors in differing technological environments.

Electronic Payment Systems

Globally there has been growing recognition that electronic payment (e-payment) systems have the potential to provide more efficient and reliable delivery of cash payments than manual cash-in-envelope systems. The four electronic payment systems that are currently being used by aid agencies are pre-paid debit cards, smart cards, mobile money transfer systems and electronic vouchers. This research discusses each e-payment system in detail and synthesises the main benefits experienced and issues faced in terms of accountability, security, partnerships, accessibility, cost, and operational efficiency.

The most important benefits that were noted for all four e-payment systems include improved security for staff and recipients; reduced leakage; improved reconciliation and control of expenditure; greater speed and efficiency of transfers; reduced costs for the agency and recipient; and the potential for realising wider impacts for the recipient. However, agencies implementing new systems in emergencies, with the poorest sections of society in low income countries, are likely to face challenges arising from lack of prior experience with technology; poor network and infrastructure; low literacy and lack of agency capacity. The research also discusses briefly the differential impacts that using e-payments may have on women, the elderly and the chronically ill.

The research found that access to e-payments technology alone should not be assumed to automatically have financial inclusion benefits for the poorest people. There is, however, evidence that access to formal identification gained through participation in cash transfer programmes can provide individuals with longer-term benefits including the potential for their households to access public services. The research also records experiences of whether there are differential or unexpected social or economic impacts of cash transfer programmes that used information and communications technology (ICT), in terms of recipients' sense of dignity; wider impacts on traders and the local economy; communications; sharing of resources transfers; and better targeting / efficiency of transfers. Although in some of these areas the use of ICT has clear potential added benefits, the longer-term impacts of these experiences have not been properly documented, and in all cases further research is recommended.

Lessons learned show that certain context-specific factors can contribute to the greater success of programmes using e-payments technology, namely: strong delivery partners; adequate training for all stakeholders; availability of on-the-ground support; a well-functioning payment agents network; a solid (private sector) strategy for and broader commitment to the development of emerging systems or networks; and a financial regulatory environment suited to or adapted to the realities of the humanitarian context.

Overall the research found that despite encountering some challenges, all practitioners who have used e-payment systems to date found them beneficial and would use them again. Under the right conditions, e-payment systems offer a promising way to deliver aid to recipients with speed, precision and flexibility even in challenging environments.

Mobile Communications

In addition to the potential for e-payments, the surge in mobile phone ownership in low income countries means that mobile communications are increasingly accessible to disaster affected populations. This research identified three main uses of mobile phones for programme communication during recent humanitarian

emergencies: providing information to households and communities; enabling two-way communications with recipients; and improving the effectiveness of programme communications between head offices and field workers, all of which have potential to improve aid effectiveness and accountability.

The research looked at the main benefits experienced and issues faced with the use of mobile phone communications in terms of partnerships, effectiveness and impact, scalability, uptake by staff, and accessibility to communities. The main benefits experienced included speed of communication; appreciation by recipients and communities; cost-efficiencies at scale; and the opportunity for voice-based communication. The main issues encountered were trust of recipients with regards to mass SMS messaging; prohibitive costs from the recipient side; limited network coverage and/or reliability in remote areas; and limited phone ownership and literacy.

Overall the experiences of those interviewed were positive and agencies expected that such systems would continue to be further developed in future emergency response. However, the research found that new communications tools should be used to complement rather than replace traditional means of communication. Furthermore, improved communications must be a strategic undertaking, not assumed to be an automatic benefit of a mobile transfer programme. Context-specific factors, especially literacy, socio-cultural factors (such as gender differentiation in access to phones), private sector partners, trust by recipients and in-house capacity of the agency all need to be taken into account in developing communications approaches using mobile technology.

Digital Data Gathering

Humanitarian agencies are looking to technology-supported solutions to increase the efficiency, speed and accuracy of data collection in all types of aid programming. This research outlines current digital data gathering (DDG) solutions, whereby hand-held devices such as PDAs, smartphones or data pens are used to record data in the field and transfer information back to a server. The research discusses in detail the benefits experienced and issues encountered in terms of operations, cost, and effectiveness / impact of using DDG solutions.

Agencies found that for the most part the technology was accessible off-line; quickly learnt and adopted by staff; easily integrated with existing systems; and accepted by recipient communities. Agencies adopting digital gathering technology experienced significant gains in speed and efficiency, and also noted improvements in data regularity and gains for controls and audits.

Some of the challenges and limitations faced by agencies included: hardware or software that was mal-adapted to challenging conditions; high costs and time required for set-up; and limitations of connectivity. Agencies also noted context-specific limitations: in some areas data collectors felt that PDAs increased personal security risks, and certain local authorities would not authorise the use of digital data gathering tools. In addition, potential gains in terms of speed of response gains are still limited by the sector's ability to act on information in a timely way.

Although the use of DDG technology is still very new to humanitarian agencies, their overall experience was positive and no agency interviewed was planning to switch back to paper-based forms. This research documents important lessons learned for maximising the benefits and minimising the risks associated with the use of DDGs. Adequate planning and preparation is critical, including assessing options and choosing context-appropriate solutions. Adopting a brand-new technological solution in the midst of a humanitarian emergency with no prior preparedness can create difficulties and could potentially slow down response times.

The report also examines in more detail the use of technological solutions for improving recipient registration systems, in particular ID card production and the capture of biometric data, and outlines the main benefits experienced and issues encountered with these processes. While experiences with biometric technologies have yielded reductions in leakages and fraud, these technologies require costly start-up investments and programmes still encountered significant errors.

Information management

Deployment of the technologies described in this report is enabling faster accumulation of data, and is highlighting a need for more effective data management systems in the humanitarian sector. The research details several solutions that have been adopted in cash transfer programmes including custom-designed aid management software solutions, cloud-based data management solutions, and web-based software tools.

The research found that while these systems offer real potential benefits in terms of scalability, rapidity, resource-sharing across multiple locations, automation and streamlining of processes and controls for access and audits, custom solutions have huge set-up costs and web-based solutions are limited by connectivity. Furthermore, restrictive in-country data regulations and concerns about data protection are barriers to uptake.

The research also highlights some preliminary experiences of humanitarian agencies with emerging technological data gathering or management solutions. One such solution is the use of the general public to gather data, or 'crowd sourcing'. Another such technology is the use of location data from mobile phones to track population movements or displacements during and after a disaster.

Cross-cutting issues

Cost effectiveness

Many of the technologies examined by this study have high initial costs, but significant cost-efficiencies over time when compared to the recurrent costs of manual operations. However, the short-term horizon of humanitarian funding cycles may not capture the extent of these advantages, and therefore represents a barrier to the adoption of technological solutions. In areas where emergencies are likely to recur, or where technology will be retained for use in longer-term programmes, a longer time horizon for cost comparisons would be advisable.

Although little direct cost-comparison evidence is available, this study found some cost comparison evidence in favour of e-payment systems and DDG versus manual cash transfer systems.

Accountability

Electronic payment and registration systems have clear potential to improve accountability of aid to donors by providing a clear audit trail from funding to recipients, although technological solutions do not completely eliminate errors or prevent corruption.

The use of technology also has the potential to increase accountability to recipients by facilitating two-way communications and improving information flows. However, in some cases the possibilities that technological

systems offer to place tighter controls on aid may go against some of the gains that the humanitarian community has achieved in advocating for dignity, flexibility and choice through the use of unconditional cash transfers. In addition, the degree of personal information available to aid agencies through the use of technological solutions puts recipients at risk of invasion of privacy, especially if they are not fully aware of their rights in this regard.

Constraints to wider adoption of new technology

If e-payments services and other tools work, why have they not been more widely adopted to date? Critically, why are they not being adopted systematically in areas where systems and solutions do exist? This research has identified barriers to wider adoption of new technology that can be grouped under seven themes: technological, financial, institutional, operational, attitudinal, political and legislative.

Technological barriers include limitations in agent coverage and cash flow for e-payments systems; gaps in mobile network coverage; difficulties in technical integration with existing systems; and error rates of biometric technology.

Financial barriers identified were lack of resources for investment in new technologies; and lack of a business case to justify the expansion of services by the private sector into remote areas.

Institutional barriers within humanitarian agencies include: lack of awareness about new technologies; time and effort required to adopt new systems; and limited resources and capacity to adopt new ways of working. The low capacity of private sector actors to scale-up and low levels of recipient literacy and education also remain important constraints.

Operational constraints in adopting new technologies include the limited availability of time and resources to research, cost and select an appropriate technological solution, and the time required to negotiate contracts, set up and test new systems, and train staff.

Political barriers include aid agencies' concerns about data protection issues and, more broadly, wariness of the risks of involving private sector actors in the humanitarian sphere and suspicions about their underlying motives. Aid agencies may also be unwilling to share technological innovations between themselves, resulting in incompatible of custom-built technological solutions to the same problem, which may have a detrimental impact on aid effectiveness.

Attitudinal barriers from senior decision makers within all stakeholders can constrain the wider adoption of new technologies. Senior managers of humanitarian organisations may perceive new technologies as being too risky or expensive, may not be familiar with the potential benefits that new technologies can offer, may fear that technology will lead to exploitation of recipients by the private sector, and may be hesitant to commit resources to adopting new systems. Donor mind-sets and requirements for aid and recipient attitudes to new technologies can also present barriers to using e-payments systems to transfer cash.

Legislative barriers in the regulatory environment vary from country to country. National governments can act as promoters of or as barriers to adoption of particular e-payment mechanisms or the use of digital gathering technology. There is also generally a lack of clear national policies on data protection in both donor and host countries as well as proprietary concerns around custom-designed solutions.

However, the research found that some of these barriers are already reducing as technology continues to advance in low income countries and donors and aid agencies gain more knowledge and experience of technological solutions. The growing adoption of cash transfer programming has pushed donors and aid agencies to forge alliances with private sector partners and adopt or develop technological solutions which have wider potential gains for humanitarian programming as a whole.

Suggested actions to move forward

If agencies are serious about realising the potential and use of new technology to deliver humanitarian aid to the poorest, rapidly and at scale, actions are needed to overcome the barriers identified.

Humanitarian stakeholders should work together to **improve the technological environment**, by collaborating with service providers, supporting the extension of existing mobile networks and branchless banking systems, and using existing solutions instead of developing parallel ones. The humanitarian community should also support the development of cross-mobile network interfaces and advocate nationally and globally for improvements in the regulatory environment.

Developing the capacity of stakeholders to use new technology for humanitarian response is also critical. Aid agencies should actively investigate digital data gathering and information management solutions, and improve their capacity and preparedness to implement new technology solutions by increasing familiarity of agency staff with new approaches. Greater linkages between humanitarian and development programming and longer funding horizons would help to improve recipients' capacity to benefit from new technologies, as would education and investment in developing user interfaces for illiterate populations. Donors should consider funding the development of open-source platforms, and make funds available for agencies to adopt new technologies. Sharing knowledge and creating an evidence base are also important to drive change.

Humanitarian stakeholders need to **formalise and improve new ways of working** in order to improve coordination, increase influence and realise economies of scale. Agencies should move towards consolidating experience with technological solutions and developing a 'tool box' of standard approaches, and invest in overcoming internal barriers to adopting new technologies. Donors should create incentive structures for the private sector to develop technology platforms that meet humanitarian needs, and finance the adoption of compatible technological solutions by aid agencies working together.

The research also recommends establishing an agency to act as a focal point or moderator within the humanitarian community to build links with the ICT sector, moderate technological development for aid and promote or advocate for adoption of technical standards for e-payments and data management systems. Leadership is also needed to develop codes of conduct, guidelines and minimum standards for the management and sharing of personal data.

Conclusion

The recommendations for the humanitarian community that finalise the research report focus on three different situations:

- **Where mobile connectivity is already established** in an area and technological solutions exist, agencies and donors should develop standard approaches to support systematic adoption of new technology in programmes to improve efficiency and effectiveness of aid provision.
- **In areas where emergencies are chronic or recurrent**, there should be a push, before the next crisis, for development of new financing models to meet costs of investment and for preparedness frameworks, between donors, agencies and the solutions providers.
- **When an area with limited infrastructure/technology** is hit by a sudden onset disaster, it is not the right time to start implementing new ways of working or try out new technology. However, the humanitarian community operating in these contexts should stay abreast of developments and seek to move forward the development of such solutions and of network connectivity where possible.

I. INTRODUCTION

I.1 Rationale for the Study

The Cash Learning Partnership (CaLP) was established in 2005 following the Indian Ocean Tsunami emergency response, to gather lessons learnt from the cash based assistance programmes. Comprised of Oxfam GB, the British Red Cross, Save the Children UK, Action Against Hunger / Action Contre la Faim International (ACF) and the Norwegian Refugee Council (NRC), the consortium aims to build the capacity of practitioners to improve the scope and quality of cash transfer and voucher programs and ensure the evolution of accountable, relevant and innovative programming through evidence-based research. In 2011 CaLP commissioned a piece of research to investigate the use of new technology to enhance cash and voucher programming in humanitarian contexts.

New technology, enabling the digital coding, encryption, transfer, management and analysis of data, including information and financial value, has evolved at an extraordinary pace over the last 20 years, driving changes in the social and commercial spheres. The humanitarian sector engages the poorest people in the world and often operates in challenging environments (isolated environments which lack support systems and infrastructure; face security issues; and with populations that may lack awareness or experience of new technology). A reliance on technology until recently was likely to be considered an additional burden, rather than a tool for improving programme effectiveness. However, advances in new technology in low-income countries mean there is growing interest from donors, practitioners and governments as to how technology can best serve humanitarian responses. Technology is felt to have potential to detect needs earlier, enlarge capacity of and speed up response, enhance specificity of transfers to match needs and enhance accountability while reducing opportunities for corruption and diversion. Changes in technological capacity, particularly those relating to banking and mobile phone technologies, pose unique opportunities for a broader consideration of the transfer of cash over in-kind aid in emergencies.

CaLP commissioned Concern Worldwide (Concern) to lead a partnership comprising Oxford Policy Management (OPM) and the Partnership for Research in International Affairs and Development (PRIAD) to review the current use of new technology in humanitarian aid applied to cash transfer programming. The team were supported with an expert working group¹, who provided access to documentation and expert interviews, advised on the approach and conducted peer review.

The research was undertaken to explore (i) preconditions for the use of technological mechanisms identified; (ii) user-friendliness of the technology for the recipient and for the agency; (iii) issues concerning accountability;

¹ Comprising representatives from Accenture Development Partnerships, Gates Foundation, Digicel, PSI Mobile, FrontlineSMS and Help Age International

and (iv) potential for wider impacts. CaLP wished to highlight evidence of the cost effectiveness of new technology, the barriers to upscale and any unmet needs of the humanitarian sector. The methodology for the research was designed specifically for the final research question, given the resources available. It involved three approaches:

1. The collection and review of available documentation on technology in humanitarian cash transfer programming and other relevant areas.
2. Over 90 telephone interviews with a range of stakeholders with experience of humanitarian cash transfer programming, electronic payment systems, digital data gathering and ICT (Information Communication Technology) for Development.
3. Over 20 face-to-face interviews in two countries of particular interest for the use of technology in humanitarian cash transfer programming.

Full detail of the methodology including the documents consulted and the people and organisations interviewed are detailed in Annex 1. The researchers examined new technologies that can be applied to achieve various objectives within the project management cycle: (i) delivering electronic payments; (ii) communication with recipients and field staff; (iii) data gathering; and (iv) data management.

1.2 Structure of the Report

Section 2 discusses experiences to date with electronic payment systems. Section 2.1 describes four electronic payment systems identified during the research as well as highlighting the scope and scale of the use of these systems by aid agencies to date. This includes pre-paid debit cards, smart cards, mobile money systems and electronic mobile vouchers. Section 2.2 discusses the benefits experienced and issues encountered by agencies working with these systems in cash transfer programmes, under the themes of accountability, security, accessibility to recipient, cost, efficiency (*vis-à-vis* time, technology and connectivity) and partnership. Section 2.3 briefly discusses electronic payment systems in relation to the needs of specific vulnerable groups – women, older people and the chronically sick.

Section 2.4 focuses on the potential wider impacts that can be leveraged through use of electronic payment systems in humanitarian programming, with a focus on financial inclusion (in 2.4.1), recognised citizenship (in 2.4.2) and socio-economic impacts (in 2.4.3), which includes a discussion on agency, wider impacts on traders and the economy, communication, sharing and other unintended impacts. Section 2.5 summarises the key lessons learned to date from experiences with electronic payment systems. This includes a discussion of the factors identified as common features of successful electronic payment programmes in 2.5.1, as well as a consideration of risk and of profitability in 2.5.2.

Section 3 highlights agencies' experiences with mobile phone technology for improved programme communication on cash transfer but also wider programming. Section 3.1 highlights the three uses of such technology identified during the research, as a channel providing information to households and communities, as a means of soliciting two-way communication with targeted communities for feedback and complaints response, and for improved communication between programme staff. Section 3.2 discusses the benefits experienced and issues encountered by agencies working with these systems. Section 3.3 highlights some of the lessons learned to date, around the need for combined approaches, a focus on context, working with the private sector, organisational capacity, the importance of accurate information, and a discussion of the merits of voice versus short message service (SMS).

Section 4 details agencies' experiences with digital data gathering on cash transfer and wider programmes. Section 4.1 considers the use of digital data gathering tools for data collection purposes during programmes and identifies several solutions that agencies have worked with, including both open source tools (Frontline SMS, Rapid SMS and Episurveyor), as well as proprietary solutions (iForm Builder provided by Apple, and PSI Mobile Solutions provided by PSI Mobile). Section 4.2 discusses the benefits experienced and issues encountered by agencies working with these systems, under the themes of operations, cost and efficiency, and effectiveness and impact. Section 4.3 discusses some of the lessons learned around the need for preparation, factoring in the human element, and the need for service support. Section 4.4 summarises the usage of electronic registration systems identified during the research, including electronic ID cards and capture of fingerprint biometrics. Section 4.5 discusses the benefits experienced and issues encountered by agencies working with these systems to date.

The focus of Section 5 is on consideration of emerging technologies to improve information management in emergency response. Section 5.1 on data management systems briefly discusses the move by some agencies towards new systems for data management, including recipient management systems and cloud computing. Section 5.2 discusses the benefits experienced and issues encountered as well as the lessons learned, including fears of agencies around data protection and the challenges with designing customised solutions in house. Section 5.3 summarises the key lessons from the experiences with crisis mapping in Haiti, whilst section 5.4 introduces the efforts during Haiti aftermath for population tracking through the mobile phone.

Section 6 briefly discusses a number of cross-cutting issues identified during the course of the research. Section 6.1 provides a discussion relating to the cost effectiveness of new technology in humanitarian contexts. Section 6.2 discusses findings relating to new technology and accountability both upwards towards donors and downwards towards recipients and communities.

Section 7 discusses barriers preventing more systematic adoption of new technology by agencies to date, grouped under seven themes. Section 7.1 discusses technological barriers relating to limitations with the technology solution or system. Section 7.2 details the financial barriers, those relating to the investment cost either on the part of the agency or of the service provider to expand to less profitable areas. Section 7.3 highlights institutional barriers, relating to the required changes to institutional practices and ways of working, which take time to develop, as well as lack of institutional capacity. Section 7.4 discusses operational barriers, such as the time required for initial scoping and establishment of systems which presents a challenge in emergency response. Under Section 7.5, Political Barriers, the paper discusses issues around the changing of power relationships as a result of introducing or sharing new technology. Section 7.6 introduces attitudinal barriers which relate to the perceptions of key decision makers, including agencies, donors, recipients and the private sector. Section 7.7 discusses legislative barriers, relating to the regulatory environment in the country concerned as well as proprietary claims on systems and data. Section 7.8 highlights summaries from the research, which indicate some of these barriers may be reducing.

The final section 8 discusses possible ways forward to overcome these barriers and realise the potential of technology to enhance capacities of aid provision. Section 8.1 discusses actions relating to overcoming the limitations of the technological environment, such as connectivity. Section 8.2 details actions to improve capacity of people or organisations. Section 8.3 proposes new processes and ways of working for the humanitarian community. The conclusion and recommendations follow in section 8.4.

2. EXPERIENCES WITH ELECTRONIC PAYMENT SYSTEMS

As a modality of humanitarian assistance, cash and voucher programmes have increased in frequency, scope and scale over the last five years. However, these programmes tend to be implemented in isolated or insecure environments. Cash transfer programmes therefore present logistical, operational and security challenges, especially in countries with limited physical and financial infrastructure². Methods of delivering cash manually, by hand or in envelopes, can be inefficient, costly and leakage-prone, and can present a security threat.

Globally there has been growing recognition that electronic payment (e-payment) systems have the potential to provide more efficient and reliable delivery for cash payments. Almost 50% of social transfer programmes launched globally in the past decade (mostly in middle-income countries) use electronic payments³. Manual payment arrangements are considered inherently prone to inefficiency and risk, particularly in isolated rural areas, to divert staff from core responsibilities and impose hidden costs.

This change is partly driven by a desire to realise cost savings. An analysis to estimate the aggregate benefits that would accrue to the Indian government if it connected all poor households to an e-payment system found that automating all government payment flows could save the Indian government up to \$22.4 billion per year, or 8% of the total flows. Inefficiencies were found to be based on 1) leakages (75-80% of total losses); 2) transaction costs (15–20% of total losses); and 3) administrative and overhead costs (5–10% of total losses)⁴.

This research has identified four electronic payment systems utilised by aid agencies to deliver cash or vouchers to recipients. These are described in detail in section 3.1 below. All are based on an electronic process for moving stored value from an agency account to an account of the recipient, based on mobile networks. Most commonly these payment systems are hosted by a commercial enterprise. Some twenty-five programmes using e-payment systems were identified. Rationales for opting for electronic payments solutions include improved security for staff and recipients, reduced leakage, improved reconciliation and control of expenditure, speed and efficiency, reduced costs for the agency and recipient, as well as the potential for wider impacts for the recipient beyond the duration of the transfer. However, agencies implementing new systems in emergencies

² Aker et al (2011a)

³ NAO (2011)

⁴ Lochan et al (2010)

with the poorest sections of society in low income countries are likely to face challenges. These include lack of prior experience with technology, poor network and infrastructure, low literacy and lack of training⁵.

2.1 Delivery Mechanisms Covered in the Research

2.1.1 Pre-paid Debit Card

Pre-paid debit cards are plastic cards with a magnetic stripe that can be read in any valid ATM (Automated Teller Machine) or retail POS (Point of Sale) device. A Personal Identification Number (PIN) is generally incorporated as a means of verification⁶. The humanitarian agency sends a file containing the information required to make the payments (unique identifier, card number and amount to be paid) to the bank providing the service. Value can be credited by the bank from a central server. Alternatively, an agency can pay in advance for a 'stockpile' of cards which they activate and accredit online as and when needed. Cards are generally valid for a defined period. Recipients swipe their card at the POS and enter their PIN to redeem all or part of the electronic value for goods or cash. The magnetic stripe can be programmed so the card is only accepted in certain POS or ATM locations (Bankable Frontier Associates 2011). Six humanitarian programmes utilising this mechanism were identified in the research, including programmes implemented during slow and rapid-onset emergencies. Three programmes were agency-led and three were initiated by the government of Pakistan. The number of recipients varied from 300 to 1.3 million households (the government-led programme). Details are in Annex 3.1.

Figure 2.1 *Examples of Pre-paid and Smart Cards*



BFA (2011)



Goulay, D. and Creti, P. (2011)

2.1.2 Smart Card

Smart cards are plastic cards with an embedded chip containing information on the recipient and the benefits they are entitled to, which are read at select ATMs or POS. These can be pre-loaded with value by the service provider before distribution to recipients. For multiple transfers, future accreditations to the card happen

⁵ Wyeth 2011

⁶ ACF's Programme in the Philippines used signatures not PIN codes

through the POS. In order to redeem the stored value, the recipient visits a participating agent, inserts the card into a POS and presents identification – such as a PIN code or fingerprint – to authenticate the transaction for goods or cash. Payment information is saved into the POS⁷. The transaction can be undertaken without the need for network connectivity, providing the vendor takes the POS to a place of connectivity at a later date to upload transaction information to the central database and reconcile the account.

The research identified six programmes using smart cards for cash payments in humanitarian contexts in agency-led programmes. The research also incorporated experiences from the Hunger Safety Nets Program (HSNP) in Kenya, a longer-term government social protection cash transfer programme. Whilst this is different in many ways to a short term emergency cash transfer, there were nevertheless relevant lessons to be learned, since this programme is delivering money to poor households in difficult remote environments. Contexts included slow and rapid onset emergencies and displacement. Numbers of recipients in these programmes ranged from 1000 to 60,000 households on the HSNP.

2.1.3 Mobile Money Transfer

Mobile money transfer applies to any payment or fund that is transferred from one person or organisation's 'mobile wallet' or bank account to another through mobile phones. Since 2005, a variety of mobile money transfer systems have emerged in 80 low or middle income countries in Africa, Asia and Latin America⁸. Most systems allow the user to store value in a 'mobile wallet', or account accessible by the handset, to convert cash in and out of the stored value account through accredited agents, and to transfer value between users⁹. It can also be used to purchase air time or pay for goods with participating vendors. Transactions are effected via an SMS (short message service) command or a menu on the phone using a unique PIN, and confirmed via SMS notification.

In some countries, such as Kenya and the Philippines, MNOs and third party platforms are allowed to store mobile money on behalf of their customers. In other countries bank regulators do not allow MNOs to hold funds. Instead the MNO must partner with a commercial bank to offer these services. In Pakistan, UBL Bank has developed its own in-house mobile banking solution without an MNO partner, meaning this system can work across the various MNO networks.

The benefit to humanitarian agencies comes from bulk payment facilities, which enable organisations to send payments to multiple 'customers' simultaneously, which increases efficiency. An agency sets up a corporate mobile money account. Targeted recipients have personal mobile money accounts opened with the service provider, linked to their phone number. The agency provides the service provider with a list of those to be credited (unique identifier plus phone number and amounts to be transferred). When a recipient receives a transfer, they are notified via SMS. Corresponding funds are debited from the agency's account. The service provider provides detail of transaction confirmations. Fees are generally charged for transferring funds to another user and for withdrawing cash from the system, borne by agencies and recipients, respectively. Often agencies also cover the cost of the initial 'cash out'¹⁰. Another potential benefit is the ability to use recipient's phones to transfer information back and forth between the agency and recipients. This is considered further in section 3.

Mobile money services are well established in Kenya, elsewhere in East Africa and in the Philippines, and are becoming available in other low income and crisis-prone countries, including Nigeria, Niger, Haiti, Zimbabwe,

⁷ Bankable Frontier Associates (2011); Ratichek (2011)

⁸ Aker (2011)

⁹ Aker et al (2011a)

¹⁰ Meaning the withdrawal of physical cash from a point of sale, ATM or participating agent

Afghanistan, Pakistan and Democratic Republic of the Congo (DR Congo). This research highlighted experiences of twelve humanitarian programmes utilising mobile money in emergency response to or early recovery from rapid and slow onset disasters and displacement in five country contexts, detailed in Annex 3.1. Several examples come from Haiti, where the inefficiency and security issues facing agencies transferring money after the earthquake meant mobile money services were in great demand. Here, six international NGOs have piloted the use of mobile money products from the two competing MNO providers. Mobile money services are also becoming available in Somalia, Pakistan, Iraq and Rwanda.

2.1.4 Mobile Payments with Vouchers via SMS

Mobile payments using electronic vouchers are relatively new tools which promise to expand the e-payment toolkit available to humanitarian agencies. Voucher redemption via mobile phone emulates a mobile money interaction, where value held by one person (the agency) is authorised to be transferred to another person (recipient) via SMS command. Redemption is validated and tracked by a central system; validation requires inputting an additional identifier or PIN. This research identified two types, using physical vouchers in the form of scratch cards or SMS voucher codes¹¹.

i Scratch card codes redeemed through the phone

Scratch card vouchers held by recipients are redeemed at a participating store vendor by scratching a panel to reveal a code. This code is input into the vendor's phone along with a serial number on the voucher corresponding to the person's ID. These details are verified by the central database and an SMS confirmation sent back in response. When a confirmation SMS is received, the vendor is authorised to provide the recipient with the specified value of money or goods. The World Food Program (WFP) made use of this technology for their SPLASH (Sustainable Program for Livelihoods and Solutions for Hunger) programme (see case study 1, annex 7).

Figure 2.2 *Example of Mobile Voucher Scratch Card*



Source: WFP Zambia

¹¹ Wyeth (2011)

ii SMS voucher codes

In this system the voucher code is not given to the recipient on a card but via SMS. This is then sent along with the recipient's PIN and the participating vendor's code as an SMS to the central database. The system verifies the ID of the recipient, and sends a response SMS regarding the value to be allocated. In October 2009 WFP undertook a mobile voucher pilot response to the Iraqi refugee crisis in the Syrian Arab Republic covering 1,000 households with two payments of \$34; this was subsequently scaled up to thousands of households over two years. FrontlineSMS in conjunction with Catholic Relief Services (CRS) in Kenya are working on development of an open source mobile voucher system delivered by SMS.

2.2 Benefits Experienced and Issues Faced

Table 2.1 *Benefits experienced and issues faced concerning e-payment system*

Theme	Benefits experienced	P	S	M	V
Accountability	● Unique PIN protection increases the likelihood cash reaches the intended person	X	X	X	X
	● Increased visibility of use of the grant and control of what recipients buy	X	X	X	X
	● Secure systems and reduced handling of cash reduces leakage	X	X	X	X
Security	● Considered to reduce the exposure of staff and recipients to possible robbery	X	X	X	X
	● Particular vulnerable groups such as women are able to keep cash securely	x	X	x	
Partnership	● Private sector service providers reduce workload and risk of staff moving money	X	X	X	X
	● Service provider have gone the extra mile in providing service required	X	X	X	X
	● Good publicity for the service provider	X	X	X	
Accessibility	● User friendly: e-payments were generally understood by recipients	X	X	x	x
	● Convenience: reduced opportunity costs; store purchase reduces liquidity issue	X	X	X	x
	● Eligibility: KYC requirements more relaxed than bank accounts		X	x	X
Cost	● Technology reduces the variable distribution costs on recurrent transfers	X	X	x	X
	● Possible to deliver via e-payments without significant investment hardware	X		x	X

Operations/ Efficiency	<ul style="list-style-type: none"> ● Branchless banking 'agent' model enables penetration to areas without banks ● Off-line functionality ● Generally the technology performed well 	x	X	X	X
Theme	Issues encountered	P	S	M	V
Accountability	<ul style="list-style-type: none"> ● People shared their PIN, meaning there remains a risk of fraud or coercion ● Increased control of expenditure reduces flexibility and choice for recipients ● There remains some evidence of leakage at point of cash out ● Some difficulties with reconciliation 	X	x	X	x
Security	<ul style="list-style-type: none"> ● Most people 'cash out', so still have a risk of carrying cash ● Desire for cash out means programmes still need to move physical cash 	x	x	x	
Partnership	<ul style="list-style-type: none"> ● Instances of the private sector provider promising more than they can deliver ● Calculated risk for the service provider since problems may damage brand 	X	X	X	
Accessibility	<ul style="list-style-type: none"> ● User friendly: literacy presents a barrier to full adoption ● Convenience: lack of agents and agent liquidity can delay cash out ● Eligibility: KYC requirements remain a barrier to some poor households 	x	X	X	X
Cost	<ul style="list-style-type: none"> ● Initial set-up costs can be significant 	x	X	X	X
Operations/ Efficiency	<ul style="list-style-type: none"> ● Poor connectivity can cause transaction delays and problems with reconciliation ● Technical glitches occur in any new system and biometrics can be error prone ● Delays due to the time required for identifying systems and negotiating contracts ● Significant investments in training are required 	x	X	x	x

P = Pre-paid card, S = Smart card, M = Mobile money, V = Electronic voucher, x = some evidence, X = substantial evidence

Sources: ACF (2011), Ratichek (2011), BFA (2011), Hunt et al (2011), WFP (2011a), WFP (2011c), Aker et al (2011a), MacAuslan, I. (2009); Interviews: WFP DR Congo, Concern Kenya, Concern Niger, Concern Haiti, Oxfam Haiti, WFP Cote d'Ivoire, Digicel, Voila, Airtel, UBL Bank, Visa, Citibank, ACF Philippines, Richard Chirchir, FrontlineSMS, WFP Zimbabwe, Oxfam Kenya, Horn Relief, Help Age Haiti, Mercy Corps Haiti, WFP Niger

Table 2.1 summarises the benefits experienced and issues faced to date by agencies utilising e-payment systems in cash and voucher programmes. Experiences to date have generally been positive and from the recipient perspective technology has generally been well received¹². However, there have undoubtedly been issues faced as agencies and households grapple with technology for the first time. The rest of section 2.2 discusses the headline information shown in table 2.1 in some detail.

Accountability¹³: Agencies interviewed agreed that a major benefit of e-payment systems is the reduced opportunity for fraud or diversion of intended funds. It is easier to track payments if they are sent electronically, which can reduce corruption and increase confidence that the right amount of money ends up with the right individuals. The agency is able to reconcile accounts through web-based systems that designated staff can access to view payments (checking which ones have been processed), transaction expenditures and remaining balance. In the case of mobile money, this reconciliation is in the form of reports downloaded through the web interface. It should be noted that this is to a certain extent anecdotal, since there was little evidence of comparisons of leakage in a manual system having been undertaken. Using electronic payment systems limits but does not completely remove the opportunity for diversion from a programme. The benefits to the agency of greater controls must also be considered from the perspective of accountability downwards to recipients and in light of the realisation that in many cases recipients have shared their PIN. Further consideration of these issues is a focus of section 6.2 ('accountability') and section 2.4 ('potential for further impact') respectively.

Security: This was an important factor for staff and recipients, particularly in areas notorious for robbery. Mobile money recipients in urban centres in Kenya and Haiti expressed satisfaction that the money was kept secure on the phone due to the PIN, and was more secret than queuing in public to receive cash, so was less likely to be stolen¹⁴. Delivering aid through e-payment systems does not remove the need for the physical movement of cash – rather the responsibility is transferred to agents. Traders participating in the Hunger Safety Nets Programme in Kenya and mobile money agents in Haiti remain fearful of robbery, but so far the benefits of being part of the system outweigh this risk¹⁵. The extent to which this spreads or concentrates the risk depends on the number of agents. In the cases of Concern's smart card programme in Malawi, Concern's initial mobile money pilot in Kenya, and WFP's experience in Niger, the lack of an established branchless banking agent network meant cash needed to be brought in to communities by few individuals, in larger amounts and appropriate security still needed to be factored in.

Private sector partnership: Almost all programmes using e-payment systems have been based on partnerships with private sector service providers that have developed or own the technologies. These new partnership arrangements have presented some mutual benefits for agencies and service providers. Service providers have had opportunities to test their branchless banking models and to reach a previously untapped market. Service providers with experience of working with aid agencies said in interviews that they saw the value of the humanitarian market. Agencies can outsource a large part of the task of distributing aid to an organisation with the systems and processes in place to manage this quickly, securely and efficiently. As Visa explained, "this is a natural extension of what we are doing on the business side – payments are what we do"¹⁶. Agencies have often

¹² Recipients' opinion is based on interviews with agencies with experience of implementing e-payments programmes, as well as programme evaluations and reviews that take into account recipient feedback: Aker et al (2011a), MacAuslan, I. (2009), ACF (2011), Ratichek (2011), Hunt, S. et al (2011)

¹³ The Humanitarian Accountability Partnership considers Humanitarian Accountability to be the mechanisms by which individuals, organisations and states account for their actions and are held responsible for them, and by which they may safely and legitimately report concerns and complaints and get redress where appropriate. It can be considered as accountability of agencies upwards to donors, whereby agencies account for funds dispersed, as well as downwards to recipients.

¹⁴ Interviews: Concern Kenya; Concern Haiti; World Vision Haiti; Mercy Corps Haiti

¹⁵ Ratichek (2011); Interviews Voila

¹⁶ Interviews: Visa

been able to negotiate preferential rates with service providers. In some cases, such as with the WATAN card programme in Pakistan, all fees were waived; it must, however, be remembered that this was a government-initiated rather than aid-agency-led programme.

There were instances of agencies citing that private sector partners could promise more than they were able to deliver, which could affect service quality as programmes increased in scale. There have been benefits and challenges for the participating agents or vendors, many of whom are relatively new to the branchless banking agent network. Benefits come in the form of commission and (in the case of shopkeepers) additional trade, which must be balanced with the difficulties and risk of managing the liquidity¹⁷.

Accessibility¹⁸: There is ample evidence that despite some challenges, e-payments solutions have proved accessible to recipients of humanitarian assistance programmes in numerous contexts, including for particularly poor and vulnerable groups, such as women and pastoral communities.

Convenience: This is determined by how easy it is for recipients to access their transfer relative to the alternative method (travelling to and waiting in line at a bank or manual distribution point). Time spent by recipients to access their transfer through e-payment systems was generally felt to be quicker, especially after systems had been operating for several distributions. In Save the Children's programme in Swaziland, queuing times to access cash through ATMs at Standard Bank significantly reduced over 3 months from 4 hours to 1¹⁹. Concern Niger's cash transfer recipients experienced a significantly decreased opportunity cost using mobile money relative to manual transfers²⁰ (see case study 2 in Annex 7). In Haiti it has been calculated that the average cost (including real costs and opportunity costs) to a household for transferring cash through traditional financial institutions is \$15, compared to an average minimum wage of \$5 per day²¹. Such costs are felt to be much reduced with mobile money. For new users time spent in preliminary mobile money training sessions must be factored in. However, the preliminary results of a study by Dalberg Associates in to the experiences with NGOs piloting mobile money services in Haiti tell a very positive story, whereby the critical path of essential steps for manual cash transfers on average was more than double that of mobile money²².

Reduced queuing time depends on sufficient cash-out points through a developed and functioning branchless banking agent network, or sufficient vendors with POS. Agent coverage on the WATAN card programme in Pakistan was much sparser in remote rural areas, increasing the transaction cost to the recipient. On average, people had to travel 30.4 km and queues of 3 hours were reported at ATMs and POS – but the alternative to distribute cash manually to 1.3m households would likely have had far longer wait times²³. The average travel cost to withdraw money was only \$3.2 from a cash transfer of \$225²⁴. Using technology to transfer cash to remote areas does not remove the need for liquidity in these areas to serve the cash-out function. Whilst proximity to an agent is required in order for a recipient to access cash, the liquidity within the branchless banking platform as a whole is based on

¹⁷ Ratichek (2011)

¹⁸ Accessibility for the recipient here is considered as three factors: the user-friendliness of the technology, the convenience to the recipient of using the technology relative to the alternative manual approach, and accessibility of the e-payment systems in terms of proof of identity requirements.

¹⁹ Beswick (2008)

²⁰ Aker et al (2011a)

²¹ Baptiste et al (2010)

²² Bernasconi, L. et al (forthcoming)

²³ Interview: DFID Pakistan

²⁴ Hunt, S. et al (2011)

the cash stock of the agents rather than simply the number of agents. In more remote areas this is a product of how well the agents are supported with liquidity by the service provider.

Demand for cash out from recipients can present a challenge for small agents with small cash flow. Mercy Corps reported that in Haiti liquidity challenges for their vendors led to wariness of vendors toward offering cash-out services. TN Bank in Zimbabwe originally aimed to give Save the Children's smart card recipients the opportunity to get 100% cash out, but this was subsequently reduced to 50% when traders participating in TN Bank's agent network pointed out that they 'are not a bank' and could not agree to this²⁵. Experiences of Save the Children's smart card programme are included in case study 3 in Annex 7. In northern Kenya Equity Bank initially had to restrict recipients to fixed pay points and specified times in order to manage the liquidity of agents in remote areas. However, e-payment systems may help to solve issues of liquidity over time by establishing systems through which cash can flow. This appears to be the case in northern Kenya. Moreover, if e-payment systems contribute to the development of cashless markets (e.g., where goods can be paid for via electronic transactions) there may in the longer-run be less need for liquidity in terms of physical cash. Humanitarian programmes can avoid liquidity problems by using e-payment systems to provide commodity vouchers, though this will restrict choice until markets develop.

Figure 2.3 Customer Education Poster for Tcho Tcho Mobile Haiti



Source: Digicel (2011). 'Tcho Tcho Mobile', Digicel Powerpoint Presentation, Slide 6.

User-friendliness: Generally people targeted by humanitarian cash transfers are the poorest sections of society, and illiteracy remains common place for the target groups of the majority of programmes highlighted in the research. This and lack of previous exposure to technology can present challenges for aid agencies. However, these can be addressed.

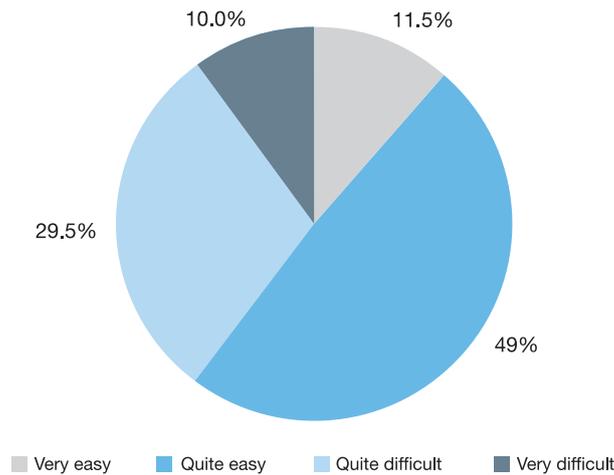
Innumeracy and/or illiteracy have presented issues with all e-payment systems requiring a PIN or higher level of interaction with the technology (such as mobile money). In all e-payment systems

²⁵ Interview: Save the Children Zimbabwe

there were examples where either innumeracy or lack of understanding of the process of cash out meant people shared their PIN. By doing so recipients could be at risk of coercion or deception, and loss of income. There were anecdotal reports of this in Haiti, and evidence in Pakistan showed that WATAN card recipients were paying a percentage to ATM guards and bank tellers²⁶. This is discussed further in Section 3.5.2 below. Despite these issues over 60% of those included in the WATAN card rapid evaluation felt the card was easy to use.

Figure 2.4 *Ease of Use of the WATAN Card*

How easy did people find using the WATAN card?



Source: Hunt, S. et al (2011)

Mobile money is where the problem of poor understanding of the technology by recipients is most acutely felt. In many low-income countries a large minority of people still do not have access to a phone or understand mobile money application. Case study 2 shows that in Niger, women on Concern's cash transfer programme required support to undertake the process of cash-out at the agent. Similar issues were reported in Haiti by Mercy Corps, who encouraged illiterate recipients to visit cash-out agents with a relative or friend²⁷.

Legal accessibility: Registration requirements for branchless banking services are set by the national banking regulators, in line with national 'Know Your Customer' (KYC)²⁸ requirements. A national ID card is generally a minimum requirement – something which many poor or disaster-affected households do not have, which means certain intended recipients of humanitarian programmes are ineligible for using branchless banking²⁹. There are cases where regulators have reduced the KYC requirement for certain e-payment services. In Haiti, it is possible to register over the phone for a 'mini-wallet' account with Voila's T-Cash and Digicel's Tchotcho mobile. This makes registration for humanitarian purposes much easier but has a reduced account size which limits the functionality of the account. In general, e-payment registration requirements are less stringent than those of the formal banking sector.

²⁶ Hunt, S. et al (2011); Interviews: DFID Pakistan, UBL Pakistan, CGAP

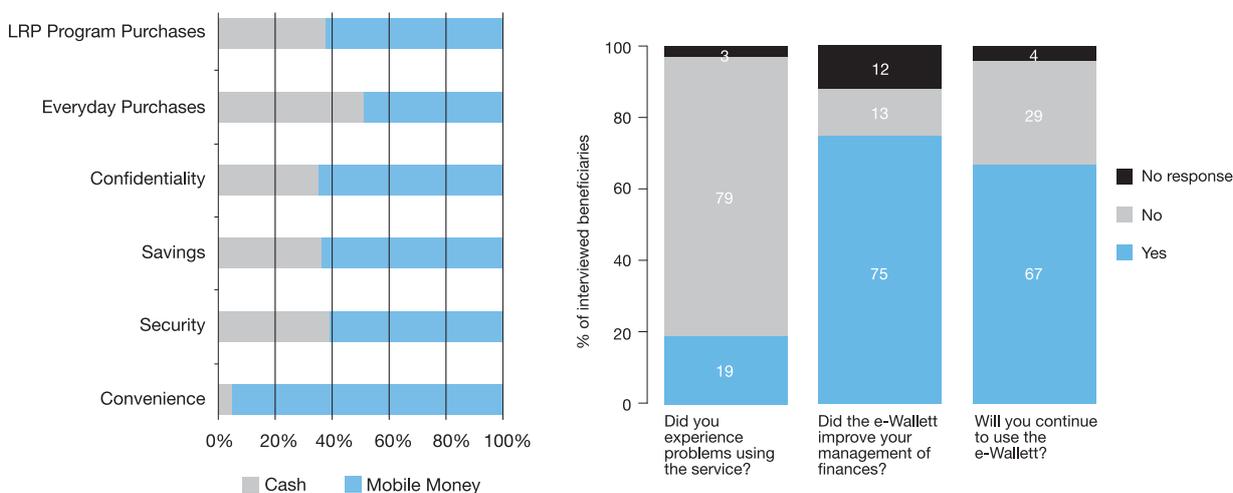
²⁷ Mercy Corps (2011b)

²⁸ The activity of customer due diligence that financial institutions and regulated companies must perform to identify their clients and ascertain relevant information pertinent to doing financial business with them

²⁹ Jere, P. and Devereux, S. (2008); Interview: Concern Kenya

Overall, card-based schemes and the mobile voucher systems using scratch cards were felt to be accessible for poor vulnerable households in low income and disaster contexts. UBL Bank and the UK Department for International Development (DFID) report satisfaction amongst WATAN card recipients in Pakistan. The rapid evaluation confirmed that everybody who received the card was able to withdraw the grant. 96.3% of recipients interviewed said they would prefer to receive the second tranche of support through the card, and 99.5% were still in possession of their card. Overall agencies report that recipients preferred the process to the alternative of manual transfers or paper vouchers. Similar findings are seen from programmes working with mobile money, despite the increased difficulties with literacy. In Niger, with one of the highest adult illiteracy rates and lowest phone penetrations in the world, almost all of the 4000 recipients were appreciative of the mobile money method. The feelings of ‘agency’ and confidence that putting such tools into the hands of recipients generates should not be underestimated.

Figure 2.5 Highlighting the Opinions of Recipients to Mobile Money in Haiti



Source: Mercy Corps (2010)

Source: Mercy Corps (2011b)

Cost: Costs of using e-payment systems can be divided into set-up and transaction costs. Transaction costs varied from 1% to 6% per transaction and were often negotiated down from commercial rates by agencies. The evidence suggests that set-up costs are highly dependent on the context – on systems that need to be invested in, and on cost sharing arrangements with the service provider. The POS units utilised in card-based systems are expensive. In all the card-based systems operating through a service provider, the costs of POS were covered by the service provider, with agencies covering costs of the cards. In the cases of mobile money transfer where agencies have provided phones and solar chargers for recipients, this capital investment increases per recipient transaction costs. In Haiti there were cases of MNOs subsidising these costs for recipients (Oxfam, Help Age, Mercy Corps) whilst in Kenya Concern only provided SIM cards, since most households had access to a phone. Without the cost of the phone in the set-up cost, the smart card solution is arguably the most expensive – cards cost on average \$5 each, compared to less than 50c for pre-paid cards and even less for a SIM or scratch card. In Haiti, Mercy Corps also needed to factor in costs associated with identifying and training vendors; setting up the agent network is a considerable investment, however, generally speaking this would be a cost covered by the service provider. Cost effectiveness is considered in section 6.1.

Operational Issues: Overall it appears that transfers through e-payment systems offer several further operational benefits beyond cost efficiency to the implementing agency, compared to alternative approaches. Much of this

evidence is anecdotal since there have been few direct comparisons. Those interviewed were in agreement that benefits in this respect increase with scale and duration. The speed at which the Pakistan WATAN card flood response was scaled up in a matter of weeks is testament that the system worked well. Stakeholders with experience of the WATAN card programme and HSNP in Kenya explained that these systems offer potential to reach huge numbers of people rapidly which would not be feasible with manual approaches. Detail of the experiences in Pakistan is found in case study 4 (annex 7). Concern Kenya pointed out that e-payment systems enable the agency to vary the value of the transfer month to month or even house to house. Challenges faced during implementation of e-payment systems related to the time required for adoption of new ways of working and ‘teething problems’ associated with an emerging technology and branchless banking agent network. Many of the programmes highlighted are pilots, and the products are new to market.

Time: One issue faced was the time migration to a new system can take. In the Philippines a proposed partnership between ACF and Citibank, Visa’s first choice of partner, to deliver cash as part of the flood response, had to be shelved because of the time Citibank required for due diligence. It was noted by all those interviewed that time to identify, set up and train stakeholders in using new systems also cannot be underestimated.

Technology: There were inevitable glitches to troubleshoot. The majority of issues raised concerned either the PIN not working or (in the case of mobile-based systems) the SMS system failing, highlighted by table 2.2 which shows complaints and enquiries WFP received during the first distribution cycle of 1000 recipients of mobile vouchers in Syria. Such glitches reduce over time, but it takes time to sort them out and the agency needs to rely on the service provider for troubleshooting. A common problem on the Kenya HSNP was a failure of a recipient’s fingerprint to authenticate the person. Pros and cons of biometrics are discussed further in section 4. Overall, however, the technology has functioned well and in challenging environments. One of the difficulties with mobile money cited by several agencies was found at the reconciliation stage. World Vision in Haiti explained that teething problems were faced when getting timely reports from the MNO showing that payment has been effected.

Table 2.2 *Complaints and enquiries during WFP’s mobile voucher programme in Syria*

Nature of complaints	Cycle I	
	Number of enquiries	% of total enquiries
SIM not working (activation)	81	21.3
SMS not received	76	19.9
PIN not working	27	7.1
PIN not received	23	6.0
Voucher exchange process	1	0.3
Other problems	11	2.9
Enquiries	162	42.5
Total	381	100

Source: Omamo, S. et al (2010)

Connectivity: Such systems require reliable connectivity. Signal strength was identified as a potential issue affecting e-payments in more rural areas of Haiti and Kenya, and even in Syria. To resolve this

issue in Haiti, Voilà deployed temporary mobile amplifiers. An FAO (Food and Agriculture Organisation) feasibility study to compare scratch and smart cards noted that in low network areas there is a risk that the scratch-card transactions cannot be completed³⁰. The off-line capability of the smart card system is a big benefit of the solution, cited by all users.

2.3 Considering needs of vulnerable groups

Cash and voucher programmes in humanitarian contexts tend to be targeted at the poorest and most vulnerable sections of society. There are concerns, understandably, that such groups will face the greatest barriers to use of new technology, for example the worst literacy challenges, little previous experience, and mobility difficulties, and that these systems may not therefore be the most appropriate for them. This section briefly highlights the findings of the research in relation to three recognised vulnerable groups – women, older people, and the sick or infirm.

Gender: The majority of the cash and voucher programmes included in this research were targeted towards women. Whilst women tend to have less prior experience with technology in general this has not proved a barrier, and e-payment systems have proved appropriate to their needs. Jenny Aker explained that in Niger “user-friendliness (of mobile money) was not necessarily a gendered issue”³¹. There were cases of both women and men handing over their PIN in Pakistan – this was not a gendered issue. Mobility restrictions in particular cultures such as Pakistan and Niger were cited as challenges to the programme design – but these are difficulties with cash generally rather than the technology per se. One of the benefits of placing the technology in the hands of women cited by many agencies and recipients themselves³² is increased security of the money. The fact that money is stored on the phone or card means it can be less easily taken than physical cash. Given the fact, though, that most people elected to cash out immediately and women in some cultures were accompanied with their menfolk to the point of cash out, more evidence is needed before it is possible to determine the extent to which the technology increases control of the cash by women. Aker’s research has found some evidence that the mobile money delivery channel may impact on intra-household decision-making with respect to the cash transfer, thereby allowing women to have greater control over the spending of the cash transfer and encourage them to engage in consumption and production decisions. These results are indicative at best, and further research is needed³³.

Older people and chronically sick: Older people will arguably have had least exposure to new technology and issues of dexterity and visual impairment risk further impacting on their ability to utilise new technology. The marketing and training of MNOs is also geared towards younger people. Finally, their mobility may be restricted, meaning long travel distances to points of ‘cash out’ can be an additional burden to older people compared to other groups. An issue affecting older people and the infirm is mobility. Two cases from Haiti are worthwhile highlighting. Mercy Corps in Haiti encouraged elderly recipients to bring a trusted family member to the mobilisations and trainings to assist them when making transactions. Help Age targeted older people in the early recovery phase of the earthquake and their target group experienced some difficulties with mobile

³⁰ Interview with FAO

³¹ Interview: Tufts University

³² Oxfam GB and Concern Worldwide (2011), Mercy Corps (2011b); Interviews: Concern Kenya, Oxfam Haiti

³³ Aker et al (2011a)

money. However, it has not dissuaded the organisation from using this system in the future³⁴. ACF Philippines opted for a separate distribution plan for older people³⁵.

2.4 Potential for Further Impact

This section discusses the evidence for wider impacts for the recipient of introducing e-payment tools.

2.4.1 Financial Inclusion

This research provides evidence that it may be possible to realise benefits of financial inclusion through introduction of poor vulnerable people to branchless banking during humanitarian response. These benefits, however, cannot be assumed to accrue automatically, and may require more concerted investment on the part of the agency and longer exposure of recipients to these financial systems beyond the duration of emergency response.

Branchless banking services are proving to successfully reach and be in demand from those who lack access to formal financial services. A recent Consultative Group to Assist the Poor (CGAP) Focus Note found that 37% of customers (or an average of 1.4 million people each) across eight branchless banking providers were previously unbanked³⁶. There are examples of successfully leveraging mobile money platforms to serve as a delivery channel for additional financial services. In Kenya, Safaricom and Equity Bank have introduced M-KESHO, an interest-bearing savings account linked to M-PESA.

One of the oft-cited benefits of delivering cash transfers through e-payment systems is the opportunity this provides to poor and vulnerable households to save money safely and access formal financial services, positively impacting on household's wellbeing beyond the duration of the transfer. Whilst not the primary goal of humanitarian programmes, it is nevertheless often cited as an additional benefit in programme documents and such perceived benefits were cited by humanitarian agencies and by all service providers interviewed. Part of the rationale on the part of the service providers for supporting these programmes is the link agencies provide to the 'unbanked' and new markets.

A study by Microfinance Opportunity in Kenya used a financial diaries approach to examine use of M-PESA relative to other financial channels by low income users living on under \$2/day, over 6 months, in non-emergency contexts. This study found that 'cash is king', with mobile money making up less than 6% of the total transactions and mainly restricted to remittances followed by rapid cash out. The study found that 'respondents did not appear to use M-PESA as de-facto savings'³⁷. Similar findings are reported by Mbiti and Weil, who find that use of M-PESA increases likelihood of using formal financial services but 'find little evidence that people use their M-PESA account as a place to store wealth'³⁸. The conclusion of both papers is that use of mobile banking by the poorest is possible, but did not change the habitual savings behaviour.

³⁴ Interview: HelpAge International Haiti

³⁵ Interview: ACF Philippines

³⁶ Mackay, C. and Pickens, M. (2010)

³⁷ Stuart, G. and Cohen, M (2011)

³⁸ Mbiti and Weil (2011)

During an emergency response programme it is unlikely households introduced to e-payment systems will begin to use them for savings, since the cash value is generally calculated to only cover a percentage of basic needs. However, many programmes have cited that a benefit of storing money on an e-payment system means the money can be withdrawn progressively over the month. This is, however, not borne out in the evidence. For example, over 50% of households in Concern Niger's cash transfer programme cashed out immediately. Even with the longer-term HSNP, evaluation showed that most recipients withdrew the full transfer of approximately \$24, and almost none had opened bank accounts. Rather, savings took the form of an asset purchase. Building trust in a new system is likely to take time.

There are programmes with evidence that recipients continue to make use of these payment systems after the humanitarian response programme is over. The pre-paid cards used in humanitarian cash transfers have a limited activation period; however, there is the potential for households to turn these into functional bank accounts, and Visa and bank partners see this as a long term objective of engagement. Donors such as DFID Pakistan also have this aim in mind. In Pakistan 70.2% of people expressed a desire to transfer the WATAN card into a permanent bank account where they could save money³⁹. UBL Bank in Pakistan has an objective of 15% of WATAN card recipients to convert in phase two – though this is considered overly ambitious. DFID's lesson is that one needs to bear in mind the confidence of the recipient and the more stringent KYC requirements for greater financial inclusion to be achieved⁴⁰. Nevertheless, it is estimated that 273,000 bank accounts were set up to date following provision of pre-paid cards in the emergency response⁴¹. The extent to which this correlates with the poorest households is unclear. Save the Children's recent programme of piloting the use of smart cards in Zimbabwe is showing signs of success in this area, with the community Village Savings and Loan scheme adopting the TN Bank card in order to save, and taking over the transaction costs of the system when the Save the Children humanitarian intervention finished. This project included savings promotion as a key component of the programme.

There is very little evidence available showing the extent to which households that are registered for mobile money in humanitarian programmes increase use of voice or SMS services, or whether people continue to use mobile money in the future. It was surprising to note that such monitoring activities were not standard on the part of the service provider, given they all said they saw humanitarian engagement as a gateway to the 'unbanked'.

If achieving financial inclusion is an aim of a humanitarian intervention it must be stated as an objective of the programme with activities included in order to achieve it – it cannot be assumed that such a benefit will accrue automatically. Something to be aware of if planning to leverage these wider benefits for targeted recipients is the standard user fee or commission structure, and the implications these have on recipient usage. In the case of M-PESA the charge for cashing out is relatively high for small amounts, which creates the incentive for recipients to cash out all in one go. In most cases the charges for mobile money remain less than charges for formal savings accounts. Those using mobile money should also be aware that without some top up or account activity, their lines will be deactivated.

In certain contexts mobile literacy presents a barrier to wider adoption of mobile money. During Concern's cash transfer programme in Niger, very few programme recipients used mobile money beyond cashing out their transfer. This is compared to Concern's programme in urban settlements in Nairobi, where recipients are more familiar with mobiles, and also with mobile money given the high visibility of mobile money services in Kenya's urban areas, and who use M-PESA more regularly. As Mercy Corps in Haiti explain, optimising the

³⁹ Hunt et al (2011)

⁴⁰ Interview: DFID Pakistan

⁴¹ Visa (2011)

double bottom line of financial education within a short term programme is difficult. Mercy Corps is instead investing now, after the humanitarian action is finished, in mobile literacy training to those enrolled⁴².

2.4.2 Recognised Citizenship

The Know Your Customer identification requirements of the e-payment service providers have sometimes meant the humanitarian agency had to support certain households to register for a national ID card. Whilst this can be a time-consuming and laborious process, it nevertheless has potential to reap important future benefits for the household concerned, since in many cases a national ID card is a requirement for accessing wider public services. In Save the Children's Swaziland cash transfer programme, 4000 households were supported to get ID through a partnership with the Ministry of Justice⁴³. On the large scale flood responses in Pakistan, possession of a national ID card was a precondition for registration. In response to this, the government agency responsible for this, NADRA (National Database and Registration Authority), undertook concerted efforts to issue over 400,000 new cards to the flood affected, free of charge. The rapid evaluation found that few people were excluded from the programme due to their not possessing a valid ID⁴⁴. The feeling of 'agency' and confidence that having an ID can instil in recipients should not be overlooked⁴⁵.

2.4.3 Socio Economic Impacts

Agency: Several studies suggest an improved sense of dignity, agency, confidence or pride on the part of the recipient that they now own a phone or bank card⁴⁶. The extent to which this translates into changes to decision making at household or community level, or to which such benefits would last beyond the duration of the transfer, is unclear.

Wider impacts on traders and the economy: There were numerous instances in the research of benefits accruing to small entrepreneurs involved in the programmes as cash out agents or vendors⁴⁷. Their voluntary participation is evidence of the attractiveness to small vendors to act as agents and provide such branchless banking services on cash transfer programmes. In cases where systems were set up specifically for the programme, such as with mobile vouchers and WFP's smart card solutions, benefits end when the programme finishes. In the case of agents of private sector service providers these agents will continue to operate. It would be interesting to ascertain, in an environment such as Haiti where NGO humanitarian programmes have formed a relatively large part of the mobile money demand to date, whether and how the cessation of aid programmes impacts on the businesses of these agents.

Communication: A potential real benefit is the wider utility of the phone to serve as a communication tool, if this is provided to the recipient during the set up for a mobile money transfer. This benefit should be factored into any cost benefit analysis (CBA) for programmes considering covering the cost of phones for recipients. Concern Niger found that those provided with a phone were more likely to make calls or send and receive 'beeps' (simple SMS notifications requesting someone call you). However, phone ownership did not increase their likelihood of receiving a call, using SMS for messaging or using mobile money⁴⁸. It also opens up the possibility of two-way communication between agencies and recipients, discussed further in section 3.

⁴² Interview: Mercy Corps Haiti

⁴³ Beswick (2008)

⁴⁴ Hunt et al (2011)

⁴⁵ Cited by recipients of programs led by Concern Niger

⁴⁶ Brewin, M. (2008), Oxfam GB and Concern Worldwide (2011); Interviews: Oxfam GB Haiti

⁴⁷ Ratichek (2011), Interviews: Visa, Mercy Corps Haiti

⁴⁸ Aker et al (2011a). This is of course one of the countries with the lowest adult literacy rates in the world; literacy should be noted as a significant stumbling block for realising wider impacts

Several stakeholders have raised concerns that introduction of technology to emergency response can remove the essential person-to-person time⁴⁹. In this study we have not found this to be significant, partly since technology is so new and thus in most cases people required programme staff or community agents to work through the process with them.

Sharing: The greater relative privacy of the mobile money transfer approach can reduce sharing among households within the village, thereby leaving more disposable income available for the household⁵⁰. From a humanitarian perspective this could be seen as positive – in the sense that the intended recipient gets 100% of the benefit – but also as negative, in the sense that the mechanism risks disrupting essential coping strategies. Concern found no effects of the mobile money programme on sharing norms in Niger – however, if realised it could prove dangerous, and it is something agencies should be aware of, assess and monitor.

Unrealised benefits: Electronic payment systems make it more feasible to nuance targeting of cash assistance according to specific needs, such as varying the value of the transfer by household size or in response to inflation in the price of goods. WFP and Concern in Kenya were doing this, but other programmes tended to provide a standard envelop of assistance to recipient households. An often-cited benefit of the smart-card solution is the opportunity to layer detailed recipient information on different ‘electronic wallets’ on the card, which could provide a centralised system that all humanitarian donors and, potentially, government services could use. However, no examples of this multi-functionality or linking of services were identified during the research.

Other unexpected impacts: Tufts University’s study of the differential effects of delivering cash through mobile compared to the manual method on Concern’s programme in Niger highlighted a range of differential impacts on account of the mobile money transfer (see case study 2, Annex 7). There is a need to be aware that the adoption of ICT has the potential to change social fabrics and behaviours. There is some evidence of this happening as a result of longer-term access to branchless banking in low income countries⁵¹. More research in this area in humanitarian contexts would be useful.

2.5 Lessons Learned

Despite encountering some challenges, all practitioners who have used e-payment systems to date found them beneficial and all would use them again. E-payment systems are a promising way to deliver aid to recipients with speed, precision and flexibility even in challenging environments. ACF in Philippines considers the pre-paid card to be practical and scalable for repeated distributions⁵². WFP in DR Congo have concluded, based on WFP’s experiences with smart cards in Kenya, that such a system has strong potential to meet a large proportion of their requirements⁵³. Concern in Niger has reverted to mobile money payments for 100% of their cash payments in 2011.

There is no single model of delivery mechanism, rather the most appropriate system depends on consideration of the context, the delivery options available, what the programme aims to achieve, its scale and scope, and recipient profile. Many issues identified are common, to a greater or lesser extent, to all four e-payment systems

⁴⁹ Nelson et al (2010)

⁵⁰ Aker et al (2011a)

⁵¹ Interview: institute for Money, Technology and Financial Inclusion

⁵² ACF (2011)

⁵³ WFP (2011a)

and a number – such as insufficient planning, capacity issues and the time required for adapting to new ways of working and new partnerships- relate to people and processes rather than the technology per se. Utilising new technology for payment delivery brings both benefits and increased complexities, but these challenges can be overcome. Whilst using new technology does not solve all of the issues associated with cash payments, many of the issues are also seen in manual payments, and often to a much greater degree (for example, fraud and extortion).

Whilst it is likely that aid recipients are those most likely to be new to such technology, this research has shown this does not present too great a barrier. The evidence shows that aid agencies should not preclude particular ‘vulnerable groups’ from opportunity to access technology, rather the decision will depend on the context, specific needs of the group, their mobility and the possibility to build responses to their needs into the programme. There is potential to leverage wider, positive benefits from introduction of e-payment systems to aid recipients. Organisations wishing to realise these should understand that it is likely to take some time and effort, depending on the context, and must factor this into the design and duration of the programme. Trust issues need to be overcome, and services need to remain accessible to households after the cash transfer programme ends. More could be done to monitor patterns of usage post-project, in order to build the evidence base for realisation of such wider impacts.

2.5.1 Factors identified that were common features of successful e-payment programmes

The following were highlighted repeatedly in the research as being factors contributing to the successful implementation of programmes using e-payment systems.

Strong delivery partners: The adoption of e-payment systems calls for expertise outside of humanitarian agencies and alliances with dedicated service providers. The private sector partners have often been more than just provider of an e-payment service – they have been active partners in the programme. The case of Pakistan is striking, where UBL Bank and Visa succeeded in deploying 1.3m cards in less than 3 months, developed training materials and also covered a significant part of the costs. Equity Bank in Kenya has invested heavily in establishing four new branches in four remote districts of the arid and semi-arid lands (ASAL), and subsidised equipment for the HSNP. All implementing partners consider the work of Equity to have been critical in the achievements of the HSNP⁵⁴. Many of the MNOs providing mobile money services have invested heavily or are in the process of investing in the agent network (Safaricom has invested a huge amount of money over the last five years in an agent network in Kenya that is now more than 16,000 strong). In the case of Haiti the MNOs have been active partners in the emergency response in other ways (see sections 3 and 5). For programmes requiring cash out the private sector partner has played a vital role in actively supporting liquidity management.

Adequate training for all stakeholders: A good understanding of the process is needed from implementing staff and recipients of humanitarian cash transfer programmes, the majority of whom can often have had little previous experience with formal banking or transferring value using phones. Vendors may also require training. One of the main lessons from Visa and UBL Bank was that success will depend on how effectively the importance of the card, the PIN, and their functionality, is communicated. In new partnerships and programmes time must be invested by both the service provider and the NGO on education. Lack of knowledge and distrust of banks risks creating resistance from people; however, with awareness raising and training this research has found that these can be removed. Additional investment is required for those who are illiterate or innumerate.

On the ground support: Programmes have not removed the human element from the process. Hands-on presence on the ground and interaction with recipients were deemed essential to support recipients through

⁵⁴ Ratichek (2011)

the process. Some considered this a requirement for oversight of the cash-out or purchase process (including ACF, WFP and Mercy Corps). Concern's program in Niger, WFP's in DR Congo and Help Age's in Haiti are examples of where agencies had community animators on hand to assist with the cash-out process through mobile money. Some target groups are likely always to require this type of support.

Functioning payments agent network: A factor behind the success of several of these programmes is the use of pre-existing payment agent networks. The Visa system is an internationally recognised standard. In the pre-paid card examples, bank partners, regulators and vendors were familiar with Visa, which reduced set-up time. Some programmes used pre-existing POS infrastructure in shops. The larger-scale humanitarian programming in Pakistan coincided with UBL Bank's plans for rapid expansion of their branchless banking model, leading to mutual benefits. Programmes in Pakistan through UBL Bank have used UBL's existing Omni technology platform for card issuance, registration and cash withdrawals.

A critical success factor for branchless banking, whether via card or mobile phone, is known to be the establishment of the distribution channel. The model of choice is to develop this through a network of agents. This is critical for successful delivery of aid through these systems, given the demand from this client base for cash out, which can put additional pressure on agent or vendor liquidity. Mobile money cash transfers in Kenya through Safaricom are taking advantage of a well-established agent network. In the Philippines Globe Telecom has over 18,000 'GCASH'⁵⁵ partner outlets. As Chris Bold of CGAP explained, it is far easier to work with the rails that are there already, than to develop a whole new system⁵⁶.

In the case of newly emerging systems, a sound strategy for rapid expansion: This research identified several instances where a humanitarian need has coincided with development and rollout of a strategy for branchless banking by the private sector. In the case of UBL Bank, Digicel, Voila, Equity bank and TN bank the company's investment was not merely a public service, but can be considered a core element in their strategy for agent network expansion to serve previously untapped markets, and central to projected revenue and profit growth. The expectation of these service providers is that scale will yield profitability. These systems are developing a model to provide branchless banking through a network of agents. All the service providers listed above were in the first 12 months of agent network development when they began working with NGOs. Experiences in Haiti (case study 5, Annex 7) show that it is indeed possible to work with emerging systems.

KYC suited to the realities of the context: In the case of Haiti, KYC requirements for accessing mobile money accounts were reduced by the regulators upon consideration of the post disaster context and assessment of the reduced risk of smaller mobile wallets. TN Bank in Zimbabwe and Airtel in Niger accepted the verification of community leaders and aid agencies respectively for households without national ID. In Kenya on the HSNP, requirement for national ID for an account with Equity Bank was relaxed by enabling dual registration per account, meaning only one member per household required ID. In Pakistan, UBL Bank reports that the central bank has been progressive in consideration of reduced KYC for facilitating access to pre-paid cards following the floods.

2.5.2 Consideration of risk and of profitability

Chip and security: Whilst the chip adds some security features to a card system, these additional features must be weighed up against the additional costs. Card-based service providers interviewed were of the opinion that if this is the only reason an agency is considering a smart card rather than pre-paid card, then the amounts

⁵⁵ The name of Globe telecom's mobile money product

⁵⁶ Interview: CGAP

transferred are generally small and the programme time-limited these anti-fraud measures may not be worth the increased costs.

Risk to recipients: Several actors consider the fact that households gave their PIN code away or requested support at the cash out point could put them at risk of extortion. This research found several actors familiar with the Pakistan experience who acknowledged that there is enough anecdotal evidence to suggest this did happen. In the rapid evaluation a significant number of recipients reported paying a fee both to collect their WATAN card and withdraw money from their account.

Table 2.3 Fees paid by WATAN card recipients to access their card or cash

	Proportion of beneficiaries reporting having to pay a fee to receive WATAN card	Proportion of beneficiaries reporting paying a fee to withdraw the CDCP
Punjab	0%	2.0%
Sindh	22.0%	18.4%
Khyber Pakhtunkwa	4.2%	9.1%
Balochistan	54.9%	42.9%
Total	20.7%	18.3%

It is not possible to tell from this data whether risk of this occurring was increased for those who had more difficulties using the system – rather it seems to have been something pervasive in the Pakistan context. As DFID Pakistan pointed out, this is a rights issue rather than the fault of the technology per se. One has to consider also what the alternative would be – since it is well-known that similar payments were very often solicited through the postal system⁵⁷. However, it is proof that technology is not a panacea for the problem of leakage and corruption.

Profitability versus Corporate Social Responsibility: For many payment service providers, humanitarian cash-transfer programmes have provided opportunities both to learn lessons from ‘pilot’ deployment of model systems and penetrate new markets. However, benefits to the private sector should not be overestimated. The branchless banking model requires considerable investment to reach profitability. In most of the above examples the service provider can be considered to be working at cost; they have charged less than market rates. The branchless banking business case becomes more costly with increased penetration into rural, isolated or sparsely populated areas. Whilst it is to their credit that the majority of firms highlighted have been happy to negotiate reduced or even to waive transaction charges, ultimately these services need to be paid for, and this is especially important from the perspective of growing the payments agent network. Development of in-house solutions would require greater effort and would likely cost more. In return, it is reasonable to expect a certain level of service quality from the provider.

⁵⁷ Interview: DFID Pakistan

3. EXPERIENCES WITH MOBILE PHONE TECHNOLOGY FOR ONE AND TWO WAY COMMUNICATION

Ensuring communication with disaster-affected communities is recognised as important to improve aid effectiveness. A recent report by NGO media development organisation Internews on the situation facing refugees in Dadaab camp, Kenya, highlights that serious communication gaps between the humanitarian sector and refugees are hampering aid response. More than 70% of the newly-arrived refugees interviewed lacked information on how to register for or access aid⁵⁸.

The surge in mobile phone ownership in low income countries in recent years means that in areas with high network coverage mobile communications channels are increasingly accessible to disaster affected populations. This research identified three main uses of mobile phones for programme communication during recent humanitarian emergencies. These are not specific to cash transfer programmes, but are logical entry points for ones seeking to use mobile money.

3.1 Uses of technology identified

Providing information to households and communities: The mobile phone has been used as a conduit through which aid agencies ensure targeted communities can access vital information, either through text or voice. Initiatives to date include call centre hotlines, automated voice-messaging systems and message-based platforms. The 'Infoasaid' project between BBC World Service Trust and Action Aid is utilising Frontline SMS⁵⁹ and Freedom Fone to send information simultaneously to pastoral communities receiving food assistance in

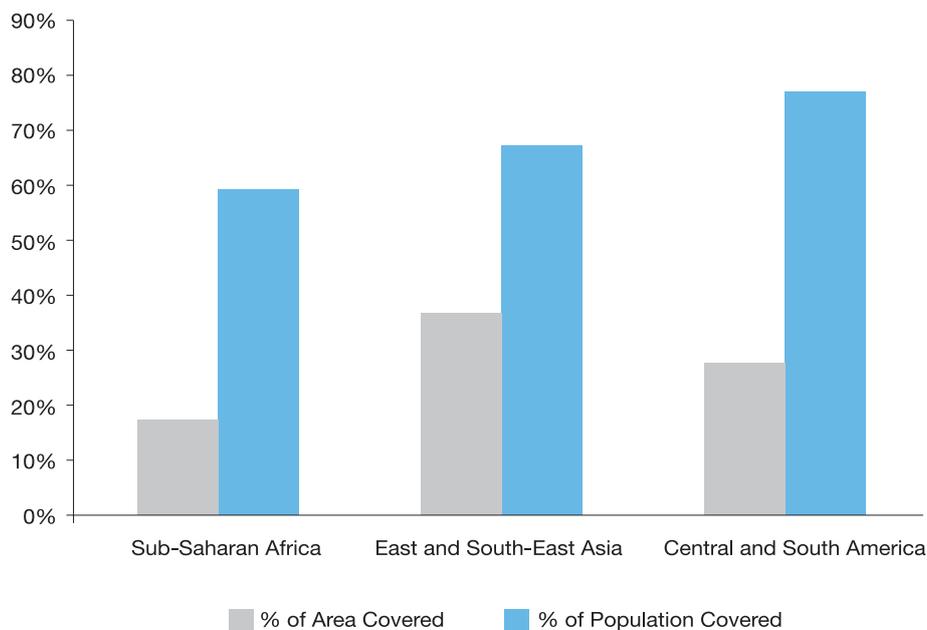
⁵⁸ Internews (2011)

⁵⁹ Frontline SMS is free software that turns a laptop and a mobile phone or modem into a central communications hub. The programme enables users to send and receive text messages with groups of people through mobile phones.

Kenya⁶⁰. IFRC⁶¹ in partnership with the MNO Voila developed an SMS broadcast system to support dissemination of health information during the earthquake response in Haiti⁶². Concern has developed an SMS message service to support community health programming in Malawi.

Figure 3.1 Graph showing area and population with mobile phone coverage by region, in 2009

Area and Population with Mobile Phone Coverage in 2009, by Region



Source: Aker, J.C. (September 2011). 'Dial "A" for Agriculture', Center for Global Development, Working Paper 269, p.24.

Feedback and complaints response: The phone has been used as a means of supporting two-way communication with recipients, either to field questions or, more commonly, as a component of an NGO's complaints response mechanism for improved accountability. This research highlights experiences from six initiatives in the recent emergency responses in Haiti and East Africa (Annex 4.1). All examples identified focus on voice rather than SMS-based systems, for reasons of literacy and because it was considered important to maintain personal contact with the communities concerned. In many of these instances this two-way communication enables recipients to take advantage of mobile money e-payment systems to deliver cash transfers.

Communication with field workers: Several organisations, including UN OCHA⁶³ in Kenya and CRS, are utilising FrontlineSMS to facilitate coordination of aid operations between office-based and field-based staff, to speed up reporting of issues to inform response⁶⁴.

⁶⁰ Taylor, A. (2011)

⁶¹ International Federation of Red Cross and Red Crescent Societies

⁶² Chazaly (2011)

⁶³ UN Office for the Coordination of Humanitarian Affairs

⁶⁴ La Rochelle, L. (2011); Interviews: UN OCHA

3.2 Benefits Experienced and Issues Faced

Overall the experiences of those interviewed were positive. While there has been limited impact evaluation of these systems to date, agencies interviewed considered the tools a successful means of communicating with and receiving information from recipients, and expected that such systems would continue to be further developed in future emergency response. IFRC's evaluation found that 95% of respondents found the SMS information service useful and 90% reported they made some kind of preparation as a result of the information received⁶⁵. Oxfam Haiti reported that calls for questions and complaints increased over time and inappropriate use of their 400 number decreased, suggesting that there was a demand and that the hotline was serving the desired purpose⁶⁶.

Phones are becoming a medium of choice for feedback, with 61.4% of camp residents and 38.7% of new arrivals in Dadaab camp citing voice calls as the preferred way to provide feedback to agencies⁶⁷. Such tools have potential to improve effectiveness of aid by enabling vital information concerning programme activities or wider issues to reach programme recipients, and to improve programme implementation based on feedback. This has potential to enable people to access more of the information they need during a crisis. These solutions can be relatively easy and cost-effective to set up and implement. They are not without challenges, but with appropriate planning can be feasible.

Table 3.2 *Benefits Experienced and Issues Faced with Mobile Communication Tools*

	Benefits	Issues
Partnerships	<ul style="list-style-type: none"> ● Telecoms sector is emerging as a new player in the humanitarian sphere. ● Use of Frontline SMS removes the need to form a partnership with an MNO 	<ul style="list-style-type: none"> ● Approaches requiring negotiation with the MNO can slow the process down
Effectiveness and Impact	<ul style="list-style-type: none"> ● Appreciated and utilised by recipients ● Closer contact with community ● Timely dealing of issues ● Speedier communication than email 	<ul style="list-style-type: none"> ● Trust of recipients: Mass SMS can be considered spam. Two-way communication can have potential to raise expectations ● Effectiveness depends on the nature of the complaint ● Charging for calls can reduce uptake
Scalability	<ul style="list-style-type: none"> ● Costs are manageable and reduced through negotiation with the MNO ● Feasible where there is mobile coverage ● SMS is a low-overhead way of managing information between staff 	<ul style="list-style-type: none"> ● Takes 3–5 seconds per message for FrontlineSMS which will be a limiting factor in scale up to large numbers of recipients ● Agency must have capacity to respond ● Depends on phone penetration in the target population

⁶⁵ Chazaly, C. (2011)

⁶⁶ Oxfam GB (2011a)

⁶⁷ Internews (2011)

Uptake by staff	<ul style="list-style-type: none"> ● Leveraging basic tools, already available ● Requires limited ICT experience ● People are used to phones ● Voice-based systems can be kept simple (a manned phone line) 	<ul style="list-style-type: none"> ● The attitude of staff to SMS, compared to the 'norm' of email, may limit adoption ● Need buy in to concept of complaints response ● Difficult to use SMS for nuanced information ● Automated voice-based services can be complicated to develop
Accessibility to communities	<ul style="list-style-type: none"> ● Evidence systems were widely used ● Evidence that mobile communications is the preferred communication channel for some disaster-affected populations 	<ul style="list-style-type: none"> ● Use is subject to GSM coverage, phone ownership and (for SMS-based systems), literacy

Source: *FrontlineSMS (2011), Nelson et al (2010), La Rochelle (2011), Chazaly (2011), Wall, I. and Chery, Y. G. (2011), Internews (2011), Aker (2011); Interviews: Oxfam GB Haiti, Internews, UN OCHA, FrontlineSMS, IFRC, Concern Niger*

3.3 Lessons Learned

The following lessons can be taken going forward:

Combined approaches: mobile technology provides a new and accessible communication channel between agencies and communities but it does not need to, nor should it, replace all traditional channels, particularly face-to-face communication. Technology was often found to be used in conjunction with other communication channels including face-to-face and radio. Several studies showed radio to be one of the most ubiquitous, commonly used and trusted sources of information⁶⁸. Radio was the most effective tool for serving the needs of the public in Haiti⁶⁹. One of the main lessons here is that the human element and face-to-face contact with communities is considered critically important in humanitarian programming, and technology should complement rather than replace this. There are benefits to combining multiple tools to ensure maximum impact. Haitian responses combined the reach of cell phones and radio technology.

Context is important: The contexts identified above have enabling factors including good network coverage, high access to phones and some familiarity with the phone, and a responsive private sector partner. It will be important to consider such factors when making decisions on whether SMS or voice is an accessible and appropriate communications channel. Other things to consider include socio-cultural factors. The Internews study, for example, highlighted that in Dadaab phones are more likely to be used by men, whilst vulnerabilities of particular target groups, such as reduced vision and dexterity of older people, for example, may make these channels less accessible.. FrontlineSMS provide a useful checklist of things to consider⁷⁰. Selection of the most appropriate tools requires an understanding of the needs and constraints facing the target population and the type of information the organisation is seeking to provide or solicit. In Haiti, while SMS was an important source

⁶⁸ Nelson et al (2011), Internews (2011), Wall, I. and Chery, Y. G. (2011)

⁶⁹ Nelson et al (2011)

⁷⁰ FrontlineSMS (2011)

of information during the crisis, the short message length meant that texts were at times a source of confusion and misunderstanding. Oxfam Haiti reported that voice and SMS channels are not effective for addressing certain complaints, such as gender-based violence⁷¹.

Both voice and SMS-based systems are recognised to have benefits and limitations. SMS is cheaper and arguably more manageable for agencies than voice-based systems; however, literacy issues do impact on the use of SMS-based systems by targeted populations in low-income countries, and more complex messaging can be difficult through SMS. In Haiti people preferred the hotlines⁷².

Working with the private sector: The MNOs emerged as key partners in the response in Haiti. NGOs were able to negotiate reduced rates for services provided by MNOs. Rates varied between network operators and also between agencies using the same operator. A more systematic costing approach for the humanitarian sector could be useful. Freephone lines are probably essential if programmes are seeking to engage the poorest sections of the community to use the service.

Voice versus SMS: SMS is cheaper and arguably more manageable for agencies than voice-based systems; however, more complex messaging can be difficult through SMS, and literacy a significant obstacle to SMS. The use of SMS communication to aid recipients through community workers, who then relay information to the wider community as in Action Aid's approach in Kenya, circumvents this problem. For two-way communications with recipients all the examples found used voice calls. CRS Haiti had very low uptake of their SMS-based feedback mechanism. Recent research in Niger has proven that investment in literacy training through the phone led to significant increases in the use of the phone's wider functionality, including SMS⁷³ – this is discussed further in section 9. SMS literacy training may be an appropriate activity in less urgent phases of a response, depending on the agency's broader objectives.

Trust and accuracy: Both Voila and Digicel responded positively to multiple requests from NGOs to send out information via SMS to their subscriber base in the earthquake-affected area. This, however, became perceived as 'spamming' by subscribers with little consistency in content, whilst systems became overloaded. Both companies understandably ceased working with free-for-all mass messaging from unverified sources to protect their customer base, with the positive effect of reinforcing coordination mechanisms⁷⁴.

Attitude and capacity: Such initiatives must be properly resourced if they are to work. On two-way communications a lack of response from the agency, if expected from the community, can lead to mistrust and impact negatively on the programme. Oxfam Haiti explained that any such communications system needs to be promoted well; it also needs to be very clear on what it will and will not do. Digicel reported an overwhelming attempt by people to contact the number from which the SMSs were sent. "The key message to NGOs is that you need to have a system which can cope with requests for further information – and someone to handle that response"⁷⁵. Adoption of such tools may be challenging to service agencies unused to 'being monitored' by recipients.

⁷¹ Interview: Oxfam GB Haiti

⁷² Nelson et al (2011)

⁷³ Aker et al (2011b)

⁷⁴ Wall, I. and Chery, Y. G. (2011)

⁷⁵ Wall, I. and Chery, Y. G. (2011)

4. EXPERIENCES WITH DIGITAL DATA GATHERING ON CASH TRANSFER AND WIDER PROGRAMMES

Data collection is an important part of the cash and voucher programme management cycle. Unique personal data is collated at point of registration to verify people's eligibility for receiving transfers. Humanitarian agencies capture available unique identifiers (names, national ID, etc.), as well as other vital personal information (date of birth, gender, relatives). Monitoring data is regularly collected from the target population through household surveys and interviews. Further ad hoc or systematic data collection activity is also being integrated into programmes to take account of how programmes are affecting external variables and vice versa. A good example of this is the regular collection of market price information of key commodities.

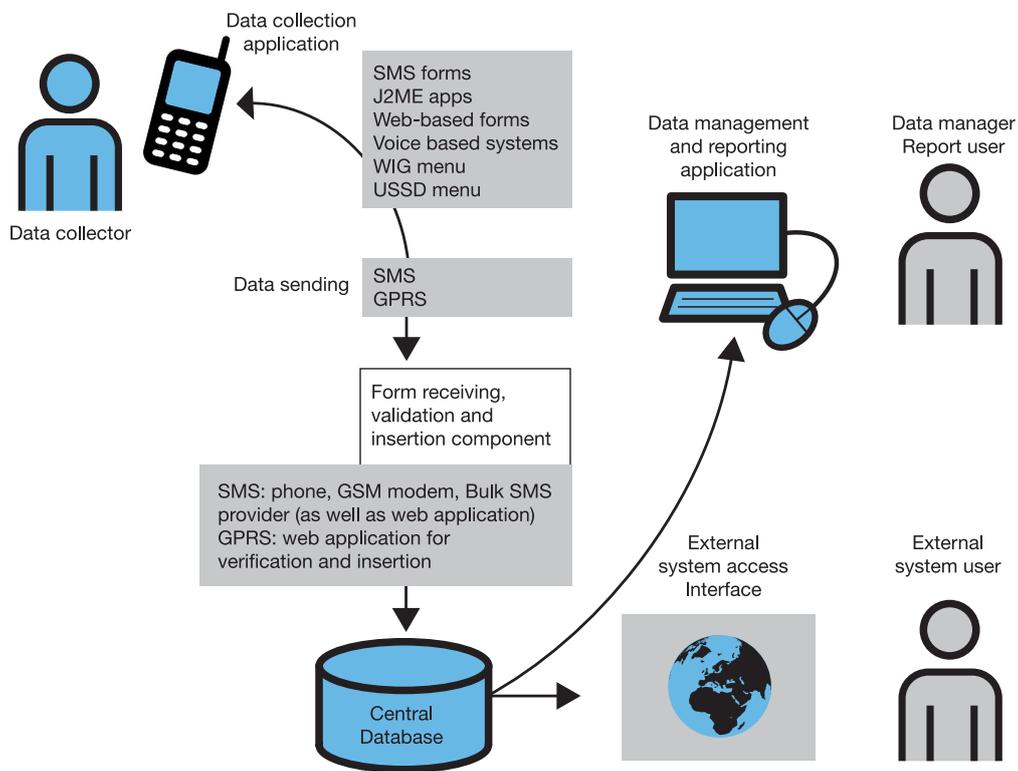
4.1 Use of Digital Data Gathering Tools for Data Collection

Traditionally programme data collection has involved completion of paper-based forms, followed by inputting into a data management system. More and more, humanitarian agencies are looking to technology-supported solutions as ways to increase efficiency, speed and accuracy of data collection. Advances in technology mean it is now possible to collect data through digital data gathering (DDG) solutions, comprising of collecting data using a hand-held device, from where it is transferred to a back-end server for storage and analysis. Personal Digital Assistants (PDAs), Java-enabled telephones or smartphones (ipod Touch, Android) or mini computers are used to key in answers on forms displayed on the device. Another solution is a data pen, where enumerators write the survey with pen and paper, as they normally would, but on specially printed forms. Electronic surveys can be uploaded into a computer or sever at a later stage, or can be directly sent to a database via the network. There are a myriad of providers offering DDG software solutions. Solutions used by humanitarian agencies who participated in the research include the open source platforms Frontline SMS, Rapid SMS and Episurveyor, as well as proprietary solutions 'iForm Builder' (provided by Apple) and

'PSI Mobile Solutions' (provided by PSI Mobile). More detail on the specifications of each can be found in Annex 5.1.

The use of such devices for data collection is becoming common-place in the NGO health sphere in low-income countries⁷⁶ and is growing in humanitarian assistance. PDA devices and handheld computers are extensively used by WFP for activities such as smart nutrition surveys in the South Africa and Asia regions, and this is slowly spreading to wider Sub-Saharan Africa. WFP's survey software has been used by implementing partners in at least fifteen countries in more than fifty assessments (NRC in DR Congo, Oxfam in Niger, Save the Children in Pakistan). The research identified thirteen programmes in eleven low-income country contexts that had piloted DDG technology for monitoring purposes during interviews with agencies. These are detailed in Annex 5.2. Rationales for piloting DDG solutions focused on the potential to increase efficiency with which data is collected and used, and to improve the quality of the data collected. This has included deployment in rural and urban areas and slow and rapid-onset emergencies. While the contexts included here are broader than cash transfer programmes, the lessons and experiences are equally applicable to programmes delivering cash and voucher assistance.

Figure 4.1 *Technology for digital data collection*



Source: MobileActiv

⁷⁶ Interview: NetHope

4.2 Benefits experienced and challenges faced

Table 4.1 *Benefits experiences and challenges faced by agencies adopting DDG*

Theme	Benefits	Challenges
Operational	<ul style="list-style-type: none"> ● Forms can be easy to build and can be amended for future use ● Off-line capability for data capture and storage ● FrontlineSMS can sit on your own server and has off-line capability for analysis ● Some require low connectivity (just SMS) ● Benefits of Opensource, for integration to in house applications ● Training on most is straightforward ● Accepted by staff 	<ul style="list-style-type: none"> ● Free versions can lack dedicated service support (sometimes available at a premium) ● Cloud-hosted solutions require connectivity for data analysis ● Solutions operating on GPRS require higher bandwidth to transmit than those operating on GSM networks ● Systems based on SMS are limited to short surveys by cost factors and phone memory ● Requires service support ● Some handhelds are not appropriate for the constraints of humanitarian programming ● Can be tied in to particular hand-held devices ● Political barriers may constrain adoption
Cost / efficiency	<ul style="list-style-type: none"> ● Open source solutions are free ● Big time efficiencies in data entry and also data collection ● Reduces time to access findings ● Reduced costs for humanitarian agencies 	<ul style="list-style-type: none"> ● Set-up costs can often be expensive – especially the hand-held devices ● Limitations imposed for usage of some free versions ● Data pen still requires a data input phase ● Need to factor in time and budget for training and support in pilot projects ● Speed of data transmission of SMS

Cont./

<p>Effectiveness / impact</p>	<ul style="list-style-type: none"> ● Answers uploaded in real-time, with promise of instantaneous analysis, translated into improved aid effectiveness ● Can increase quality of survey design through control of user rights ● Accepted by communities ● Productivity gains ● Can collect more regular information that would be possible without technology ● Data entry controls and potential for data audit with GPS can improve quality of data collected ● GPS offers potential to improve analysis 	<ul style="list-style-type: none"> ● Frontline SMS currently limited to small scale collection ● Data pen lacks the additional quality controls of other DDG technologies
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Sources: La Rochelle (2011), Pain, C. and Wanta, A.B.(2011), Kopplov, R. (2011); Interviews: PSI Mobile, Internews, Crisis Mappers, CRS Kenya, CRS Haiti, Concern Worldwide, Concern Niger, Concern Kenya, Horn Relief, UNICEF Kenya, WFP Rome, BBC World Service

Operational: In the cases studied, experiences were overall positive and tools were highly accepted by staff. All reported that the systems were easy to use. Concern Sudan found that training enumerators (even government workers with little ICT experience) in the device and in how to do the survey took only half a day, and that the whole preparation process (training and testing) took no longer than the time taken to train people on a paper-based survey⁷⁷. Similar experiences were found in Internews’ project in Dadaab, where enumerators required only one day’s training on the technology⁷⁸, and in the joint monitoring initiative of cash programmes in the 2011 Horn of Africa drought response (see case study 6, annex 7). The form logic was generally considered easy to follow. Concern Sudan restricted certain menus on the PDA, meaning enumerators couldn’t get ‘lost’. In examples where staff built forms themselves, as with Episurveyor, Frontline SMS and iForm Builder, this was not considered to require extensive ICT expertise. In cases of proprietary solutions, agencies were able to outsource this for a fee, and this was well received⁷⁹.

The main difficulties highlighted relate to interacting with the hardware in what can be challenging conditions, and installing software. The UN Office for Project Services in DR Congo piloted DDG tools as part of a UNHCR⁸⁰-funded programme to improve accuracy of data collected from IDP (internally displaced people) camps and the unit invested in thirty Android phones. The problem enumerators encountered was that the device was not suited to the constraints enumerators faced in the camps, being difficult to manipulate at night and having low battery life⁸¹. CRS experienced similar problems when using iPod touch in Central African Republic (CAR)⁸².

⁷⁷ Kopplov, R. (2011)

⁷⁸ Interview: Crisis Mappers

⁷⁹ Interviews: Concern Worldwide Dublin; UNICEF

⁸⁰ United Nations High Commissioner for Refugees

⁸¹ Interview: UNOPS

⁸² Interview: CRS Kenya

Concern highlighted that small screen size on phones relative to PDAs can make them difficult to use for longer surveys. In the 2011 Horn of Africa drought response, agencies participating in the joint monitoring initiative experienced software installation difficulties with the data pens compounded by the fact that trainers could not travel to provide hands-on support in Somalia.

A big benefit cited by all is the off-line capability for data collection. Perhaps an unmet need is an option for offline synchronisation, to enable users to move data collected from the handheld device to a laptop or computer, which could be useful for real-time checking of new data in the absence of a connection to the online database. The reaction of enumerators to the technology was generally positive; however, it was noted that the context could have a bearing on this. Anahi Ayala lacucci from Crisis Mappers reports that in Internews' needs assessment in Haiti, enumerators did not feel safe using handhelds in the camps, compared to in Dadaab where extent of phone penetration meant enumerators felt more secure⁸³.

Level of support overall was considered to be good – either through the online forums in the case of the open-source tools or the dedicated support of premium open source and the proprietary systems. It was considered essential by those interviewed to have a certain level of support in place even for simple applications – and especially during pilot set up and implementation.

Concern Sudan pointed out the need to ensure that permission for not only the survey itself but also the use of the PDAs is granted by the local authorities. Similar issues were faced by agencies in Somalia who were participating in the joint monitoring initiative of the 2011 Horn of Africa drought response where data pens could not be used in areas controlled by anti-government authorities.

Cost and efficiency: There are significant efficiency gains to be made relative to manual approaches, since DDG tools remove the need for the entire stage of data entry to the database. This reduces the costs of enumerators and speeds up the process of data collection. Concern Kenya estimated that the use of DDG shortened the usual process of household data collection and entry by up to 4 weeks⁸⁴. Feedback from the Concern pilot in Sudan is that the time to complete a survey using the DDG tool was in fact 40% faster than the paper-based approach. This is echoed by estimates from CRS that the solution piloted in CAR could reduce preparation and collection time by 27% and 21% respectively, and data entry time by 93%⁸⁵. Concern Niger estimate that use of FrontlineSMS reduced the process of collecting market price information from 6 hours to 1.5 hours. This in turn reduced staffing requirements from twenty-five people to twenty-two⁸⁶.

Such benefits will be greater at scale. Stephen Kidd cites the case of two social protection programmes in Africa – the Kenya Orphans and Vulnerable Children Cash Transfer programme and Ghana's social protection programme, whose management information systems (MIS) are based on the use of paper and vehicles. Twenty-five data entry clerks have to be employed in Nairobi and twenty in Accra, despite the relatively small number of recipients on both schemes. Both schemes have large amounts of paper piling up in their central offices. If new technologies are not introduced, the number of data-entry clerks will need to expand exponentially⁸⁷.

One of the issues faced by those wishing to utilise DDG solutions is the initial set-up cost. Whilst costs vary and depend much on the devices used, they can be significant, especially for the hand-held devices. Likewise, agencies using these tools for the first time needed to factor in time and resources for adequate training and preparation.

⁸³ Interview: Crisis Mappers

⁸⁴ Interview: Concern Worldwide Kenya

⁸⁵ Dashevsky, O.R. and Coffey, C. (2011)

⁸⁶ Interview: Concern Niger

⁸⁷ Kidd, S. and Chirchir, R. (2009)

Effectiveness and Impact: There is evidence that the use of DDG technology has improved programme effectiveness and likely impact in the following ways:

Improved quality: Some solutions enable inbuilt controls in the electronic forms (e.g., to prevent enumerators skipping questions, or control the range of values that can be inputted), which those interviewed considered to have reduced errors and improved data quality. The removal of the manual data entry phase removes one of the greatest opportunities for error. It also means completed surveys are available in real time. In the case of Concern in Sudan, 94% of all completed surveys were available on the same day, meaning any errors in the survey design or enumerator coding could be identified and rectified. A major benefit of some solutions is the ability to include GPS (Global Positioning System) coordinates. This opens up huge new possibility in terms of highlighting trends and spatial relationships in the data to inform programming, through use of GIS (Geographic Information Systems) software⁸⁸. GIS is not a commonly utilised skill in humanitarian cash and voucher programming, but integration into data collection and analysis would have huge potential. This is discussed further in section 9. This feature has also been used for quality control of data collected by enumerators, through a data audit⁸⁹.

Speed of response: With manual data entry it can take weeks or months before data is available for analysis. The evidence is that DDG solutions provide access to data in near real time and that this has had a knock-on positive effect on humanitarian response times. Internews report that real-time data collection in Dadaab meant that a simple analysis was instantaneous after day 3 of data collection. Concern's nutrition adviser considers that "the DDG tool provides you with provisional global acute and severe acute malnutrition results just 1 hour after your 5 days of data collection, meaning you can decide whether to intervene immediately. Usually it would take at least 6 days to get the data. The potential is there for saving lives"⁹⁰. CRS report that the use of DDG in their regional Great Lakes Cassava Initiative programme improved agency response time: "we could see who was receiving seeds in 1 week, compared to the 4 months it would have taken to digitise the data. You can see discrepancies with partners or regions and begin to fix them"⁹¹. However, the improved speed of data access will only realise the potential to improve response times if people act on the information received in a timely manner.

4.3 Lessons Learned

Whilst utilisation of such tools is still in the early stages of adoption, no agency interviewed was planning to switch back to paper-based forms. Use of DDG technology appears feasible in most places. Whilst connectivity is required for synching the data to the server, it is difficult to imagine an aid agency operating in a context where access to connectivity on an intermittent basis was not possible. These constraints can be overcome dependent on process management, and plans for operating in an offline environment should also be put in place. Even without the benefit of real-time data in such places, with sufficient preparation the other advantages of time savings and quality control still exist.

⁸⁸ Interviews: Concern Worldwide Kenya, Crisis Mappers

⁸⁹ Interview: CRS Kenya

⁹⁰ Interview: Concern Worldwide

⁹¹ Interview: CRS Kenya

Preparation: Humanitarian agencies are taking off-the-shelf DDG solutions to difficult operating environments. The cases where difficulties were experienced are where the devices used were not aligned with the realities on the ground. In the case of CRS, the device chosen worked well in the urban environment of Haiti, where it is being expanded for use in other programme sectors, but is considered less appropriate for the operating context in sub-Saharan Africa. In the case of the Horn of Africa joint monitoring initiative, the speed of the response required meant a limited preparation period and no opportunity to research what could be the most appropriate device for the context. UNOPS recommend investing time to study the devices and options available, according to the context. Some guidance for selecting the appropriate tool is included in Annex 5.3. CRS explained that the main lesson in CAR was that introducing a new technology for the first time during the middle of an emergency response project can create difficulties and highlighted that migration to these tools must be adequately planned. Preparations need to be made and tools tested before a crisis occurs. This is similar to lessons described in case study 6 (annex 7).

Do not remove the human element: Those involved in the research were in agreement that face-to-face communication during humanitarian programming is essential to aid effectiveness and should not be lost⁹². Several recent reports on communicating with disaster-affected communities draw similar conclusions. Concern's experiences with DDG to date have shown that the integration of technology into programming can actually enable greater interaction between humanitarian actors and targeted communities. Similarly, realisation of the potential positive impacts through use of DDG, such as a faster response time and improved data quality, require the people and process elements to complement the technology.

Service support: Several of those interviewed cited the need for a level of IT support during deployment, whether in-house or from the solution provider. It is likely such needs will grow with increased scale of adoption. The way humanitarian agencies work is new for many solution providers. David Costello of PSI Mobile explained that humanitarian surveys can have a complex logic; commercial clients with similar requirements tend to have greater IT capacity in house. In the early stages he believes the process would benefit from bringing together both programme and IT departments⁹³. Several people recommended that agencies' in-house IT must be involved to support the process.

4.4 Electronic Registration

At the onset of a new humanitarian assistance programme, household registration activities generally collect personal information on a paper form, to be referred to throughout the distributions in order to confirm whether a person is eligible to claim assistance through the programme. The difficulties with leakage and duplication in aid distributions are well known. These problems increase with scale and complexity of programmes, especially in areas where significant numbers of those in need of assistance lack proof of national identity. The lack of official identity documents creates difficulties for the introduction of electronic payment services, since recipients do not meet the Know Your Customer identity requirements of the service provider. Some organisations have moved towards electronic registration and verification in recent years, in an effort to improve efficiency and accuracy of distribution.

⁹² Interview: FAO Kenya

⁹³ Interview: PSI Mobile

ID card production: World Vision Canada has invested in development of a recipient information management tool for multiple distributions, known as ‘Last Mile Mobile Solutions’ (LMMS). At point of registration, household data including a photo is collected using mobile computing devices with extended battery packs, for upload to a central data management system. This generates a plastic agency registration card for each recipient, including a photo and a unique barcode as shown below.

Figure 4.2 Example of an LMMS Registration card



Source: World Vision Canada

These cards serve as unique identifiers for recipients in repeated distributions and other humanitarian services (such as health indicator tracking), where they are scanned and verified by the LMMS system. In Haiti this meant recipients fulfilled the KYC requirements for setting up mobile money accounts with Digicel. In Niger Concern used ID-flow software to create plastic photo ID cards for cash transfer recipients, accepted as valid ID under Airtel's KYC requirements for mobile money registration. CRS has recently piloted a similar system, utilising bar codes through DDG devices equipped with barcode readers at voucher fairs in CAR.

Capture of biometrics: Fingerprint recognition software is used as the mechanism for identification on the HSNP in northern Kenya. In emergency response, fingerprint recognition has been used by aid agencies on small-scale cash transfer programmes in Malawi⁹⁴ and WFP's smart card system in Kenya, which WFP plans to expand to other operations within the region. Following successful piloting, UNHCR have adopted biometric registration for households in refugee camps in DR Congo, Kenya, Tanzania and Pakistan. The largest programme to date using biometrics was the government-owned WATAN flood response programme in Pakistan, which made use of the national biometric database NADRA.

⁹⁴ Concern's Dowa Emergency Cash Transfer programme

4.5 Benefits experienced and issues faced

Table 4.2 highlights the advantages and difficulties of these forms of electronic registration. Selecting the most appropriate solution must factor in the benefits conferred against consideration of the investment cost and likely level of risk. For example, in the case of Concern Niger a photo ID only, rather than a barcode, was selected because it was not felt the additional cost of the barcode conferred any significant additional benefit. It is important to note that no solution removes the requirement for accurate initial targeting. As Concern explained, “if the wrong person comes the first time, even capturing biometrics is still going to get it wrong”⁹⁵.

Biometric identification systems have many advantages. In Kenya their inclusion in the HSNP is considered to have enabled a large scale cash distribution programme to operate in an environment inherently prone to high leakage⁹⁶. Both WFP and UNHCR report reductions in refugee recycling and fraud in registration for assistance as a result of their adoption⁹⁷. The experiences in Pakistan, with the rapid roll out of biometric screening equipment across all WATAN card registration centres, show that such systems can be adopted and can go to scale. The rapid evaluation of the programme did not find that this process caused applicants unnecessary problems (OPM 2011).

However, integrating biometric recognition into programmes requires significant upfront investment, and these systems are not without error. Several organisations reported being interested in such solutions, but explained perceived costs had proved to be a barrier to use. While it is difficult to pinpoint accurate costs for inclusion of biometrics in registration and cash-out verification, since the picture varies widely, a consensus on this research was that add-on readers, attached to a laptop, POS or smart phone, can be bought for \$100-\$200 depending on the scale, ruggedness or degree of proprietary in the print algorithm involved⁹⁸. Gelb and Decker undertook some research based on interviews, wider literature and case study data and estimated that costs are roughly US\$5 per person for registration, rising to \$7 per person when including verification at point of cash out. This estimation included training and salary of enrolment staff, transportation and logistics, cost of database and hardware. It is based on 1 million registrations, so it benefits from economies of scale larger than most cash transfers in emergencies⁹⁹.

While reports vary, the general consensus is that fingerprint readers show a percentage of error. All HSNP agents have reported incidents of unreadable fingerprints, though they consider it was a small percentage of the total¹⁰⁰. However, WFP consider that between 10-15% of their target group experienced issues, a fairly significant figure¹⁰¹. BFA explain that the issue on the HSNP was not so much the error but rather that the problem ‘loomed large -- because of the time required to solve the problem of a frustrated recipient’¹⁰². Having a backup system for verification is important. It would be useful to undertake an analysis of the relative pros and cons for a biometric versus PIN-based versus manual identification system to serve the needs of illiterate people.

⁹⁵ Interview: Concern Niger

⁹⁶ Ratichek (2011)

⁹⁷ Omamo, S. et al (2010); Interview UNHCR Kenya

⁹⁸ Gelb, A. and Decker, C. (2011); Interviews: UBL Bank, Bankable Frontier Associates

⁹⁹ Gelb, A. and Decker, C. (2011)

¹⁰⁰ Ratichek (2011)

¹⁰¹ WFP (2011a)

¹⁰² Ratichek (2011)

Table 4.2 *Advantages and Disadvantages of electronic registration processes*

System	Advantages	Disadvantages
Card with barcode / photo	<ul style="list-style-type: none"> ● Relatively easy to produce ● Relatively cheap to produce (~90 cents/card) ● Avoid double registration ● Can provide an audit trail with integrated system ● Suitable for those who are illiterate and have difficulty with PIN numbers ● Potential to help address 'KYC' requirements for banks/mobile money providers 	<ul style="list-style-type: none"> ● Relatively easy to forge – decreases with integrated system using barcode against visual verification of photo images ● Only avoid duplications or fraud within programmes working from the same database
Biometric (finger print) identification	<ul style="list-style-type: none"> ● Helps avoid duplication in humanitarian programming ● Provides an audit trail ● Speeds up large-scale programmes since no need to produce a card ● Cannot be mislaid or stolen ● Particularly suitable for those who are illiterate and have difficulty with pin numbers ● Potential to help address 'KYC' requirements for banks/mobile money providers ● Potential for wider benefits such as confirming citizenship ● Depending on the technology, fingerprint readers can be relatively cheap 	<ul style="list-style-type: none"> ● Only avoid duplications within programmes working from the same database ● The upfront investment can make it unsuitable for small-scale or one-off programmes ● Ethical and protection concerns around who can access people's personal data and how this information is stored and utilised ● This is linked to a worry of who can lay claim over the data, in countries with terrorism or insurgency threat ● Inaccuracy for certain groups including elderly and manual labourers ● Lack of robustness of the technology is possible in harsh environments ● Difficulties for those unable to travel to point of cash out

Source: Gelb, A. and Decker, C (2011), Ratichek (2011), WFP (2011a); Interviews: UBL Bank, CRS Kenya, Concern Haiti, WorldVision Haiti, Financial Sector Deepening, Bankable Frontier Associates, Richard Chirchir, Concern Niger, UNHCR Kenya, WFP DR Congo

There were many concerns raised regarding the risks associated with biometric identification, concerning the storage and usage of unique identifiers, particularly in areas of protection or anti-terrorism concerns. There are worries that such data may be laid claim to by governments or donors. It was surprising to see such concern particularly expressed around storage and use of biometric data, when, really, the issues apply to collection and storage of all personal data. Aid agencies have been collecting such personal information for decades. The shift to electronic capture of this data, however, is highlighting gaps in data management practices.

5. EMERGING TECHNOLOGIES TO IMPROVE INFORMATION MANAGEMENT IN EMERGENCY RESPONSE

5.1 Data Management Systems

Deployment of the technologies highlighted in sections 2 to 4 is enabling faster accumulation of data, and is highlighting a need for more effective data management systems in the humanitarian sector. During the course of the research it was found that several tools have been deployed to attempt to address this in cash and voucher programming. World Vision Canada has developed a recipient management and aid distribution system, 'Last Mile Mobile Solutions', a digital project management tool for registering recipients of aid and tying them to humanitarian services including those associated with managing humanitarian aid entitlement (i.e., automating the calculation of rations due; including cash due to households, the delivery, tracking and reporting on aid and cash distributions). The tool and World Vision's experiences developing this for broader application are detailed in Case Study 7 in Annex 7.

'Cloud-based' data management systems for cash transfers have also been developed. Cloud computing is a rapidly evolving concept that utilises the internet to create convenient, on-demand IT services. In its simplest form it consists of shared computing resources through a web-based interface. It enables remote users to store and access data, and to work collaboratively on files. These solutions are being promoted by NetHope¹⁰³, who report 30-50% benefits in efficiency gains for field workers, community health workers and community mobilisers from application by members to date¹⁰⁴. Much of this has been in the health, education and

¹⁰³ NetHope was established in 2001 to bridge the gap between NGOs and new technology solutions providers, and to realise economies of scale for input provisioning, in order to advance new technology deployment in the developing world. It is a collaboration of 33 of the world's leading international humanitarian organisations, and provides a single point of contact for members with major technology providers.

¹⁰⁴ NetHope (2010)

agriculture sector, and mostly in non-emergency settings. Of the DDG solutions highlighted in section 4, all except FrontlineSMS store data through cloud services managed by the solution provider.

Concern Worldwide Niger developed a simple web-based tool for the 2010 cash transfer programme in order to assist recipient management as well as management of mobile money pay roll for workers in multiple locations. Different access and use rights are assigned to different individuals in programme staff, senior management and finance through password protection. For their pilot mobile voucher programme in Syria, WFP developed an electronic data management system that managed the entire distribution, reporting and monitoring process for the programme. A primary output of WFP's Cash for Change initiative is an in-house, web-based data management system for their smart card solution which will be globally applicable. Red Cross opted to use an existing online database (Visionlink) for registration and tracking of recipients and cash disbursed during their program in Haiti. This incorporated data from the International Organisation of Migration camp registration database through a custom-built link between the two systems.

5.2 Benefits experienced and issues faced and main lessons learned

Table 5.1 *Benefits experienced and issues faced with data management systems*

Benefits	Issues
Little to no upfront costs for an off the shelf solution.	Huge cost of in house development
Scalability	Depends on connectivity
Rapidity	Customising solutions can be time-consuming
Resource sharing across multiple locations	Country-specific legislation on data management may inhibit cloud
Automation and streamlining processes	Proprietary systems inhibit further development
Control for access, audit trail	Concerns from agencies regarding data protection can prevent wider utilisation

The main lessons from these experiences:

Cloud-hosted services offer real potential if NGO fears can be assuaged: Web-based applications for data management could revolutionise how agencies manage data within and between organisations. More will need to be done to assuage fears around data confidentiality. In both cases of shared data management identified in this research – the joint monitoring in Somalia and GRM's data management in Zimbabwe – participating agencies expressed concern about data protection. In Zimbabwe some implementing partners felt that the joint data management was being prescribed without engagement with partners or discussion on issues such as data security, or discussion of the expected benefits or impacts of having this centralised repository. On the basis of this the process was subsequently revised, and the length was cut down considerably. Any efforts for shared data management across remote locations must consider data protection, and have a clear rationale for the objectives of sharing, in order to be beneficial for all concerned.

Difficulties with custom builds: There was general agreement from those interviewed, both solutions providers and agencies, that custom-built solutions can run into difficulty when it comes to scale up or wider application¹⁰⁵. These solutions can take time to develop, at a significant cost to the organisation. Further investment will be required in order to make future changes or improvements as needs, and technology, evolve. Laura Walker Hudson of FrontlineSMS explains that in-house development leads to development of highly context-specific tools, and this and the fact that others are unaware of them can lead to similar tools being customised over and over by different organisations¹⁰⁶. The proprietary nature of the tools and the investment in such a tool by a single agency can limit wider sharing. This is detailed in case study 7 (annex 7).

5.3 Crisis Mapping in Haiti and the Volunteer Technology Community

The aftermath of the Haitian earthquake saw increased usage of digital media technologies by stakeholders responding to the needs of the affected populations, to manage essential humanitarian information. Innovative tools and platforms were applied in an attempt to coordinate new forms of collective action and problem-solving for tasks such as guiding search-and-rescue, locating missing persons and delivering aid to populations¹⁰⁷. There are several excellent reports which catalogue the detail of the crisis mapping communities' experiences in Haiti extensively¹⁰⁸. We include highlights of this experience to showcase emerging open source technology with potential to be more widely leveraged by humanitarian agencies for targeting and coordination of relief, and to highlight some of the constraints to wider adoption of new technology by international humanitarian agencies.

The Ushahidi Haiti Project was a volunteer-driven effort to produce a crowd-sourced, open map to support effective aid response following the 2010 earthquake. 'Crowdsourcing' is a child of the age of Web 2.0 interactive media, in which users both create and access content. By marshalling the "wisdom of the crowd," information from dispersed individuals can be compiled into critical bodies of knowledge. Information technology experts converged to customise a crowd sourcing programme called Ushahidi, created for citizen tracking of the 2007 election violence in Kenya, for application in Haiti. A team of volunteers at Tufts University began to receive information from sources on the ground. They geo-coordinated the incidents to build an electronic map and published the results online, continually updating the material. Initially they depended primarily on phone calls and press reports, but as time went on, the free 4636 SMS message service set up by Digicel provided incident reports from the Haitian population, which were included in the map with support from another volunteer technology organisation, Crowdfunder. Students at Georgia Tech's School of Computer Science also converted the data from Ushahidi to Google Earth file formats.

The independent evaluation of the Ushahidi Haiti project considered the project was an "impressive proof of concept for the application of crisis mapping and crowdsourcing to large scale catastrophes" and considered the tool to be highly relevant in early response to emergencies with "enormous appeal --- in the media and among stakeholders"¹⁰⁹. It provided situational awareness and critical early information with a relatively high

¹⁰⁵ Interviews: CRS Kenya, Concern Worldwide Dublin, World Vision Canada, FrontlineSMS, Crisis Mappers, Ushahidi, Google Crisis Response

¹⁰⁶ Interview: FrontlineSMS

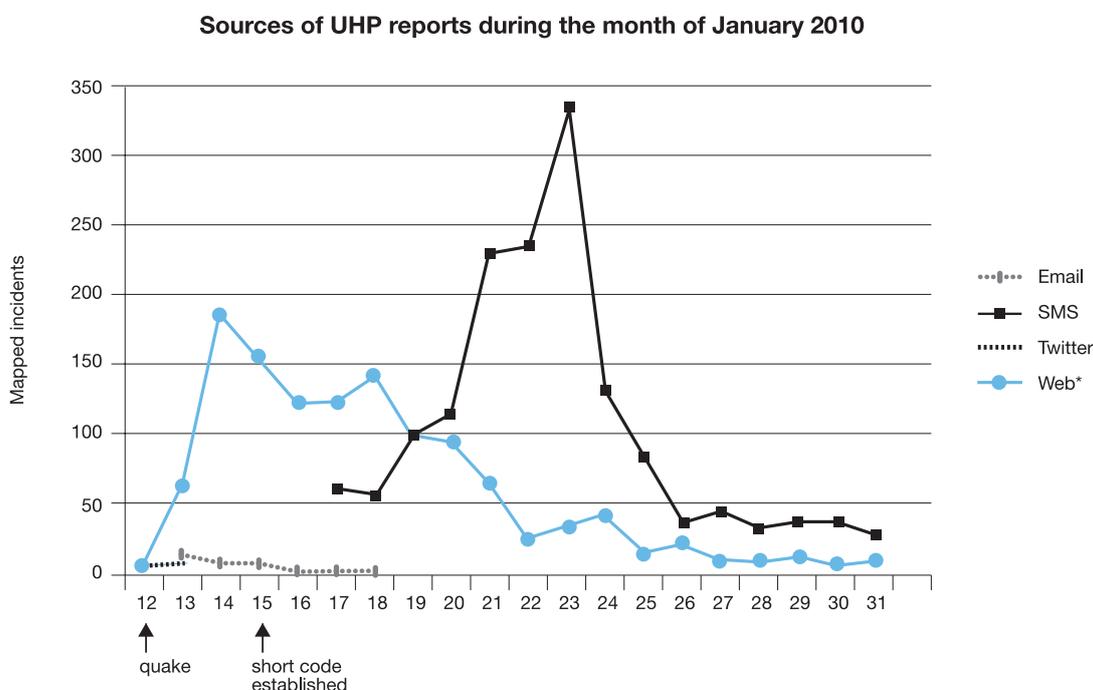
¹⁰⁷ Nelson et al (2010)

¹⁰⁸ Morrow, N. et al (2011), Wall, I. and Chery, Y. G. (2011), Nelson et al (2010), Harvard Humanitarian Initiative (2011)

¹⁰⁹ Morrow, N. et al (2011)

degree of geographic precision and in a ground breaking turn of events, limited numbers of humanitarian agencies attempted to include the information to inform decisions about where to respond. The most common use was for situational awareness by US Government Departments and small privately-funded non-profits.

Figure 5.1 Graph illustrating crowd sourcing sources in the Ushahidi Project



*According to a volunteer source, due to the way incidents were entered into Ushahidi all non-SMS incidents added after the first few days post-quake were added via the web and thus tagged as "Web" submissions. The web category is ultimately a composite of incidents pulled from Email, Twitter and all other non-SMS feeds.

Source: Morrow, N., Mock, N., Papendieck, A. and Kocmich, N. (8 April 2011). 'Independent Evaluation of the Ushahidi Haiti Project', Development Information Systems International Ushahidi Haiti Project, p.19.

However, the information was not extensively made use of by international humanitarian agencies to inform delivery of aid, because of several critical factors. Traditional humanitarian organisations were "nervous about the implications of information and power sharing through crowdsourcing and new media platforms"¹¹⁰. The dynamic data aggregated by the Ushahidi Haiti Project was at odds with the more rigid information requirements of traditional responding organisations organised around certain response sectors and geographies. There was general "suspicion of the crowd", and there were related questions about the representativeness and quality of the data provided via such tools without vetting or reviews. Some felt that the "value" of information provided is actually not radically different to what aid workers would do based on their rapid assessments¹¹¹. Whilst the evidence does not show these being borne out, there were certainly instances of misleading information and of delays in the processing of information, which could affect accuracy. There were concerns regarding protection of vulnerable groups. Use was also limited due to low capacity to use the information.

¹¹⁰ Nelson et al (2010)

¹¹¹ MobileActiv (2011)

Key lessons synthesised from this experience are that:

The period after an emergency is not the right time for the introduction of new technology: The crisis mapping community's lack of pre-established relationships with humanitarian organisations and issues of trust limited uptake. These tools need to become an understood part of the humanitarian response community's toolkit if they are to truly add value.

Difficulties in dialogue between humanitarian sector and technology providers: Humanitarian organisations were found to deal with information in much more closed systems at odds with the dynamic, multi-stakeholder approach of crisis mapping. As the developer Erik Hersman points out, the team who came together to develop Ushahidi for use in Haiti had limited humanitarian response experience.

Capacity: ICT capacity for humanitarian programming within agencies is often limited.

5.4 Population Tracking through Mobile Phone

Another major innovation in Haiti was the use of mobile phones to track population movements following the earthquake and later following the cholera outbreak. Data from the Digicel network in Haiti was used by researchers at Sweden's Karolinska Institute and Columbia University in the US to estimate and map population movement following the earthquake based on location data from two million handsets. From that data they estimated that 600,000 Haitians had left the capital in the first 19 days, and were able to locate concentrations of displaced people on a map. Scientists forwarded this analysis to aid coordinators working in the field, so that numbers of evacuees could be verified and supplies targeted to specific locations. That information allowed aid organisations to channel relief supplies to those areas most in need¹¹². Such tools have since been used in the Tsunami response in Japan.

Figure 5.2 *Population tracking.*



In areas with high phone penetration there is potential that such tools could support improved targeting of disaster aid. Researchers are planning to set up a non-profit organisation to provide location analysis for future disasters.

¹¹² Bengtsson, L. et al (2011); Interviews: Karolinska Institute

6. CROSS CUTTING ISSUES

This section discusses two cross cutting issues, those of cost effectiveness and accountability relating to the use of new technology.

6.1 Cost Effectiveness and CBA

Cost effectiveness describes the relationship between the costs and benefits of a particular intervention. Here, we first consider the relative (financial) costs of manual and technological options, and then a discussion of the wider benefits. Clearly, a decision on which system to adopt requires information not only about financial costs or savings but also other costs and benefits.

The relative costs of different systems will vary according to the context. The initial investment cost for the hardware or software required can be significant, relative to the costs of the traditional methods, such as manual cash in envelopes, use of a security firm to deliver cash and paper-based means of data collection. However, following this initial investment, recurrent cost of technology options tends to be lower than the recurrent costs for manual operations. This implies that technological options may look more expensive than manual options if the time horizon for cost estimation is short (as it often is in emergencies). In areas where emergencies are likely to recur, or where technology will be retained for use in recovery and longer-term rehabilitation and development programmes, however, a longer time horizon for cost comparisons is sensible. The short-term nature of budgeting in many humanitarian agencies therefore represents a barrier to the adoption of technological solutions. This is illustrated in the graph below.

In general, however, aid agencies have not undertaken detailed cost comparison studies. This study found some cost comparison evidence in favour of e-payment systems and DDG. A study by Tufts University provides a direct comparison of costs and benefits associated with manual versus mobile money transfer on Concern's cash transfer programme in Niger. This factored in initial investment costs, including expenses for identifying programme recipients, purchasing mobile phones and training recipients. Variable costs for the manual cash distribution included transport, security and costs of organising cash into envelopes. Mobile money delivery reduced the variable distribution costs by 30%. The average per-recipient cost was US\$12.76 in cash villages and US\$13.65 in mobile money villages. Excluding the cost of the mobile phone, the per-recipient cost of the mobile money intervention falls to \$8.80 per recipient. Thus, this became the most cost-effective intervention over the program duration¹¹³. Costs to recipients should also be considered in terms of time incurred in obtaining the

¹¹³ Aker et al (2011a)

cash transfer. Figure 6.2 below shows that program participants in mobile money villages in Niger incurred significantly fewer transport and opportunity costs than participants in manual cash transfer villages.

Figure 6.1 *Graph illustrating the reduced costs of technology versus manual solutions over time*

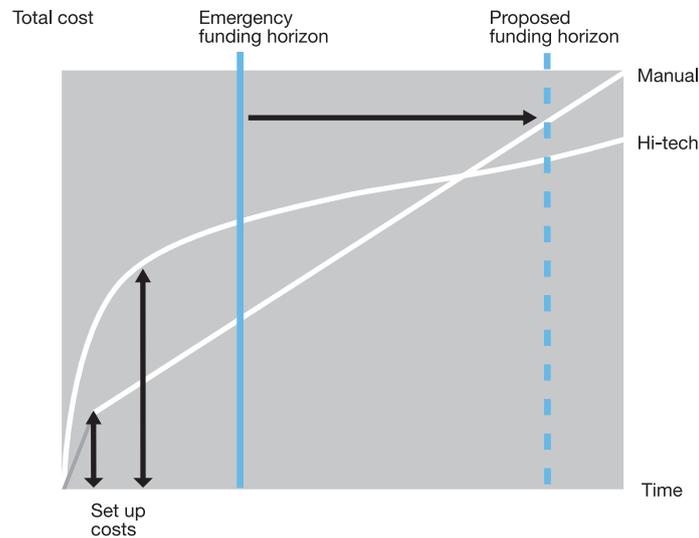
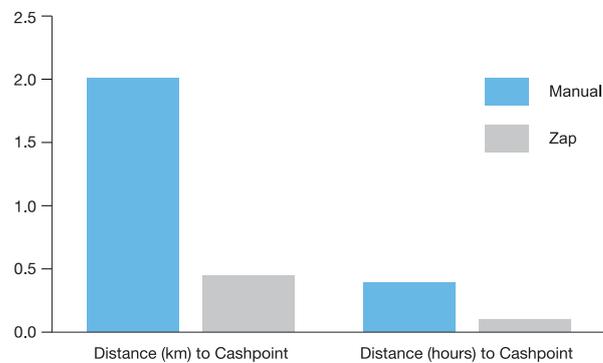


Figure 6.2 *Opportunity cost of Mobile Money versus Manual Cash Distributions*

Cost-Effectiveness of Zap versus Manual Cash Distribution: Distance



Source: Aker et al (2011a)

The early findings of a study by Dalberg Associates to ascertain in more detail the cost effectiveness of the mobile money solutions piloted by aid agencies in Haiti appear to agree with these findings. Dalberg's case study in Haiti found that the mobile money pilot of an aid agency was 30% more expensive than the equivalent manual distribution; a significant proportion of this increased cost was due to the cost of providing phones as well as also an increase in human resources for training of recipients in what was a totally new system. The preliminary findings suggest that 60% of these additional costs are in fact one-off rather than recurring costs¹¹⁴.

¹¹⁴ These will be detailed in the forthcoming report by Dalberg Associates – Bernasconi, L. et al (forthcoming)

The emerging evidence suggests that there may be cost savings in switching to new technologies, especially over a longer time horizon. Naturally, however, a decision of which technology to use in emergency response should take account of other (non-financial) costs and benefits as well. Even if a new technology proves more costly, this may be justified by the benefits it brings. For example, a higher cost for a delivery mechanism needs to take into account whether that cost can be justified because it is getting assistance safely from agency to recipient in a difficult context. The main aim of DDG is to reduce the time between the completion of the survey and the supervisor receiving the results – the improved response time as a result may justify any increased set up costs. Cost benefit analysis is tricky since there are costs and benefits that it is difficult to put a financial value on. This includes hidden costs such as staff time, risk of security, feelings of safety/status, etc. Based on the monetary values of the reduced opportunity costs for recipients of the mobile money transfer and the increased cash crop harvest, Tufts University calculated that the additional costs of the electronic payment system in Niger yielded an equivalent or higher monetary benefit than the manual alternative.

6.2 Accountability

This research has shown that leveraging new technology has potential to positively affect accountability upwards and downwards, but also perhaps negatively.

6.2.1 Accountability to donors

Electronic payment and registration systems have clear potential to improve accountability of aid, by providing a clear audit trail from funding source to intended recipient for all donor money allocated to cash and voucher programming. This is of course dependent on the receipt of timely and accurate reports from the solution provider for reconciliation; this research has highlighted that reconciliation is not always a smooth process with e-payment systems. It is, however, a massive improvement from the traditional ink fingerprint technique. Post distribution monitoring is still important, since there is no guarantee that collection of cash out follows through to use of cash by the intended recipient. Technology and systems are important, but they do not solve the corruption problem.

6.2.2 Accountability to recipients

Facilitation of two way communication: This research has shown how technology has the potential to improve two way communications with recipients, something which is vital to programme effectiveness and to fulfilment of agencies commitments under the Humanitarian Accountability Partnership (HAP). It is, however, not yet being realised on a large scale.

Improved information flows: Use of technology has potential to support improved flow of information to recipients – for example, the payment advice slips that can now be generated by systems like World Vision's recipient data management system LMMS highlighted in section 6, which relays information on payments due based on the amount of work performed under Cash-for-Work projects.

Importance of education: Evidence shows that aid agencies need to invest appropriately in education and awareness raising activities in order for recipients to feel comfortable with new e-payments processes and be aware of their entitlements.

Concerns over movement to control expenditure: A focus by aid agencies on the ways that new technology can facilitate improved accountability of programming upwards to donors could potentially be at the expense of accountability to recipients. Over the last five years there has been a huge shift towards use of unconditional cash transfers in emergencies on the basis of the dignity, choice and flexibility that this offers households over prescriptive in-kind delivery. This is supported by a wealth of evidence showing that targeted households appreciate this, that cash is in fact spent on useful items, and not diverted, and that this prevents households needing to inefficiently resell commodities¹¹⁵. Donors have been increasingly buying into this and to the idea that providing aid for, for example, food security, does not mean that every cent must be shown to be spent on food purchases. This research highlighted several programmes whereby technology has enabled agencies to limit the expenditure choice of recipients to a limited number of approved commodities, at point of sale. The reason given for this was that this ensured that the money was going to the intended use (i.e., for accountability to donors). In fact on some of these programmes it was acknowledged the recipients would have preferred a wider selection of goods. Too much control undermines the advantage of cash.

Issue of informed consent: The use of technology provides a high degree of oversight on the part of agencies regarding such things as purchasing behaviour. In some cases oversight went as far as visibility of account details, such as remaining balance on accounts. Clearly such information can be perceived as useful by aid agencies for monitoring purposes. However, in the case of systems utilising branchless banking such oversight is an invasion of privacy. There was agreement from service providers that such information was not something that should be provided to agencies without prior informed consent from the account holder. This is considered further in section 9 below.

¹¹⁵ Brewin, M. (2008), Aker et al (2011a)

7. CONSTRAINTS TO WIDER ADOPTION OF NEW TECHNOLOGY

This research has highlighted a variety of technologies with potential to support effective cash and voucher, as well as wider, humanitarian programming. Whilst issues have been raised, experiences of those who have adopted these to date have generally been positive. No one interviewed is planning to return to the alternative traditional methods, such as manual delivery of cash or paper based data collection, and many country programmes included in the research have already used or have plans to use such systems again. Technology can support humanitarians to improve efficiency and effectiveness of aid, and is becoming more accessible.

Having said that, the research identified only a handful of initiatives that could be said to be using technology 'at scale', and there is to date only a limited move towards more systematic adoption of these tools – either by actors working within a country context or systematically within an agency. Initiatives to date have been in more urban than rural areas. If e-payments services and other tools highlighted work, why have they not been more widely adopted to date? Critically, why are they not being adopted systematically in areas where systems and solutions do exist?

This research has identified barriers to wider adoption of new technology that can be grouped under seven themes: technological, financial, institutional, operational, attitudinal, political and legislative. Issues relating to each theme that were identified during the research are highlighted in the tables below.

7.1 Technological barriers

These are barriers relating to limitations with the technology solution or system.

	Issue	P	S	M	V	DDG	DM	MC
TECHNICAL	Agent coverage and liquidity	X	X	X	X			
	Limited network coverage	X	x	X	X	X	x	X
	No electricity	x	x	x	X	X		x
	Technical systems underlying mobile payment platforms are difficult to interact with			x				
	Inaccuracies of biometrics	x	x	x				

P = Pre-paid card, S = Smart card, M = Mobile money, V = Electronic voucher, x = some evidence, X = substantial evidence, DDG = digital data gathering, DM = data management, MC = Mobile communications, DDG = digital data gathering, DM = data management, MC = mobile communications

Agent coverage: Whilst the landscape for branchless banking is changing rapidly in low-income and disaster-prone countries, the required 'rails' for e-payments are lacking in many parts of the world, particularly in Africa. Lessons from the evolution of mobile money show that success depends on a functioning agent network – on the accessibility and liquidity of agents¹¹⁶. Many mobile money platforms are still at the emergent stage and the agent network a work in progress. As seen in Haiti the agent network tends to begin in cities and then branches outward to less populated areas. In countries where branchless banking products are relatively well-developed there are populations in need of humanitarian assistance that are not yet reached by these services. Additionally, agents that do exist do not have unlimited capacity of how many customers they can provide cash-out facility to. Even in Kenya, where considerable investment on the part of Safaricom means that there are some 16,000 M-PESA agents nationwide, areas of the country remain underserved, while cash flow remains a problem in some areas where there is coverage. In Zimbabwe TN Banks's agents set up to date are mainly urban and there were some challenges to deal with cash-out demand on Save the Children's programme. This improved when traders were given sufficient notice of the cash-out date.

Network coverage: Underpinning and limiting expansion of branchless banking, as well as wider adoption of technology in humanitarian response, is the issue of connectivity. Even smart-card solutions with their offline functionality require a regular online reconciliation, which for small traders with cash flow and credit issues can pose insurmountable transaction costs. In rural Kenya traders on the HSNP travelled for several hours to complete this every 2 weeks. In other contexts this distance, and cost, could be considerably more. The difficulty comes down to the reduced profitability of networks in low population density areas.

Technical integration: Systems underlying some mobile payment platforms are recognised to be difficult to interact with from a data management perspective. They do not integrate into an organisation's existing programmes such as accounts packages. Data is typically exchanged with such systems via spread sheets that are uploaded and downloaded from the website interface. Data management tools of such interfaces are limited, and are not tailored to the varied needs of the diverse client base that now makes use of the bulk payment facilities of mobile money systems. Several mobile money clients reported difficulties in accessing

¹¹⁶ Eijkman, F. et al (2010), Martinez, M. and McKay, C. (2011); Interviews: Gates Foundation, DFID, CGAP, MEDA, FrontlineSMS

Figure 7.1 Maps showing mobile phone versus electricity coverage in Africa



Mobile phone service in Africa (left) is currently more broadly available than electricity (right).

Source: Blaschke, S., Bokenkamp, K., Cosmaciuc, R., Denby, M., Hailu, B. and Short, R. (June 2009). 'Using Mobile Phones to Improve Child Nutrition Surveillance in Malawi', Government of Malawi, UNICEF and Columbia University, p.10.

reconciliation reports¹¹⁷. While it is not a fundamental obstacle, this prevents the realisation of efficiencies and cost savings, which could act as a barrier to programme upscale.

Error rate of biometric readers: The research noted that several organisations saw the potential benefits of utilising biometric technology. There were, however, concerns over the error rate of the readers, particularly with individuals whose fingerprints have become worn with age or manual labour. However, no evidence was found as to the comparable error rate expected using traditional manual identification methods, such as ink finger prints, and further research in this area would be useful.

7.2 Financial Barriers

These are barriers relating to the investment cost, either on the part of the agency or for the service provider to expand to less profitable areas.

Lack of resources for the investment: Evidence shows that the initial set up costs for programmes seeking to move to technology-based solutions can be relatively high, and this presents a barrier to adoption. This is in part caused by the time horizons of humanitarian funding envelopes, which lead to a focus on cost and efficiency of the immediate programme rather than consideration of benefits that such an investment has potential to realise over time. It also relates to the budgeting requirements of donors, where capital costs can be restricted to a percentage of the total budget.

WFP pointed out that the costs do not stop there – investment in a new way of working requires a systematic approach to organisational change that includes not only software development but also broader business

¹¹⁷ Wyeth (2011)

processes development, management of new risks and liabilities, and comprehensive capacity building and staff training. More systematic adoption of such tools requires organisations to cover the costs of change management. WFP's Cash for Change unit has a 3-year strategy and \$10.8m budget to increase use of cash and vouchers in food assistance programming, a large focus of which is researching, piloting and consolidating various e-payment systems and the processes required to manage this change¹¹⁸.

	Issue	P	S	M	V	DDG	DM	MC
FINANCIAL	Set-up costs of solution considered as a barrier to adoption	X	X	X	X	X	X	
	Investment can be difficult to align with donor budget requirements	x	X	X	X	X	X	X
	Financial barrier for private sector partner – getting involved in humanitarian programme is based on an underlying business case as well as CSR motives.	X	X	X		x		
	In countries with greater penetration, remote areas not targeted for expansion by the primary network operator	X	x	X	X	x	X	X

P = Pre-paid card, S = Smart card, M = Mobile money, V = Electronic voucher, x = some evidence, X = substantial evidence, DDG = digital data gathering, DM = data management, MC = Mobile communications, DDG = digital data gathering, DM = data management, MC = mobile communications

Another factor is a lack of evidence to show that the additional benefits make the investments in technology worthwhile. This research was unable to find many concrete examples of cost efficiency studies or CBA relating to use of new technology in humanitarian programming. The recent NAO audit of DFID-supported social protection programmes worldwide highlighted that the Department lacked sufficient analysis to establish whether the cost of delivering transfers is optimal, and that DFID remains under-informed about efficiency. Gaps highlighted include the lack of systematic capture and analysis of the full cost of delivering transfers, including staff and communities' time¹¹⁹. The lack of such data on longer term cash transfer programmes highlights the difficulty of providing such information in short term emergency contexts. Many benefits realised from investing in new technology are difficult to attach financial value to; CBA or value-for-money calculations are also not activities that those working in humanitarian programming tend to do or have the necessary skill sets for.

Lack of business case for expansion of services: In many countries development of the underlying infrastructure for new technology solutions is solely the responsibility of the private sector. This creates an important constraint, since it relies on the service provider determining a business case for operating in poor or remote, isolated communities. Rural areas tend to have slower returns for branchless banking agents, given the lower levels of population density and economic activity. Network coverage is a critical issue for adoption of technological solutions but mobile base stations are expensive to establish and maintain¹²⁰. MNOs must

¹¹⁸ Interview: WFP Rome

¹¹⁹ NAO (2011)

¹²⁰ The Telecommunications Regulatory Authority of India estimates the capital cost of installing a mobile site at around INR 5 million (\$120,000), inclusive of building and power equipment. These figures seem to be relatively coherent with other estimates. The above price

qualify that there is a minimum level of usage to guarantee return on investment. In particularly isolated areas the business case is simply considered non-viable. Whilst a certain amount could be expected in an emergency through corporate social responsibility on the part of an MNO, ultimately the existence of these systems, if costs are the responsibility of the MNO alone, must be determined by profitability. Pastoral areas are a particular challenge. This is related to a problem known in economics as ‘free-riding’, with no single organisation willing to bear the full costs for an investment in a public good from which everyone would benefit. Overcoming this barrier requires joint investment.

7.3 Institutional Barriers

These relate to changes to institutional practices and ways of working that are necessary, but which take time to develop, as well as barriers of institutional capacity.

	Issue	P	S	M	V	DDG	DM	MC
INSTITUTIONAL	Agencies lack knowledge of the technology, options, benefits and constraints	X	X	x	x	X		x
	Institutional inertia	X	X	x	x	X	X	x
	Use to date concentrated within technical programme teams; needs to be cross-departmental	X	X	X	x	X	X	x
	Keeping up with the pace of change in technology development poses considerable challenges to organisation's capacity	X	X	X	X	X	X	X
	Capacity of solution provider may prevent scale up	X	X	x	x	x	x	X
	Lack of knowledge and low education levels of recipient populations – especially literacy	X	X	x				x

P = Pre-paid card, S = Smart card, M = Mobile money, V = Electronic voucher, x = some evidence, X = substantial evidence, DDG = digital data gathering, DM = data management, MC = Mobile communications, DDG = digital data gathering, DM = data management, MC = mobile communications

Lack of awareness: Organisations cited a lack of awareness about what new technologies exists, their potentials and limitations. NetHope explain that many data management solutions are simply not visible to humanitarian and development organisations¹²¹. In a recent survey of UK charity and not-for-profit workers about how they

does not include the cost of the electronics or recurring costs, such as rent for the premises it is mounted. EcoNet in Zimbabwe quoted \$130,000 and Airtel Niger \$110,000.

¹²¹ Interview: NetHope

use technology, 80% people said that technology could help improve operations but only 33% have the time or confidence to try out new tools like cloud computing¹²². The movements of aid agencies towards looking at the potential of technology for humanitarian needs are happening in isolation with a lack of cross-referencing or learning. There is a lack of informed and nuanced debate and information sharing in this regard to enable agencies to make more informed decisions. Several people interviewed discussed the division of two camps – those who are what one person described as ‘evangelically enthusiastic’ about the potential of technology versus those who are distrustful¹²³. This was seen in Haiti, where traditional international humanitarian organisations did not know the volunteer ITC sector and doubted credibility of the data produced. Until now no organisation has had a mandate or technical credibility to moderate the pros and cons of new technology, or promote adoption of technical standards.

New approaches take time: Technology adoption necessitates greater collaboration between different departments within and amongst aid agencies and their partners. Within organisations, technology adoption requires a more involved role for organisation’s IT services in supporting programmes. There is a need for finance departments to be involved in selection and set up of e-payment systems. Such a change takes time; in larger organisations the pace of change is likely to be slower. The experiences in Haiti – where the potential for increased interaction between the technology community and aid agencies was there but the ‘rules of engagement’ were yet to be determined – highlight the need for new ways of working between organisations.

Capacity issues: Assessing and supporting the move to wider adoption of technology requires resources. This is not a one-off investment, since organisations must keep up with advances in technology. Keeping up with the pace of change in technology development poses considerable challenges to organisation’s capacity¹²⁴. Ideally, integration of technology into programming should be guided by a strategy – such strategies are still generally in the emergent stages or lacking. New competencies within the humanitarian community are needed to bridge the gap between programme implementation and technology providers, in order to ensure that technology solutions respond to the needs and reality of humanitarian response.

There are also recognised capacity constraints facing solution providers. In the case of e-payment service providers it is acknowledged that these companies can tend to operate a high volume, low margin business model, which may lead to reduced capacity for service quality. Most companies are still in expansion mode and are yet to consolidate service delivery. WFP Niger experienced reduced service quality when their service provider partner attempted rapid scale up¹²⁵. The emergent volunteer technology sector highlighted in section 6.3 must still grow their capacity to respond to the needs of the humanitarian sector while open-source providers lack resources for service support that is often required by aid agencies¹²⁶.

Recipient education: FrontlineSMS explain that “even in countries with high overall rates of mobile penetration, phone ownership falls off based on age, location, and gender, such that people over 40, those in rural areas, and women are often significantly less likely to own phones, in an inverse relationship with those most likely to be recipients of aid programmes”¹²⁷. The average phone owner is likely to be male, educated and urban¹²⁸. The common target groups for aid are more likely to have lower levels of previous access, understanding or usage of new technology. Literacy and numeracy are clear barriers for many. It is likely certain populations will require on-going support to utilise technology-based solutions.

¹²² Maison, A. (2011)

¹²³ Interviews: Oxfam GB, DFID, Crisis Mappers, NetHope, FrontlineSMS)

¹²⁴ Harvard Humanitarian Initiative (2011)

¹²⁵ Interview: WFP Niger

¹²⁶ Interview: Google Crisis Response, FrontlineSMS

¹²⁷ Wyeth (2011)

¹²⁸ Tortora, B. and Rheault, M. (2011)

7.4 Operational Barriers

These barriers relate to the time required for initial scoping and establishment of systems based on new technology, which presents a challenge in emergency response where time is a critical factor.

	Issue	P	S	M	V	DDG	DM	MC
OPERATIONAL	Identifying and assessing relative merits and accurate costing of solutions is time demanding.	X	X	X	X	x	x	x
	Timelines for establishing and implementing technology-based solutions after an emergency are at odds with rapid response	X	X	X	X	X	X	x
	Number of stakeholders in these programs requires significant coordination and several layers of administration	X	X	X	x	x	x	x

P = Pre-paid card, S = Smart card, M = Mobile money, V = Electronic voucher, x = some evidence, X = substantial evidence, DDG = digital data gathering, DM = data management, MC = Mobile communications, DDG = digital data gathering, DM = data management, MC = mobile communications

Integrating technology into programming takes time and resources: There are numerous ICT solutions available that have potential to improve programming, and new services are becoming available all the time. In Kenya there are currently 4 MNOs providing mobile money services, whose agent network capacity, tariff structures, products and operating model will differ. Researching and identifying the solutions available, and undertaking comparative analysis based on programme requirements, is a necessary but time-consuming task, and is generally not sufficiently resourced. Concern Kenya explained that while their aim is to revisit the mobile money market every year to ascertain the most appropriate solution in this rapidly evolving market place, in 2011, following the declaration of the drought crisis, there was insufficient time to undertake this assessment.

Setting up systems takes time: Once a solution is identified it takes time to undertake contractual negotiations, to train staff in the relevant systems and ensure the hardware and systems required are ready for implementation. CaLP Philippines' approach to Citibank for support with pre-paid card services after the flood response ran into difficulties because Citibank's usual contractual and due diligence period takes several weeks, whilst agencies required a solution that was operable in a fraction of that time. Negotiations after the emergency are difficult. Such processes conflict with the short-time horizons of emergency response programmes and donor pressures for on-time expenditure. New technologies and supporting systems need also to be tested extensively before implementation. US Red Cross highlight their early experience in Haiti as a lesson here. The programme initially planned to assist 80,000 households with a one-off unconditional cash grant through mobile money transfer as a top up to non-food item distributions, but found after several weeks of discussion and field testing that the phone company could not deliver on its commitments¹²⁹.

¹²⁹ Interview: IFRC

7.5 Political barriers

These relate to issues arising as a result of a change in power relationships caused by introducing or sharing new technology.

	Issue	P	S	M	V	DDG	DM	MC
POLITICAL	Private sector protective about their brand – reluctance to admit to problems; no interoperability	X	X	X	X	X	X	X
	Lack of sharing information concerning technology innovation; especially negative experiences	X	X	X	X	X	X	x
	First mover problem, especially in context of rapidly moving field	X	X	X		x	X	x
	Sharing of systems is impeded by concerns about ownership and data protection.		x			X	X	

P = Pre-paid card, S = Smart card, M = Mobile money, V = Electronic voucher, x = some evidence, X = substantial evidence, DDG = digital data gathering, DM = data management, MC = Mobile communications, DDG = digital data gathering, DM = data management, MC = mobile communications

Risk of engagement for the private sector: Humanitarian agencies tend to focus on the potential benefits available to private sector service providers for engaging in humanitarian response as well as their obligation to do so. Supporting service delivery in potentially high profile emergencies can in fact be a considerable risk for the private sector. Digicel and Voila limited their cell broadcasting service for aid agencies in Haiti to information from verified sources, following concerns about how misinformation could affect their brand¹³⁰. Private sector providers are in competition with each other. While this can have benefits for aid agencies, such as reduced tariffs and providers who are willing to go the extra mile, it can also lead to a certain lack of transparency. Many markets are still emerging and have yet to reach the phase of interoperability.

Lack of sharing of technology innovation on the part of aid agencies: A lack of willingness to share information concerning experiences with technology innovation persists on the part of agencies. Those interviewed put this down to a combination of factors, including competition for funding, the kudos technology innovation can bring to agencies seeking to gain 'competitive advantage', and a desire to maintain control. The private sector is not the only sector protective of their 'brand'. It was suggested that donors can add to this problem with a focus on funding 'innovation'. It was acknowledged it can be difficult for agencies to be open about sharing lessons on what did not work so well from piloting new approaches.

Much has been said before regarding issues with collaborative ways of working in the humanitarian sector. This is, however, a critical issue when it comes to adoption of technology. The first mover problem means that whilst there is growing interest in technological solutions, agencies are happy for others to take the risk and so are 'dipping their toe in the water and waiting to see who will jump in first'¹³¹. CaLP explained that this is

¹³⁰ Wall, I. and Chery, Y. G. (2011)

¹³¹ Interview: Crisis Mappers

the situation at the moment concerning e-payments in Zimbabwe¹³², for example. Lack of common action concerning needs in this respect is a factor behind the development of customised in-house solutions. This in turn inhibits wider sharing of the custom-built solutions, since an agency investing considerably in a tool can understandably be reluctant to share the wider benefits. This can result in systems which essentially have the same function being developed over and over. Communicating with Disaster Affected Communities (CDAC) highlight a relevant example in Haiti where a number of different stakeholders created independent new sites and applications to organise missing person information, which were redundant and potentially confusing. These systems separately tried to solve the same problem, lacked common coding standards and did not share information with other efforts¹³³.

Concerns over data protection: There were concerns raised regarding the risks associated with electronic storage and sharing of confidential data, especially in contexts where there is a protection concern and a perceived risk of repercussions if data was to ‘fall into the wrong hands’. The move to electronic data capture is highlighting a lack of protocol for data management in the aid sector in general. Whilst this is the case for data collected and stored on paper, it is considered more of a risk when in electronic form as it is potentially easier to move or access. There were also concerns expressed by some, regarding to how private sector service providers may utilise personal data of programme recipients.

7.6 Attitudinal Barriers

These barriers relate to the perceptions of key decision makers including agencies, donors, recipients and the private sector.

	Issue	P	S	M	V	DDG	DM	MC
ATTITUDINAL	Organisations can be quite risk averse. Perceptions of technology being expensive and difficult to use	X	X	X	x	X	X	x
	Distrust of private sector by agencies	X	X	x			x	
	Donor attitude	X	X	x	x	x	x	X
	Resistance to / distrust of the technology by target population	X	X	x	x	X		x

P = Pre-paid card, S = Smart card, M = Mobile money, V = Electronic voucher, x = some evidence, X = substantial evidence, DDG = digital data gathering, DM = data management, MC = Mobile communications, DDG = digital data gathering, DM = data management, MC = mobile communications

Perceptions of technology and of technology providers: An organisation interviewed in Haiti explained there was a running joke amongst agency staff about the “Pilots of the Caribbean” when it came to aid agencies’ approach to adopting new things. The pilot mentality is driven by the acknowledged tendency of humanitarian agencies to be risk averse. Interviews highlighted some aid agencies’ assumptions of technology being expensive

¹³² Interview: CaLP Zimbabwe
¹³³ Nelson et al (2010)

or difficult to use. Technology has a tendency to be seen as a 'black box' that will require specialist knowledge and support. There is a worry about capacity to cope with new systems and tools and about relinquishing control of programmes, with increasing reliance of implementation staff on specialist IT support.

Moving from the 'pilot' phase to broader upscale in an organisation requires buy in from senior decision makers, which is recognised as a barrier to change¹³⁴. Senior managers can be removed from operations and lack exposure to the potential benefits technology can bring. Several people said that senior managers may hold on to notions of how programming has been traditionally conducted. Decisions to upscale will involve financial controllers to support the initial investment, who require an understanding of the efficiencies or cost savings over time, to justify the initial investment. Limited evidence available may not convince them that the investment is justified. There are also worries that the pace of change of technology could make investments obsolete.

Participants expressed worries in the research over moving to new partnerships. There were concerns that the introduction of vulnerable households to e-payment services could possibly put them at risk of exploitation by the private sector. Likewise, there were concerns highlighted in Haiti around the validity of data generated through the crisis-mapping community.

Donor attitude: While donors are becoming more accepting of technology and some are driving the expansion of such services as mobile money in low income countries, donor requirements for aid – especially around budgeting – are not evolving. Budgetary restrictions to capital investment and budget inflexibility limit technology adoption and such things as index linking assistance.

Recipient attitude: Another worry of aid agencies concerns the accessibility and user friendliness for targeted communities and risk that a move toward technology-based operations puts increased burdens on vulnerable recipients of aid. In some contexts people identified that a distrust of banks and lack of exposure to branchless banking technology could create resistance to the acceptance of and limited uptake of technologies by targeted communities.

7.7 Legislative Barriers

These barriers relate to the regulatory environment in the country concerned, as well as issues relating to the proprietary claim on systems and data.

	Issue	P	S	M	V	DDG	DM	MC
LEGISLATIVE	Restrictive regulatory environments impede system development and can exclude potential recipients from access	×	×	×		×	×	×
	Lack of legislation concerning data protection	×	×	×		×	×	
	Proprietary nature of systems					×	×	×

Restrictive regulatory environment: New branchless banking models are being increasingly adopted in low-income and disaster-prone countries, but there remain countries where such products are lacking – such as in Ethiopia and Bangladesh – on account of a restrictive regulatory environment. In countries where these

¹³⁴ Harvard Humanitarian Initiative (2009); Interview Harvard Humanitarian Initiative

systems are established, regulators can also demand a level of KYC detail that is unrealistic for humanitarian programming considering the timeframe of emergency response or reality of the circumstances of the target recipients. National governments can act as promoters of but also as barriers to adoption of particular e-payment mechanisms. The government of Pakistan recently demanded that national financial institutions supporting delivery of the national social protection scheme, the Benazir Income Support Program, include delivery by mobile money rather than card-based systems, despite the fact that card-based systems were well established¹³⁵.

Regulators in country must also acknowledge systems for electronic data collection and data management. It is recognised by NetHope that some governments are unsure about migration of government services to cloud-based systems since this has potential to move data outside national borders¹³⁶. This could have potential impact on movement to cloud-based humanitarian data management systems where governments are a partner. In some countries data collection relating to national social protection programmes remains paper-based since this format is required as a legal document¹³⁷. Concern Sudan needed to ensure that permission for use of PDAs for digital data collection was granted by local authorities. As seen in the case study of the joint monitoring initiative of the 2011 Horn of Africa drought response, aid agencies can encounter barriers to adoption of such tools by authorities.

Lack of clarity concerning data protection: The secure electronic storage, management and sharing of personal or confidential data has a legislative angle. In parts of Africa and other regions governments are not advanced in shaping national policies on data protection and it is difficult to plan or design programmes that take this angle into account. This was particularly raised in terms of whether national governments (both donor and in country governments) could lay claim to the databases of aid agencies containing confidential data of recipients. There were also some concerns as to the transparency of private sector companies when it comes to use of recipient data.

Proprietary concerns: There were difficulties highlighted around ownership of systems, or data within systems that can affect scale up, particularly in cases where systems have been custom built. For example, on the HSNP in Kenya, it is Equity Bank and not the government which owns the database; whilst the chip in the smart cards used by Equity Bank belongs to the company providing the technology and requires their services (for a fee) in order to re-program them. Custom-built solutions may be dependent on multiple levels of software and the use of some may have proprietary restrictions. License rights prevented use of earlier versions of LMMS by non-World Vision agencies until negotiations with proprietary owners and legal liberty concerns had been concluded¹³⁸. Proprietary systems lack of common coding standards which limits interoperability.

7.8 Findings from the Research Show that Some Barriers are Already Reducing

This research has highlighted several recent developments which have the potential to reduce some of the barriers identified in section 7. For example, while only a snapshot, this report is a step towards addressing the problem of lack of knowledge of aid agencies concerning the technology options available. In some

¹³⁵ Interviews: CGAP, DFID Pakistan, UBL Bank

¹³⁶ Interview: NetHope

¹³⁷ Interview: Richard Chirchir

¹³⁸ Interview: World Vision Canada

countries KYC regulations are being reduced. In 2010 USAID joined NetHope to form the Global Broadband and Innovations Alliance with a focus on leveraging broadband infrastructure to support mobile network-enabled applications for aid programmes. USAID's proposed initiative, the 'Better than Cash Alliance' will seek to leverage collective action on the part of donors and NGOs to move forward with wider adoption of branchless banking systems. Solutions providers, including the private sector, will also have an increasing role to play in humanitarian preparedness and response. For example, the Development Fund of the GSM Association (GSMA) is embarking on a new initiative focusing on disaster risk reduction, which will seek to leverage commitment from GSMA members to support humanitarian actions in areas affected by disasters¹³⁹. Actors such as the GSMA, Vodafone Foundation Crisis Mapping community are emerging partners in delivery of aid.

There is movement towards wider sharing of the custom-built tools highlighted in the research. WFP hopes that there will be benefits in sharing their custom-built smart card tool and data-management system more widely, and the aim is to have this available for partners. An option being discussed is a cloud-based, centralised recipient management system hosted by WFP's data centre, but with access for country programmes and partner NGOs¹⁴⁰. The LMMS development team in World Vision has completed a product offering fully independent of any private sector proprietary software. The current version will undergo testing and product improvements before the tool can be presented for wider industry use. World Vision plans to host a live webinar session to present the current product features and corroborate the requirements of other agencies interested in becoming expansion partners in the near future. The business model on how to make this solution formally available for third parties is currently being discussed, both from a full ownership and services perspective. Also, World Vision is working with the development team, legal and finance on this direction. Limited Service Level Agreements are also being formulated to assist with the anticipated phased deployments with external agencies. Future LMMS product development will be contingent on World Vision securing sufficient financing¹⁴¹.

The research identified several recent advances in the technology environment which will reduce some of the technological and financial barriers highlighted in section 7.1 and 7.2. These include:

- **Altobridge Data-at-the-Edge™:** Altobridge is a solution provider that has developed a low-energy, low-cost micro base station to bring connectivity to small communities. The significantly reduced set-up and operating costs¹⁴² of the solution relative to the usual network towers mean they become profitable over shorter time horizons and with far fewer users. An MNO in Niger has installed 37 stations in remote village locations with hitherto zero coverage. Four of these have reached return on investment within 6 months¹⁴³. Besides being a potential solution to solving the connectivity issue, the existence of these permanent stations means there could be potential for development of a branchless banking agent network.
- **Vodafone's Instant Network:** Vodafone Foundation in partnership with Telecom Sans Frontières have developed and tested an Instant Network, a portable network solution for rapid deployment in emergencies. Vodafone Foundation has a roll-out plan to make these available in all Vodafone and partner markets by June 2012. These could be deployed in an emergency, either to re-establish coverage in the case of infrastructure damage or to provide communications in areas aid agencies are operating.

¹³⁹ This is likely to include encouraging MNOs to commit to a level of network access post disaster; finding ways to ensure MNOs can improve the targeting of aid, such as through providing mobile phone positioning data to enable tracking of populations; and improving coordination capacity in the MNOs for engagement with the humanitarian sector.

¹⁴⁰ Interview: WFP Rome

¹⁴¹ Interviews: World Vision Canada, World Vision Haiti

¹⁴² Altobridge base station costs \$3000 instead of the \$120,000 of standard towers. Site costs taking into account satellite and energy needs come to \$50,000 compared to \$200,000 for standard towers.

¹⁴³ Interview: Altobridge

- Visa's acquisition of the Fundamo platform, which provides the technology underlying many of the world's mobile money platforms, is likely to expand the opening of interfaces between mobile money providers and between card and phone based e-payment systems in 2012¹⁴⁴.
- In response to the difficulties with mobile money interfaces, service providers such as KopoKopo in East Africa are emerging with systems available to agencies on a subscription basis. These take payment information and offer it to clients in a format that can be more easily brought into a client's database. FrontlineSMS is creating generic, open-source software that can be used in these situations¹⁴⁵.
- FrontlineSMS is developing their version 2.0 web based platform which will cater for the needs of larger organisations¹⁴⁶.
- Trilogy International, the parent company of Voila, has granted the IFRC a free license to deploy the mobile phone based two way communication platform developed in Haiti, the Trilogy Emergency Relief Application, in other disaster-prone countries¹⁴⁷.
- Virtual SIM technology, which provides a mobile identity accessible over the mobile network from any phone on that network, is being successfully targeted at markets with the poorest consumers as a way to remove the need for poor households to invest in their own phone¹⁴⁸.
- Whilst there are still challenges related to (i) the need for uninterrupted connectivity; (ii) large data files; and (iii) background noise, voice recognition technology is advancing at a great pace and is considered to be a solution to the accuracy problems with fingerprints. This is considered to be something that will become more feasible over time, as technology improves and costs come down¹⁴⁹.

In fact this report provides evidence that some of the barriers identified by aid agencies are perceived barriers. For example, in terms of using e-payment systems post-disaster, while the ideal is a pre-existing mobile money agent network, it has been possible to put in the agent network and train people with intensive, ground-level cooperation with operators where the product exists. This research has also highlighted two custom-built solutions (WFP's smart card and FrontlineSMS mobile voucher) which going forward it could be possible to deploy in areas where these services are not available. The report has shown that integration of new technology into programming does not need to be expensive, and that whilst it can require upfront investment there is real potential for significant cost savings over time. It has proved that new technology does not have to be difficult to operate, with appropriate communication and training.

Finally, whilst the ICT environment is changing very rapidly, there was agreement between GSMA Development Fund¹⁵⁰, CGAP, Accenture and Vodafone that despite rapid developments in the field of telecoms and ICT, the fundamentals – i.e., the underlying networks – will remain the same for the next decade, particularly in low-income countries, and that such tools will not become obsolete.

¹⁴⁴ Interview: Visa USA

¹⁴⁵ Wyeth (2011)

¹⁴⁶ Interview: FrontlineSMS

¹⁴⁷ IFRC (2011)

¹⁴⁸ Wyeth (2011) : Movirtu, a UK company, has successfully implemented their system with Airtel Madagascar, and Indian provider Comviva has implemented theirs with MTN Cameroon.

¹⁴⁹ Interviews: CGAP, DFID Pakistan

¹⁵⁰ Founded in 1987 The GSM Association (GSMA) is a global trade association for more than 700 GSM operators and 180 wireless phone manufacturers and suppliers. The GSMA estimate that of the world's 6.5 billion people, only 2.5 billion are connected to mobile voice and data systems and these are almost exclusively in the developed world. To redress this, the GSMA initiated the GSMA Development Fund in October 2005 as a way to create replicable applications of GSM services in emerging markets.

8. SUGGESTED ACTIONS TO MOVE FORWARD IN ADOPTION OF TECHNOLOGY

This research has highlighted that new technology tools used in cash transfer and humanitarian programmes to date have improved efficiency and effectiveness of aid. The barriers identified above currently limit this efficiency and effectiveness in large areas in need of humanitarian response. They are, however, not insurmountable. If agencies are serious about realising the potential and use of new technology to deliver humanitarian aid to the poorest, rapidly and at scale, actions are needed to overcome the barriers identified. This will require actions to increase capacity of agencies and solutions providers, as well as developing and formalising new and improved ways of working within and between donors, aid agencies and solutions providers. Continued advances in technology mean the constraints relating to the limitations of technology in section 8.1 are likely to diminish over time. Even here, however, the humanitarian sector can take a proactive role in seeking to overcome these barriers more rapidly, especially in countries subject to regular, relatively predictable emergencies.

8.1 Actions the Humanitarian Sector Could Take to Improve the Technological Environment

8.1.1 Collaboration with Service Providers

Experiences of Concern in Niger and Save the Children in Zimbabwe highlight proactive approaches to e-payment service providers in emerging markets can inform development of the branchless banking agent network to where it is needed for humanitarian purposes. The WATAN card programme in Pakistan, which reached some 1.9m households, was possible because of a government directive to the private sector. Political capital could be leveraged in this way elsewhere. Similarly, solution providers working in the field of data

management consider that “if we could get several agencies and providers of data management tools in a room together it would make a big difference; there are skills out there to be leveraged”¹⁵¹.

8.1.2 Supporting Development of the Network

Connectivity is a critical requirement for upscale of new technology in programmes. WFP successfully negotiated with Airtel regarding prioritisation of locations for network development in DR Congo and other emerging network providers expressed interest to hear from the humanitarian sector regarding their needs¹⁵². The collective requirements of the humanitarian sector, including donors, could build the case for expansion of networks to un-served areas, especially in markets where MNOs are seeking to capture market share. This is likely to become more feasible with the development of low-cost network solutions, such as that of Altobridge highlighted in section 7.1. This solution is generating interest with donors in low income countries prone to humanitarian crisis, as a way to provide permanent connectivity to isolated regions¹⁵³.

The GSMA acknowledged that in remote and isolated areas with low population density, external investment is probably needed to overcome the free rider barrier to improving connectivity identified in section 7.2. In Kenya, Safaricom explained that their business case going forward is focused on service quality rather than further network expansion since they do not consider these areas sufficiently profitable, but that the company would be happy to work with the humanitarian community to support aid provision, providing the arrangement was one of shared costs and benefits¹⁵⁴. In areas prone to humanitarian crisis it is not unreasonable to expect that some sort of cost-sharing arrangement could be entered into between the donor community and an MNO in order to overcome the barrier of initial cost of investment, particularly given the development of low-cost network solutions. Cost sharing could perhaps be on the basis of a commitment from an MNO for realising expansion of mobile money or branchless banking into these areas, whether on a temporary emergency basis as part of a preparedness framework (see section 8.3.4 below) or on a permanent basis. Perhaps there is a case for using Universal Service Funds¹⁵⁵. DFID said that such an idea could fit well with DFID’s longer-term objectives, especially in countries where DFID also have a Social Protection mandate¹⁵⁶.

The humanitarian community could also approach the GSMA Development Fund to promote initiatives which drive down costs of deployment for rural network development, such as that of Altobridge, with member MNOs in countries prone to disaster and where connectivity would support humanitarian communications and wider deployment of technology solutions. The aid community in such environments could put together a business case for MNOs in country – based on projected usage, which goes beyond usage during emergency response. This links to section 8.3.9 on linking humanitarian and development objectives.

8.1.3 Use systems already in place

Both Pakistan and the Philippines are examples of disaster-prone countries where the delivery channels for emergency response are converging with the branchless banking e-payment systems being rolled out

¹⁵¹ Interview: FrontlineSMS

¹⁵² Econet in Zimbabwe, Orange in Kenya

¹⁵³ The United States Agency for International Development (USAID) is currently in negotiation in relation to needs in DR Congo. Safaricom has committed to introduce two stations to the drought-affected Turkana district in northern Kenya, as part of a corporate social responsibility initiative to facilitate aid agency communications.

¹⁵⁴ Interview: Safaricom Kenya

¹⁵⁵ The Universal Service Fund is a levy charged on MNO licensees. The object and purpose of the Fund is to support widespread access to, support capacity building and promote innovation in information and communications technology services. The fund is to accelerate access to communication services by un-served or underserved sections of the population.

¹⁵⁶ Interview: DFID

for national social protection programming. In countries where this is feasible it would make sense for the humanitarian sector to seek to realise some of the efficiencies potentially available from 'piggy backing' on the infrastructure and systems developed and tested for a similar purpose, rather than developing parallel systems. For example, over 40,000 households in northern Kenya that were affected by the 2011 drought crisis are being registered for a branchless banking account and smart card with Equity Bank. This will mean they are able to receive cash transfers through the same e-payment system as used by the government's HSNP social protection programme¹⁵⁷, which is operational in the same districts.

8.1.4 Support growth of the branchless banking agent network

Use of branchless banking and mobile money systems by the humanitarian sector does not need to be limited to relief provision. Branchless banking products are still developing. As FrontlineSMS explain, "the single most attractive thing to MNOs will be the number of people that agencies interact with and the amount of money that they move. This can be totalled up to include both emergency cash transfers and on-going cash transfer and other activities"¹⁵⁸. Organisations working in the humanitarian sector can inject cash into the branchless banking agent network to support its development and improve the business case for agents in more isolated environments by using it for other payments such as salaries of field staff. This would mean staff becomes familiar with the systems and would work towards improving the efficiency and effectiveness of the agent network. Both USAID and Gates Foundation are supporting this¹⁵⁹. For example, USAID's new initiative, the 'Better than Cash Alliance', includes a focus on considering use of mobile money across all programme supply chains.

8.1.5 Addressing the mobile money interface challenge

While mobile payment platforms vary, there may be commonalities in humanitarian data management that make it possible for a mobile payment data tool to be easily inserted into a wide variety of situations, linking up the internal organisational systems of aid agencies with the systems of the payment platforms, with minimal customisation. FrontlineSMS has created generic, open-source software that can be used in these situations, and this could be a starting point to removing this challenge¹⁶⁰. This will be of great use when data management become complex, particularly in cases where multiple payment platforms are being used in a single programme, since systems are yet to be made interoperable. This is likely to require a certain amount of software customisation. Humanitarian organisations could begin by identifying countries where cash transfers are likely to take place and mobile money services are developing, in order to optimise the establishment of interface technology. FrontlineSMS can advise on variables. The GSMA or CGAP could be a convenor for such an activity.

8.1.6 Action to improve the regulatory environment

In the case of Haiti, mini wallets requiring limited KYC were introduced by both mobile money providers, after the central bank relaxed requirements following negotiation with Gates Foundation. Approaches by the humanitarian community to the regulators would be useful in places where country governments are interested in supporting disaster risk reduction and where KYC requirements for branchless banking remain restrictive.

¹⁵⁷ DFID pers. Comm.

¹⁵⁸ Wyeth (2011)

¹⁵⁹ Interview: Gates Foundation

¹⁶⁰ Wyeth (2011)

Several donors as well as organisations such as CGAP and GSMA already play a significant role in influencing the regulatory environment for branchless banking. These could lobby national regulators and international standard setting bodies¹⁶¹ in order to:

- Allow particular KYC requirements appropriate to a humanitarian emergency context.
- In countries where this is an issue (Kenya, for example), find ways to enable refugees in need of humanitarian assistance to access e-payment systems without citizenship, perhaps through consideration of UNHCR registration cards, or use of biometrics.
- In restrictive regulatory environments, allow development of e-payment systems to support emergency response.

8.2 Develop Capacity of Stakeholders to Use New Technology for Humanitarian Response

8.2.1 Improve agency capacity

Humanitarian agencies need to be equipped with the resources and capacity to leverage the benefits that technology can bring. More can be done to increase familiarity of staff with the technology solutions that are available through such things as practical training, as well as by encouraging use of e-payment systems in everyday work. Practice is the best preparation. Training in open source solutions should be convened. Similarly training in electronic payment systems, perhaps in conjunction with a service provider, would be useful. Identifying the most appropriate solution must be based on informed analysis of the solutions available, whilst agencies need to stay abreast of future developments in technology and of emerging lessons from future deployment of technology in humanitarian programming. These activities are time-consuming and need to be appropriately resourced.

Several people during the research highlighted the potential usefulness of GIS mapping to cash and wider humanitarian programming. Maps utilised in provision of relief tend to be provided by cluster leaders to implementing agencies as PDFs, which, as Andrej Verity of UN OCHA points out, is not data, only a photograph of data¹⁶². More useful would be a map that implementing staff were able to manipulate and use as a tool to improve programme effectiveness. For agencies interested to develop more interactive ways of working, the platform Ushahidi would seem to be a natural place to begin. This is a pre-existing, open source tool and there are already efforts underway to make it more appropriate for humanitarian use¹⁶³. As a natural extension to existing ways of working, Ushahidi stakeholders George Chamales and Jennifer Chan explain this could enable agencies to generate a visual representation of 'who is doing what, where', as a way to highlight gaps in assistance. Agencies could 'crowd source' information from community agents rather than the wider population. This would

¹⁶¹ International standard setting bodies considering changes to their standards and practices to improve access to branchless banking include The Financial Action Task Force (FATF), which sets anti-money laundering (AML) and anti-terrorist financing standards and the Bank of International Settlements (BIS), which sets supervisory standards. Enabling tiered-KYC regulations would permit poor customers to open entry-level accounts with lower identification requirements. International regulatory standards for non-bank electronic money issuers and non-bank licensing would be useful for in-country regulators who remain hesitant to push the envelope in these areas.

¹⁶² Interview: UN OCHA

¹⁶³ Morrow et al (2011)

enable quality control of the data and could be a useful way to introduce agencies to and build confidence in these tools. Taken further and linked to GPS-located data it could enable users to highlight emergent trends and spatial relationships to inform response. CaLP Kenya is interested in this approach, as is ECHO Niger¹⁶⁴.

8.2.2 Improve recipient capacity

Investment in the additional support required to enable recipients of aid to access future benefits of branchless banking, or operate the full functionality of a phone can be worthwhile. This requires linkages between organisations' emergency and longer term programming, and perhaps longer funding horizons, discussed in section 8.3.9 below. One thing that more effort could be put into is actions to support poor households in areas with high risk of disaster to obtain a national ID card, where these are a requirement for branchless banking.

To leverage the wider benefits of mobile money requires support for those with low literacy and numeracy. There are already alternatives to the traditional menu-based options for mobile money operating in Haiti and Afghanistan¹⁶⁵. Programmes could actively promote the SMS short codes required for the mobile money operations with their target group, through high visibility posters, for example. Subject to evidence of the success of these emerging user interfaces, consideration should be given to ways to enable these to be more widely adopted. GSMA could have a role in promoting such innovations with members.

As mentioned in section 3, CRS in Niger have pioneered mobile-based literacy training, which research by Tufts University has proven to lead to wider utilisation of the phone for mobile money, SMS and other tools requiring basic fluency with mobile phone keypads¹⁶⁶. CRS are of the opinion that such a course could be condensed into 2 months, with 10 days sufficient for training in basic short code commands using numbers¹⁶⁷. An intensive mobile literacy course for mobile money could be developed and piloted in the first instance in a country context where mobile money is used or will be used for longer term social protection cash payments to the poorest, such as the Philippines or potentially Niger.

8.2.3 Support capacity building of solutions providers

The research has highlighted the potential role that the humanitarian sector can play in increasing the capacity of technology solutions providers to better support humanitarian response. In Haiti the HIFIVE grant to Mercy Corps enabled them to trial Voila's emerging payment platform for humanitarian needs and support agent network development. Donor funding of open source platforms such as FrontlineSMS is leading to development of tools which can improve aid effectiveness. There could be value in supporting service providers and the open source community to further develop tools and services of relevance. More can be done also to support the open-source technology community to formalise and professionalise if it is to be relied upon in future emergencies and treated confidently by agencies.

8.2.4 Partner with external expertise

The research highlighted numerous advantages of working with the private sector and open source community to make use of their expertise and off-the-shelf solutions. More could be done to improve coordination between the humanitarian sector and these solutions providers. One of the objectives of the GSMA Development Fund's

¹⁶⁴ Interview: CaLP Kenya, ECHO Niger

¹⁶⁵ Roshan in Afghanistan have a voice-operated mobile money, whilst operators in Haiti use USSD codes

¹⁶⁶ Aker et al (2011b)

¹⁶⁷ Interview: CRS Niger

new disaster risk reduction initiative will be to improve coordination of their MNO members with aid agencies, and they have engaged with CDAC on this. Any custom-built solutions, if necessary, must be developed carefully and with a collaborative approach to the design, investment and plans for upscale, and with an appreciation that such solutions risk becoming redundant as commercial systems and services in low-income countries continue to develop. It would be useful to leverage external expertise of academic institutions with relevant and impartial research expertise such as is required to build an evidence base.

8.2.5 Invest in knowledge generation to inform the business case

More evidence is required to fill critical gaps in the business case for use of new technology in humanitarian contexts. For example, evidence around cost effectiveness and value for money of technology-based systems compared to manual options, especially for programmes undertaken at scale and in remote areas, is required for budget holders. The wider social impacts of the increased utilisation of technology on local livelihoods, including coping strategies, should be prioritised.

The humanitarian community could also influence those MNOs installing low-cost network solutions in remote communities to serve emergency response to monitor uptake of voice and SMS activity, in order to better inform the business case of network provision in low income rural and pastoral communities. Several organisations expressed an interest in supporting such an initiative, including GSMA, Financial Sector Deepening, Bankable Frontier Associates and DFID. Vodafone Foundation explained they would also be in a position to work with the humanitarian community to monitor any increased usage of such networks as a result of an Instant Network deployment¹⁶⁸.

8.3 Improving Processes and Formalising New Ways of Working

8.3.1 Collective Action

More collective ways of working between humanitarian agencies would improve coordination, increase influence and realise economies of scale which would address a number of the barriers to technology adoption identified in section 8. For example, the humanitarian sector's collective requirements for e-payment services in low-income countries prone to humanitarian crises can be significant¹⁶⁹. Aggregating demands from the humanitarian sector to service providers could build a significant business case for expansion of e-payment agent networks, and would also save time and money for agencies. GSMA confirmed that more strategic approaches to the private sector would likely reduce MNO fatigue and this was something in demand from the service providers interviewed. Collective influence could similarly be applied to build the case for expansion of the networks to rural and isolated areas and could act as a catalyst for providers to develop new tools. Organisations would similarly benefit from a collective discussion with solution providers regarding data management requirements. Subject to lessons, joint monitoring initiatives similar to that undertaken by aid agencies in the Horn of Africa drought response could be useful. Given the potential benefits to the wider humanitarian sector of the WFP and

¹⁶⁸ Interview: Vodafone Foundation

¹⁶⁹ For example, in Zimbabwe there are currently 35 cash transfer programmes reaching over 141,000 households

World Visions custom-built systems, it would be of value if a donor and a consortium of agencies could come together to develop and fund a strategy for wider roll out to suit external needs.

8.3.2 Establish a moderator

No organisation in the humanitarian sphere has a mandate and the technical credibility to build links with the ICT sector, moderate technological development for aid or to promote or advocate for adoption of technical standards for e-payments or data management systems. Agencies should consider establishing such a mandate within the aid system. This is where UN agencies could show added value. This could potentially be split, such that, for example, WFP could moderate standards in e-payments, or UN OCHA in DDG and data management.

8.3.3 Donor incentive structures

The experiences in Haiti show that there is real potential for creating incentives for the private sector to develop e-payment systems, and that creating competition in the market place can have knock-on positive impacts on service delivery. USAID are already developing a similar 'prize' incentive for mobile money development in Afghanistan. Donors could consider incentive schemes in other low-income countries likely to be affected by disaster, if there is a need to promote sector innovation for development of these services for use in humanitarian response. Companies that are willing to go the 'last mile' in developing services accessible to the poorest should be able to receive some support. Public subsidies for private branchless banking operations are justifiable when funders target their money and influence as much as possible toward the wider public good¹⁷⁰. Those donors working at the cutting edge of this (DFID, USAID, Gates Foundation) have a role to play in sharing lessons, both positive and negative, and bringing other donors to the table. Perhaps more could also be done to bring national governments to the table in such contexts.

Donors could also play a convening role in furthering the use of information technology in humanitarian preparedness and response through financing and coordinating adoption by implementing partners and by disseminating lessons. Donor funding could be linked to conditions or incentives relating to sharing of information and systems to avoid the first mover problem. These need to be carefully considered and sensitively applied. For example, a donor working through multiple implementing partners could support partners to adopt cloud-based or shared data management systems. Donors funding technological 'innovations' in the humanitarian sector should allocate a proportion of that funding to developing and implementing strategies for wider scale up and sustainable adoption of the innovation.

8.3.4 Preparedness and contingency planning

A key lesson from the research is that after an emergency has been declared it is not the right time to be thinking of designing and implementing a programme integrating e-payment systems or new technology solutions for the first time. Rather these systems need to be developed in advance. This includes full assessments of available options, as well as consideration of the costs and benefits, approaches to the private sector and completion of appropriate due diligence by both parties. Ideally, this should be undertaken as joint action between agencies to realise economies of scale. Similar pre-emptive collective engagement between technology providers and humanitarian organisations, including the UN Cluster Information management group and CDAC, to identify and move forward on the needs of the response community for solutions including data aggregation and mapping would be useful.

¹⁷⁰ Martinez, M. and McKay, C. (2011)

Visa explained that in areas with regular emergencies it should be possible to come up with systems for electronic payments that can be 'switched on' when needed, and that these conversations are beginning to happen with humanitarian actors at global level¹⁷¹. The ideal would be to develop a procedural framework for preparedness. This could establish standard tariffs for the humanitarian sector similar to what Voila has introduced for NGO partners in Haiti¹⁷² and a senior focal point of contact within the service provider. In disaster-prone countries with well-established branchless banking partners it would include some commitment on the part of the service provider to provide 'temporary agents' and liquidity where needed. Given that this would likely be a diversion from the core business model, some sort of cost-sharing arrangement may be required. Such negotiation is underway in the Philippines between CaLP and financial institutions with the aim of developing a single, standardised agreement. Visa Pakistan said they would support such an initiative bringing together relief management expertise and their systems expertise. In countries such as Kenya, where branchless banking is established, the imminent pre-provisioning of Vodafone Instant Network could perhaps leverage prior commitment from a branchless banking service provider to provide a temporary branchless banking service through roving agents, for delivery of aid in areas where Instant Network is deployed during times of crisis. Certainly a commitment to Instant Network deployment could enable agencies to factor in future use of mobile voucher systems.

While it may not be possible to commit to a definitive figure in terms of the value, duration or geographic scope of future humanitarian assistance, there are parameters that it should be possible to estimate. For example, it can be said with a fair degree of certainty that in 2012 there will be humanitarian activity in the Horn of Africa and, based on experience, agencies should be able to provide some estimate of the scope and duration of such assistance.

New technology developers and humanitarian agencies should engage in preparation and simulation exercises to mainstream new technologies for future emergency responses. Donors should resource preparedness activities that enable establishment of systems pre-disaster in areas of high risk. Experience of UBL Bank and Visa in Pakistan showed what is possible to be achieved at scale with cost sharing arrangements, which is something that donors could leverage in future.

8.3.5 Formalising Roles and Responsibilities

It is important to determine from the start the roles and responsibilities of each party. GSMA reports that the expected role for MNOs in humanitarian mobile money programmes remains unclear and has varied from country to country. At the very least a memorandum detailing the commitment between the parties should be entered into. Whilst every agency could have individual agreements with a service provider, it would make sense for the negotiations to be undertaken collectively.

Memorandums between partners should set realistic targets for how long things take and what can be expected taking into account realistic expectations of each partner's capacity. It is important to bear in mind the support required from the e-payment service or other technology solution providers, and the capacity of these providers to deliver. It would ensure that the humanitarian sphere has a level of confidence of the commitment and capacity they can expect from a provider or in the event of an emergency, and that the provider understands what is expected, for example in terms of cost sharing, technical assistance or pre-positioning or provisioning of hardware. Anyone looking to establish agreements with a more global scope will need to factor in longer time and complexity. Some have warned that the practice by aid agencies to select preferential global suppliers

¹⁷¹ Interview: Visa Pakistan

¹⁷² This does not preclude alternative measures for strategic partners

could be dangerous since at scale these could have potential to distort the market¹⁷³. Similarly, it would be useful to formalise relationships with data gathering and data management solutions providers to support humanitarian response.

8.3.6 Develop codes of conduct for management and sharing of personal data

It was identified that aid agencies lack defined processes for data storage, usage and sharing and that movement towards electronic data management is highlighting this as a serious gap¹⁷⁴. WFP highlighted that in order to move forward in this area, aid agencies must fully understand the issues and the rules on data protection storage and require specialist guidance. It was highlighted that this is an issue to be addressed across the humanitarian sector. A sector more advanced in this respect, and where agencies could look for information and guidance, is the health sector, which has very strong regulations governing data protection. FrontlineSMS also have some useful guidance notes¹⁷⁵.

Codes of conducts for data management similar to the minimum standards adopted by agencies through SPHERE¹⁷⁶ would help to overcome some of the concerns with regard to electronic storage and usage of recipient data and sharing of this information. WFP explained that such a code of conduct would need to be taken into consideration alongside the regulations in country, but that this would provide clarity for all and set minimum standard in countries where regulations are weak. These would need to take into account the needs and concerns of agencies in order to be workable, and should not be imposed. The emphasis should be on ensuring recipient privacy and security of data whilst still enabling aid agencies to operate efficiently. Suggestions for what this should cover included physical security of data, security authorisation, protection of unique identifiers, levels of sharing and data aggregation, and on when or how recipients need to give their consent.

The informed consent issue is of most relevance when it comes to the disclosure of recipient branchless banking account details to aid agencies. As Chrissy Martin of Mennonite Economic Development Associates (MEDA) explained, the reputational risk for MNOs for not abiding by high standards with governing sharing or use of client data is huge. Companies will abide by the rules of the regulators or they risk losing their licence. However, since some countries have limited rules in place in this regard a code of conduct would be useful. These should detail such things as what level of data aggregation or disaggregation is acceptable, the level of detail on recipient's expenditure activity that aid agencies can expect from payment service providers and the need for prior informed consent on the part of the recipients.

8.3.7 Movement towards standard approaches for technology

There was general agreement from those interviewed that developing standard approaches could simplify the process of adoption of technology and support wider scale up. Whilst taking care not to stifle further useful innovation, the wealth of information available from pilot approaches mean that it should now be possible to move towards a 'tool box' of successful mechanisms, to enable wider adoption of proven innovations. This would enable development of common tools such as contractual templates, and could reduce set-up costs. WFP agreed that the next step should be to standardise approaches, or business processes, such as for e-payments,

¹⁷³ Interview: World Vision

¹⁷⁴ Interviews: WFP Rome, World Vision, Save the Children UK

¹⁷⁵ FrontlineSMS (2011a)

¹⁷⁶ Humanitarian Charter and Minimum Standards Governing Humanitarian Response

so as to support a move from an innovations phase to consolidation¹⁷⁷. Donors should not move to prescribing that a particular technology is to be used, but could support development of policies and strategies that assist agencies to adopt more standard approaches in their use of technology. Such coordinated adoption of systems would reduce the risk of fatigue on the part of solutions providers. Save the Children has been working on preparedness assessments in four country contexts¹⁷⁸ through CaLP funding for institutionalisation of good operational practices around cash transfer programmes, including identifying options for partnering with organisations offering technological solutions for delivering money. Findings of these should be widely shared. CaLP could also be ideally placed to focus on developing tools (e.g., frameworks, checklists, MOU templates) for adopting standard approaches to the use of technology.

8.3.8 Leverage the support of existing networks and alliances

The CaLP global network and in-country focal points, as well as cash-transfer working groups, are proving useful for sharing information on cash transfers. NetHope brings together key decision makers from the technology, donor and NGO spheres. However, it remains the IT department within aid organisations that interacts with NetHope and there is a need to ensure wider involvement from those with visibility of needs and realities in terms of programme implementation. Other relevant forums and coordination mechanisms that could be used to move forward any commitments on adoption of technology for effective humanitarian response include CDAC, the new International Conference for Crisis Mapping and the humanitarian clusters under UN OCHA.

8.3.9 Support for new ways of working

It is possible to overcome the internal barriers to technology adoption through new ways of working:

- **Inter-departmental working:** IT departments are moving beyond a generalist support role to a more active role in supporting programme implementation¹⁷⁹. Integration of technology into programming will be greatly supported by a more collective engagement between IT, senior decision makers and field operations. It may require IT staff to take on specific responsibilities as part of their terms of reference. Intra-agency working groups combining input from all appropriate departments could also help.
- **Strategies to guide integration of ICT into programmes:** Several organisations interviewed are developing strategies incorporating new technology as part of humanitarian programming¹⁸⁰. Development of such strategies is a requirement to leverage financial and legal support to make the change and will certainly help to define the roles and responsibilities of each department. Strategy for global organisations should not focus on roll out of global solutions to the neglect of those potentially available in country.
- **Longer term projections:** WFP's *Cash for Change* unit's investments highlights the cost that can be involved with supporting integration of technology into programming. Benefits from investing in technology increase with scale and frequency of use. Longer-term projections on the part of budget holders, both internally and from donors, are required. Several donors are looking at cash payments and e-payment systems in both their development and humanitarian engagements. Donors should seek ways to link these payment envelopes.

¹⁷⁷ Interview: WFP Rome

¹⁷⁸ Afghanistan, South Sudan, Philippines, Nepal

¹⁷⁹ Interview: Internews

¹⁸⁰ Mercy Corps, IFRC, Concern Worldwide, Save the Children UK

- **Bringing the developmental in to the humanitarian context:** This was one of the recommendations of the Humanitarian Emergency Response Review (HERR) and is a focus for DFID going forward¹⁸¹. There are numerous advantages to this from the point of view of advancing e-payments for humanitarian cash programming. Besides the benefits from a financing perspective identified above, this would better enable inclusion of the after support required to ensure that people introduced to branchless banking for the first time are better able to access the longer term benefits. It could enable the 'piggy backing' of emergency payments onto the payment infrastructure used by other government or donor cash transfer programmes to realise time and cost efficiencies.

8.4 Conclusion and Recommendations

This report makes the case for wider adoption of new technology in humanitarian cash and voucher programming. Based on the ever-growing range of experiences of implementing organisations, this report has shown how new technologies are tools with potential to serve humanitarian cash-based responses throughout the programme cycle in order to detect needs earlier, enlarge capacity of and speed up response, enhance specificity of transfers to match needs and foster accountability while reducing opportunities for corruption and diversion. It is also becoming recognised that the traditional, manual logistical system of aid provision is not always efficient or effective at addressing the real needs of households and communities affected by crisis, particularly as crises are increasing in frequency and severity in a number of low-income countries. There is an opportunity for provision of technology to realise benefits for recipients that go beyond the duration of the cash transfer programme. In order to realise these benefits, supporting actions would need to be factored into programme timelines and budgets that are likely to go beyond the horizon of emergency response, but in areas subject to regular crises such actions could go some way to increasing their resilience to future shocks. Technology is a tool like any other and its use should add value to humanitarian operations. It is not likely to, nor should it, replace all 'traditional' ways of programming, rather it should complement programme processes.

Adoption of new technology in humanitarian cash programmes has required investment in systems, in planning and in capacity development of agencies and recipients. Nevertheless, the report shows that gains can be significant and that no agencies were considering reverting to old ways of working. The potential benefits increase with scale and duration of adoption. While initial investment can be high, unit costs reduce as actions go to scale or continue over time. There should be no further need to ask 'if' things work anymore, or continued focus on small-scale pilots. More widespread adoption would allow development of common systems to increase efficiencies, as well as investment in training and add-on applications. The humanitarian sector is reaching a critical juncture in moving from a phase of development and testing towards wider diffusion of these innovations, and this is where the main challenges lie ahead. Kim Scriven of ALNAP identifies that "while the 'eureka moments' and successes of innovation are what capture the imagination, in reality the development and spread of new ideas takes time and commitment"¹⁸².

The barriers to wider adoption identified in section 8 of this report can be essentially divided into those caused by existing limitations of the technology solutions, supporting infrastructure or agent network; and those within the humanitarian community, both aid agencies and donors. These are caused by entrenched attitudes, mindsets and ways of working, allegiances to existing, possibly outmoded systems and a culture of hierarchy

¹⁸¹ Interview: DFID

¹⁸² Scriven (2011)

and control within the humanitarian sector which is difficult to move away from. This report shows that these barriers in many places can be overcome – but not individually. More systematic adoption of new technology as part of emergency response requires a more collective way of working on the part of agencies and new partnerships between multiple stakeholders. There is a role for international NGOs, UN agencies, donors, governments, the private sector and emerging open source solution providers.

Whilst access to new technology remains limited in some areas due to low service capacity or connectivity, the penetration of these IT and financial systems is increasing. Technology solutions and systems will become ever more accessible in low-income and disaster-affected communities and the logistics approach will become progressively redundant. This report has sought to show that by working collectively, by proactively engaging with the private sector and through considering new financial models, the humanitarian community could ensure certain necessary advances occur in the short to medium term to enable a more systematic adoption of technology solutions in places affected by recurrent crises.

Erik Hersman, the founder of Ushahidi, explained that “technology is only ten percent of the solution needed – technology does overcome inefficiencies but it takes people to make it happen”¹⁸³. Technology is only part of the solution. To ensure wider adoption and to leverage the full benefits of new technology requires the people and processes to work. It requires both aid agencies and donors to overcome institutional and attitudinal barriers and to adopt new ways of working. Vodafone Foundation said that “it is no longer a question of technology – it is a question of imagination. The means exist, now what is required is bringing people together to get things done”¹⁸⁴.

As a starting point aid agencies need to be serious about wanting to use new technology such as e-payments in humanitarian programmes and need to work together for greater influence and to realise economies of scale. Collective approaches to private sector providers may be challenging but can stimulate competition and yield preferential rates, with potential to leverage expansion of services to new areas. Charging a major agency with reviewing, adopting and disseminating technology across the humanitarian sector is needed. Feeding learning back within and across organisations is crucial to building innovations with long-term impact. Both the progressive cost effectiveness and the hidden benefits of new technology need to be factored into decision making.

New technology adoption requires new alliances between solution providers and the humanitarian community, as neither sector has the complete skill set to evolve responses alone. Working with the private sector and open source technology communities takes away a great deal of the risk, hassle and responsibilities from aid agencies. Solutions are ready-to-go and require far less support and investment than in-house systems. These solutions providers will increasingly become an active stakeholder in humanitarian response; agencies need to recognise this and move toward adopting clear ways of working with them in order to realise the full potential of these partnerships. Relationships must be developed strategically and for the longer term. Custom-built solutions risk becoming obsolete with further advances and penetration of new technology provided through the private sector. Where in-house systems are today justified, these must be shared to enable most effective use while no alternative solution is available.

Donors have a role to play in leveraging funds for new initiatives. This includes supporting agencies to make the necessary investments in technology and new financial models to support network development in areas where they are required for humanitarian response. They could provide incentives for agencies and the private sector to innovate and share. This could include developing policies and strategies for collective action

¹⁸³ Hersman, E. (2010)

¹⁸⁴ Interview: Vodafone Foundation

towards fostering more systematic adoption. Donors are well-placed to work with governments to improve the regulatory environment, in order to increase accessibility of e-payment systems by populations in areas with high risk of disaster or crisis. To leverage the wider benefits of technology requires longer-term funding horizons. Donors should begin to define and build linkages between emergency and development objectives and funding and develop new financing models to facilitate the adoption.

The report finishes with the following recommendations for the humanitarian community:

Action for where the rails exist: In areas of high penetration of mobile connectivity, and advancement in e-payment systems, there should be a major push, by donors and agencies, for developing standard approaches to support systematic adoption of new technology in programmes to improve efficiency and effectiveness of aid provision. A starting point would be for members of a cash consortium, or implementing partners of a donor funding cash transfers to determine that they will utilise the same tool to realise economies of scale.

Action in contexts of chronic or regular, recurrent crisis: In countries facing protracted crises or cyclical emergencies, where it is possible to say with a high degree of certainty that a future humanitarian programme is required, there should be a push, before the next crisis, for development of new financing models to meet costs of investment and for preparedness frameworks, between donors, agencies and the solutions providers.

Action in sudden onset disasters with poor penetration of technology: The period after an emergency has hit is not the time to be attempting to develop technological solutions or new ways of working for the first time. In such cases it is likely agencies should resort to more traditional methods of aid distribution. However, such contexts will become an increasingly small and marginal part of humanitarian response, and the humanitarian community operating in these contexts should stay abreast of developments and seek to move the development of such solutions and of network connectivity forward where possible.

ANNEXES

ANNEX I: REFERENCES

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ANNEX 2. RESEARCH METHODOLOGY

i. Literature Review

The objective of the literature review was to provide a comprehensive bibliography and inventory of grey and academic writing on technology in humanitarian cash transfer programming and the other relevant areas. The focus of the review was on:

- Instances of the use of new technology throughout the programme management cycle: targeting, registration, cash delivery, impact monitoring, ensuring accountability
- The preconditions for using technology in humanitarian cash transfer programming, including
 - enabling and constraining factors for the uptake and upscale of technology
 - the user-friendliness of technology in cash transfers
 - issues around accountability and transparency
 - privacy and data protection issues

This bibliography was begun using a set of key sources on this subject identified by the research team and through consultations, and then following up their references. This was complemented by keyword searches of specific databases set out in Table 2.1.

Databases searched in literature review

Google	Google Scholar
Disasters/Humanitarian Policy Group	Center for Global Development
ALNAP	ELDIS
Regional Hunger Vulnerability Program	CaLP
UNICEF	Consultative Group to Assist the Poor (CGAP)

The documents collected were then organised in two Excel sheets, by different programme stages and functions (contingency, management information systems (MIS), targeting and registration, needs and response assessment, delivery, monitoring and evaluation, accountability systems and audit) and by different types of technology (digital data gathering, biometrics, electronic payment systems, crowd-sourcing, digital data management software, and others). The first sheet provided a comprehensive list of programme examples

in each category, and the second detailed enabling and constraining factors in each category. This literature review was written up as a standalone document with suggested next steps and gaps in knowledge to inform the interview stage.

ii. Expert Interviews

The second stage involved the identification and interview of over 100 key experts, bringing experiences from Kenya, Niger, Zimbabwe, Pakistan, Philippines, Democratic Republic of Congo (DR Congo), Somalia and Haiti. It included experiences with a variety of electronic payments solutions and wider technologies, implemented in a variety of humanitarian contexts, such as slow onset (drought), rapid onset and disaster (flood, earthquake), conflict and early recovery. It included input from:

- International Non-Governmental Organisations (NGOs): Concern Worldwide, Oxfam, Save the Children, Mercy Corps, Catholic Relief Services (CRS), NRC, Dan Church Aid, Help Age International, World Vision Canada and World Vision International, Horn Relief, ACF• International Organisations: CGAP, IFRC, WFP, UNICEF, OCHA, FAO, UNHCR, UNOPS
- Donors: DFID, Gates Foundation, European Commission Directorate-General for Humanitarian Aid (ECHO), USAID
- Coalitions: CALP The GSM Association, NetHope
- Mobile Network Operators: Digicel, Voila,
- Safaricom, Airtel, Orange, Globe Telecom, Econet
- Financial Services: TN Bank, Unibank, UBL Bank, Citibank, Visa
- ICT Solutions Providers: Frontline SMS, Ushahidi, PSI Mobile Solutions, Crisis Mappers, Google Crisis Response
- Consultancies: Financial Sector Deepening (FSD), Bankable Frontier Associates (BFA), Dalberg Associates, Accenture Development Partnership
- Academics/researchers: Tufts University, Karolinska Institute, Institute for Development Studies (IDS), Overseas Development Institute (ODI), Harvard Humanitarian Initiative

A full list of interviewees is available below.

Core team members Gabrielle Smith and Mathieu Tromme conducted the interviews, using a semi-structured interview guide and reporting template. Respondents were asked to detail their experiences using different types of technology across different parts of the programme cycle. They were also asked to describe the benefits, pitfalls, constraints and pre-conditions for using different types of technology and what they have learned for the future, including plans for further use of technologies in their or others' plans for humanitarian programming. In order to deepen the findings from the literature review, they were asked particularly to discuss barriers to the further adoption, upscale and integration of technology, under the headings of Technical; Operational; Financial; Legislative; Political; Attitudinal; and Institutional.

iii. Case Studies

The final component of the methodology involved two country case studies. Of the countries focused on in the research, Niger and Haiti were selected for fieldwork on the basis of the availability of respondents and

the existence of interesting examples of the use of technology (in response to the earthquake in Haiti and the drought and conflict in Niger). These case studies were designed to delve deeper into specific issues and constraints around the use of technology through face-to-face interviews with stakeholders.

iv. Limitations

This methodology was designed to deliver a fairly comprehensive mapping of the use of technology in humanitarian and cash transfer response. However, it is important to be realistic about the limitations of an exercise that relies on the interest and goodwill of respondents.

The methodology does not claim to deliver a fully comprehensive list of every use of technology in the sector. Whilst the research team attempted to follow up all available leads, there is doubtless an extraordinarily wide range of individual initiatives, and the objective here is to have captured a reasonably representative set of them.

- It is common for respondents discussing their own programmes to report favourably on their outcomes and to justify their decisions. Interviewers tried specifically to correct for this tendency by asking directly about challenges and problems, and by triangulating between commentators, service providers and programme staff.
- Technology changes extremely fast and this complicates its adoption, regulation and assessment. The research aims to provide information on challenges, but it should be noted that this is a fast moving and complex field, so the information presented here should not be viewed as immutable.
- Several barriers to the adoption of technology, such as political and attitudinal challenges, are complex and difficult to uncover through short-term research. These assessments are not based on detailed political research.

v. List of Interviewees

Organisation	Name	Location
Accenture Development Partnerships	Atalla, Sally	France
Accenture Development Partnerships	Manton, Rachel	Global
Action Against Hunger	Navaro, Isabel	Philippines
Action Against Hunger	Pietzsch, Silke	United States
Action Contre la Faim	Navarro, Isabel	Philippines
Action Contre La Faim	Sardier, Marie	Ivory Coast
Airtel	Abdoul Salam, Ben Leo	Niger
Airtel	Hamani, Salim Daouda	Niger
Altobridge	Collins, Gerry	Ireland
Bankable Frontier Associates	Porteous, David	Kenya
BBC World Service	Shah, Anita	UK

CALP	Devred, Geraud	Philippines
CALP	Gourlay, Debbie	Zimbabwe
CALP	Hughson, Glenn	Kenya
Catholic Relief Services	Ahmadou, Issahak	Niger
Catholic Relief Services	Matarasso, Michael	Kenya
Catholic Relief Services	McGlinchy, Megan	Kenya
Catholic Relief Services	Osborne, Kevin	Haiti
Catholic Relief Services	Schaefer, Andrew	Kenya
Centre for Global Development	Gelb, Alan	United States
CGAP	Bold, Chris	Global
CGAP	Rotman, Sarah	United States
Citibank	Vestergaard, Thore	Singapore
Concern Worldwide	Abassi, Hamza	Pakistan
Concern Worldwide	Abdulla, Amina	Kenya
Concern Worldwide	Boumnijiel, Rachid	Niger
Concern Worldwide	Gaughan, Bernard	Ireland
Concern Worldwide	Idrissa, Mahamane Sani	Niger
Concern Worldwide	Jeanfrenel, Tham	Haiti
Concern Worldwide	McClelland, Amanda	Kenya
Concern Worldwide	Sani, Mahaman	Niger
Concern Worldwide	Schofield, Lilly	Kenya
Concern Worldwide	Soulaman	Niger
Concern Worldwide	Van Duursen, Nicolette	Zimbabwe
Crisis Mappers	Ayala Iacucci, Anahi	Kenya
Dalberg Associates	Bernasconi, Lorenzo	USA
Dalberg Associates	Shakhovskoy, Matt	USA
Danish Church Aid	Johnson, Erik	Denmark
DFID	Ferrand, Alex	Pakistan
DFID	Greenslade, Matthew	UK
Digicel	Planta, Rosano	Haiti
ECHO	Franzen, Wim	Niger
ECHO	Kreidler, Corinna	DR Congo

Econet	Nkosi	Zimbabwe
FAO	Fong, Phillip	Kenya
FAO	Malouda, Douglas	Zimbabwe
FAO	Were, Jacqueline	Southern Africa
Financial Sector Deepening	Malu, Victor	Kenya
Fonkoze	Roenen, Carine	Haiti
FrontlineSMS	Wyeth, Nathan	Kenya
FrontlineSMS	Walker Hudson, Laura	United Kingdom
Gates Foundation	Kendall, Jake	USA
Give Directly	Shapiro, Jeremy	Kenya
Globe Cell	Puno, Michael	Philippines
Google Crisis Response	Adams, Christiaan	USA
GSM Association Development Fund	Locke, Chris	UK
Harvard Humanitarian Initiative	Chan, Jennifer	United States
Help Age International	Chibole, Moses	Kenya
Help Age International	Meance, Bertin	Haiti
Horn Relief	White, Tom	Kenya
IFRC	Gilert, Heidi	Spain
Independent Consultant	Alio, Ali Karim	Niger
Independent Consultant	Chirchir, Richard	Kenya
Independent Consultant	Schubert, Bernd	Germany
Institute for Development Studies	Berdou, Evangelina	United Kingdom
Institute for Money, Technology and Financial Inclusion	Maurer, Bill	USA
InterNews	Quintanilla, Jacobo	Kenya
Karolinska Institute	Bengtsson, Linus	Sweden
Kiwanja	Banks, Ken	Global
Mennonite Development Associates	Martin, Chrissy	USA
Mercy Corps	Adongo, Eva	Haiti
NetHope	Schott, Frank	USA
NetHope	Winses, Fred	USA
Norwegian Refugee Council	Inwani, Charles	Kenya

Norwegian Refugee Council	Pietro	DR Congo
Overseas Development Institute	Bailey, Sarah	UK
Overseas Development Institute	Harvey, Paul	United Kingdom
Oxfam	Ahmed, Rabeea	Pakistan
Oxfam	Evrard Diakit�, Madeleine	Niger
Oxfam	Fontana, Solange	Kenya
Oxfam GB	Guillaume, Esther	Haiti
Oxfam GB	Kukrety, Nupur	United Kingdom
Oxfam GB	Young, Philippa	Haiti
PSI Mobile	Costello, David	Ireland
QuantumGIS	Rigby, Jan	Ireland
Safaricom	Logan, John	Kenya
Safaricom	Mwangi, Betty	Kenya
Save the Children	Ghulam, Mustafa	Pakistan
Save the Children	Pelly, Isabelle	Niger
Save the Children	Zhakata, Milton	Zimbabwe
Telecom Sans Frontieres	Rebattu, David	Bangkok
TN Bank	Majoni, Lindiwe	Zimbabwe
Tufts University	Aker, Jenny	United States
UN Children's Fund	Mariani, Claire	Kenya
UN High Commissioner for Refugees	Kleinschmidt, Killian	Kenya
UN High Commissioner for Refugees	Samb, Babacar	DR Congo
UN OCHA	Verity, Andrej	Global
UN Office for Project Services	Randrianaina, Dimby	DR Congo
United Bank Limited	Mir, Abrar	Pakistan
USAID	Harihareswara, Nandini	USA
USAID	Vertus, Marie	Haiti
US Red Cross	Dipretoro, Scott	USA
Ushahidi	Chamales, George	USA
Veterinaries Without Borders	Buono, Nicoletta	Kenya
Visa	Amer, Pasha	Pakistan
Visa	Ewing, Hope	USA

Visa	Rizwan, Naeem	Pakistan
Visa	Sabo, Doug	Global
Vodafone	Maynard, John	UK
Voila	Sossouvi, Koko	Haiti
WFP	Clements, Simon	Italy
WFP	Dolidze, Giorgi	Niger
WFP	Gouplet, Laurene	DR Congo
WFP	Joyceva, Liliana	Zimbabwe
WFP	Kramer, Ellen	Ivory Coast
WFP	Lacerda Carla	Philippines
WFP	Lovall, Mads	Uganda
WFP	McCann, Paul	Italy
World Vision International	Chibafa, Keith	Haiti
World Vision International	Mafosa, Thabani	South Africa
World Vision International	Narhan, Jay	Canada
Yellow Pepper	Succar, Jean	Haiti
Yellow Pepper	Wolff, Chris	Haiti

ANNEX 3: E-PAYMENT SYSTEMS

i. Programmes Using E-Payments Systems Included in the Research

Country	Year	Organisation	Partner	Detail
Pre-paid Card				
Swaziland	2007	Save the Children	Standard Bank	6067 households received a monthly CT for 3 months during a period of food insecurity. Households had bank accounts opened for them and could cash out at ATMs. Save the Children provides financial literacy training.
Chile	2011	US Red Cross	Visa	US Red Cross have a global contract with Visa; the system began in the USA to facilitate payments to individuals and is now being adopted in LICs. One-off payment of \$376 to 8400 low income families affected by the earthquake in Chile, to support their shelter needs. The card was redeemable for goods at 40 hardware stores in the city.
Philippines	2011	ACF	Visa and Philippine Veterans Bank	Small-scale pilot in the response to flood-affected households in Cobato City. Through CALP ACF sought the services of a bank partner verified by Visa. 305 of the 2500 households were paid 2 monthly transfers through the card, redeemable for select goods at participating supermarkets. The bank partner provided an expenditure report per recipient.

Pakistan	2009	Government of Pakistan	UBL bank and Visa	<p>Visa and its partner bank in Pakistan have provided pre-paid card services to support several large scale emergency responses.</p> <ul style="list-style-type: none"> ● In 2009 the government's decision to provide aid to households displaced by conflict coincided with UBL bank developing their branchless banking model. The 'omni' technology platform was trialled for the first G2P e-payment for 250,000 HH in camps. ● WFP followed with a pilot of 30,000 HH. ● More recently UBL distributed over 1.3m cards to facilitate government payments of 20,000 Rupees to households affected by the 2010 floods. Visa leveraged rapid provision of cards and supported upscale of the infrastructure. UBL has earned interest on the disbursement and covered the cost of the card.
Smart Card				
Malawi	2006	Concern Worldwide	Opportunity International Bank	Provided cash transfers to 11,000 households affected by food insecurity through use of smart card with biometric identification and mobile banking units.
Zimbabwe	2011	Save the Children	TN Bank	In the first technology-based cash delivery system by an aid agency in humanitarian response in Zimbabwe, TN Cash Cards were provided to 1000 participants in a Cash for Work programme in Karoi urban settlement. Following market assessment and FGD with communities, TN Bank set up 18 local shops with POS devices. Recipients could purchase goods or obtain 'cash back' in these outlets or at the local TN Bank agent. Save the Children provided training in ISAL. The card remained live after the programme with the rate reverted to the standard 2% per transaction.
Zimbabwe	2011	WVI	Barclays	Introduced a smart card system to support 100 poor labour-constrained households in Bulawayo City. Barclays provided low-cost access to individual bank accounts. The programme enables cash out at ATMs and purchases through POS in major supermarkets.

cont./

Niger	2010	WFP	Asusu MFI	The absence of an available e-payment solution available, WFP contacted over 20 financial institutions in Niger to explain their requirements for such a service and invited solutions. Three institutions proposed solutions and WFP selected the smart card solution with off-line capability of MFI Asusu. The MFI leveraged support from a firm for the plastic cards and web-based database, and provided the POS. Cash is taken by road under convoy to community pay points by MFI staff equipped with a POS and generator. Payments are made to 5000 HH.
Kenya, DR Congo	2010 – 2011	WFP	In house solution	With the support of a national software solution provider WFP Kenya developed an in-house e-voucher system to support migration from food distribution to open market systems. WFP procure the hardware and cards directly. POS devices are equipped with fingerprint scanners and solar chargers. The web-based data management system links to Equity bank for payment of traders. This solution has subsequently been successfully field tested for similar work in DRC, expected to upscale to +200,000 HH in 2012.
Kenya	2009 – ongoing	DFID and GoK	Equity Bank	The Government of Kenya's Hunger Safety Nets Programme is the largest cash transfer programme through smart cards to date. Bi-monthly cash payments of KSh2150 are distributed to 60,000 HH in four remote districts of northern Kenya. Payment points were installed in over 80 local shops and recipients can redeem all or part of the cash following fingerprint recognition.
Mobile Money				
Kenya	2008	Concern Worldwide	Safaricom	First usage of mobile money for aid distribution, targeting 500 households in the rural Kerio Valley that were affected by the post election violence. Subsequently expanded to the urban settlements of Nairobi for 6,522 households.
Kenya	2010	Concern Worldwide	Safaricom	Use of Safaricom's M-PESA platform in the urban slums to deliver approximately \$18 a month to 2,400 households, for 8 months to support basic needs.
Kenya	2010	Oxfam	Safaricom	Monthly cash transfers to 3000 households in urban settlements for 10 months during period of escalated food prices.

Haiti	2010 – 2011	Mercy Corps	Voila	<p>Mercy Corps received a grant from the USAID HIFIVE programme to work with Voila and piloted the product in three contexts:</p> <ul style="list-style-type: none"> ● C4W programme transferring \$53,000 for 415 HH, for cash out at bank outlets ● 9 month food aid programme for 5870 HH, who received \$60/month redeemable for goods at 60 vendors trained by Mercy Corps. Cash out was not available. ● One-off payment of \$225 UCT to 100 HH living in more rural Haute Plateau, redeemable for cash of goods through eight vendors
Haiti	2011	Concern	Digicel	129 C4W team leaders were paid through mobile money, most owned their own phone
Haiti	2011	Oxfam	Voila	Bought phones for 4000 households and delivered approximately \$50/month for 3 months to 979 men and 3021 women
Haiti	2011	Help Age International	Voila	Urban and rural programme targeting 6500 older people with a monthly cash transfer of \$17 per month.
Haiti	2011	CRS	Voila	Urban programme targeting 500 households with cash transfers to support food security, with the aim to scale up to 2-3000 households.
Cote d'Ivoire	2011	WFP	MTN	Urban programme providing monthly cash transfers for 2 months to 10,300 households affected by displacement from Liberia.
Niger	2010 – 2011	Concern Worldwide	Airtel	First humanitarian cash transfer through mobile in francophone Africa, providing \$40 for 4000 households for 5 months. Concern provided programme recipients with mobile phones. Subsequently up-scaled in the 2011 mitigation programme.
Philippines	2011	WFP	Globe	Used Globe Telecom's GCASH mobile money service to deliver cash transfers to 2000 flood affected households.
Haiti	2011	WorldVision	Digicel	Piloted use of mobile money in three programme contexts, including cash for work, unconditional cash and shelter grants, targeting over 6500 households, with payment cycles of between 1 and 3 payments.

ii. Process Outlined for E-payment Delivery Mechanisms

Pre-paid/debit cards	Smartcards	Mobile Money transfer (MMT)	Scratch cards (e-voucher)
<p>1. The Bank receives a file with recipient names and amount to be loaded onto the card.</p> <p>2. Cards and PIN numbers are distributed to recipients.</p> <p>3. Recipients use these cards at designated POS sites/ATMs.</p> <p>4. The Bank or agency can re-credit accounts online.</p>	<p>1. At registration recipients receive a smartcard loaded with their personal information (e.g., biometric ID).</p> <p>2. The card can be pre-programmed with transfer values, or this information can be sent each month, relayed to the POS when online.</p> <p>3. On paydays recipients withdraw cash from a shop equipped with a POS and/or purchase goods with smartcard. The POS can be used offline as well.</p> <p>Smartcard can be customised for ID (biometrics, pin).</p>	<p>1. At registration recipients set up a mobile money account with pin number.</p> <p>2. The MNO service provider receives the list of recipients, IDs and transfer value from the agency.</p> <p>3. On paydays, recipients receive a text from the MNO indicating the value of the transfer received in their mobile money account.</p> <p>4. They can withdraw all or a % of the transfer by going to a mobile money agent and completing a transaction using SMS.</p> <p>5. Agents' mobile money account is reimbursed from the recipient's account.</p>	<p>1. During the registration phase, the scratch card/e-voucher is linked to a unique ID number.</p> <p>2. To redeem a voucher, a vendor inputs serial number for the scratch card, national ID number, and PIN code as an SMS.</p> <p>3. The Vendor receives confirmation, disburses goods/cash.</p> <p>4. The Vendor's account is then credited with the amount from the agency's account.</p>

ANNEX 4. MOBILE COMMUNICATIONS

Programmes Utilising Mobile Communications Included in the Research

Country	Date	Agency	Partner	Detail
Haiti	2010	IFRC	Voila	Set up a hotline of 40 lines, to which another 20 lines were added
Haiti	2011	Oxfam GB	Digicel	Established a Freephone number 400 that operated across networks, and fielded over 1079 calls during their cash transfer programme. Oxfam arranged a post-paid tariff of 6 cents per call.
Pakistan	2011	Oxfam GB	–	A similar system to the 400 number in Haiti was used by Oxfam during the flood response
Haiti	2011	Help Age	Voila	Established an information service for their mobile money recipients, for which there was a cost of 12 cents per call.
Haiti	2011	CRS	Voila	Utilised a free phone feedback tool, this also had the option to respond via SMS
Somalia	2011	Oxfam	–	Established a complaints hotline as one channel of their complaints response mechanism
Niger	2010	Concern	Airtel	Established a free phone number for recipients of their cash transfer programme

ANNEX 5. DIGITAL DATA GATHERING

i. Specifications of some of the DDG Products Included in the Research

	Frontline SMS	Episurveyor	RapidSMS	Gather DATA	EMIT	PSI Mobile solution
Developers	FrontlineSMS, Kiwanja	DataDyne	Unicef	AED – Satellife	Cell-Life	PSI Mobile
Mobile requirements	Java phones	Java or Android	Basic phones	Java phones	Java phones	Java, Android, PDA
Data type collected	Text	Text, GPS	Text	Text, image, GPS	Text, image, video	Text, image, GPS
Basic description of system	Server software on a local PC	Cloud based service	Server software on a local PC	Server software on a Linux PC	Cloud based service	Cloud based service
Saved forms on phones	✓	✓	☒	✓	✓	✓
Software customisation	Open source	Partly open source	Open source	Open source	Proprietary	Proprietary
Data export	Excel, .CSV	Excel, .CSV, Access	Excel, .CSV	Excel, .CSV	Excel, .CSV	Excel, CSV, Access
Software costs	Free	Free (with limits)	Free	Free	Setup costs	Setup costs
Usage costs	No	Limited usage is free	No	No	Monthly fees	Monthly fees
Connectivity costs	SMS	Data (GPRS, EDGE, 3G)	SMS	Data (GPRS)	Data (GPRS)	Data (GPRS)

Premium services	Training, customisation	Pro version, training, custom support / report)	TBD	Custom support, server storage, training	TBD	TBD
Free support(s) available	Wiki, online tutorial, video, case studies	Wiki, case studies, user guides, video	Wiki, tutorial, mailing list, case studies	Development and configuration instructions	On-site support, case studies	
Customers examples	International Organization of Migration, Concern Worldwide	American Red Cross, WHO, CDC	UNICEF (Nigeria, Malawi, Ethiopia, Senegal)	TBD	Community media trust (HIV, South Africa)	Concern Worldwide

ii. Examples of Programmes Using DDG Tools

Type of activity	Program	Year	Context	Tool
Data collection to inform programmes (market prices, distribution figures, etc)	InfoasAid food assistance programme	2011	Kenya drought response: rural	Frontline SMS / mobile
	Concern Hunger Mitigation programme	2010	Niger drought response: rural	Frontline SMS / mobile
	WFP West Africa	2010	Cross border trade monitoring	Rapid SMS
Household survey / M&E	Internews Community Info Needs Assessment (survey of 600 HH)	2011	Dadaab camp – 'urban'	Episurveyor / smart phone
	Concern Malawi agricultural extension support (non-ER)	2011	Malawi rural	PSI / motorola
	Concern Sudan nutrition SMART survey	2011	Sudan Rural	PSI / motorola
	CRS Voucher fair registration and survey	2011	CAR – rural	Iform builder / iphone touch
	CRS livelihoods and cash and WASH programme assessment	2011	Haiti – urban	Iform builder / iPhone touch
	CRS Great Lakes Cassava Initiative M&E	2010	East Africa – rural	Mini pc
	UNOPS camp registration	2011	DRC – Rural – displacement	Episurveyor / Android phone
Horn of Africa cash transfer programmes joint monitoring initiative	2011	Horn of Africa drought response	Data pens	

iii. Selecting the Appropriate DDG Tool

Benefits and Constraints of the Hardware

	 Mobile phones	 Laptops	 PDA's	 Paper forms
Pros	<ul style="list-style-type: none"> ● Fastest data transfer ● GPS location data ● Improved data accuracy ● No duplicated work ● Lower transport costs ● Portable ● Long battery life ● Light, easy to carry ● Easy to protect from theft, damage ● Invest in only one device 	<ul style="list-style-type: none"> ● Faster data transfer than paper forms ● No duplicated work ● Improved data accuracy 	<ul style="list-style-type: none"> ● Faster data transfer than paper forms ● No duplicated work ● Improve data accuracy ● Portable ● Long battery life ● Light, easy to carry ● Easy to protect from theft and damage ● More appropriate for longer forms than mobiles 	<ul style="list-style-type: none"> ● Low up-front investment ● Easy questionnaire creation ● Easy to use
Cons	<ul style="list-style-type: none"> ● Up-front investment ● Technical training required ● Might not be appropriate for longer forms 	<ul style="list-style-type: none"> ● Slower data transfer than mobile phone ● Up-front investment greater than for mobiles ● Short battery life ● Not very portable ● Requires personnel to carry multiple devices ● Difficult to protect from theft and damage ● Technical training required 	<ul style="list-style-type: none"> ● Slower data transfer than mobile phones ● Up front investment greater than for mobile phones ● Redundant infrastructure ● Requires personnel to carry multiple devices ● Technical training required 	<ul style="list-style-type: none"> ● Slow ● Transcription errors ● Duplicated data entry ● Transportation costs ● Higher operating costs ● Lack of data security ● Risk of total data loss

Advantages and Limitations of Tools Identified

Product	Status	Cost	Uses	Advantages	Limitations	Good for:
Rapid	Opensource	Free	SMS	Any phone Can be web or local server hosted End-to-end solution (collection, transfer, analysis)	Need to understand how to code SMS text Only suitable for limited data collection in small quantities Requires data management expertise for the back end	Regular, small scale data collection, economically with some in-house IT expertise, where uptime is not completely critical
Frontline	Opensource	Free with paid add-ons including trouble shooting and data management	SMS	Data collection on form Local server hosted; version 2.0 with web hosting No IT programming knowledge required Any java enabled phone End-to-end solution Excel export Easy to hand over	SMS means only suitable for limited data collection Limited to small number of users (though this will increase with version 2.0) Delays in SMS speed	Regular, small scale data collected simply and economically with little in house IT expertise, where uptime is not completely critical
PSI	Proprietary	Paid, with scaled pricing plans	GPRS	Data collection on form Supports complex form design Supported on windows devices (PDA) and smart phones GPS Exportable to analysis (Excel, Access, SPSS)	No offline function for data sync Requires some programming knowledge for form building	Large scale, more complex data collection Harsh/remote environments

contd./

Iform builder	Proprietary	Paid, with scaled pricing plans	GPRS	Ease of form building Exportable to analysis (CSV) GPS	No offline function for data sync Limited to apple devices Cannot export on to SIM for sync via a laptop	Large scale, more complex data collection where Apple device is appropriate
Episurveyor	Opensource	Free with paid add-ons	GPRS	Form builder tool supports ease of complex form design Supported on all Java enabled devices and PDAs Exportable to analysis (CSV) GPS	No offline function for data sync	Large scale, more complex data collection Remote environments
Xcallibre Data pen	Proprietary	Paid	GPRS	Easy to use since mirrors paper survey	No offline function Not as significant time savings since writing on paper; Less quality/error control than other devices	Qualitative data collection and mapping exercises

ANNEX 6. DATA MANAGEMENT

i. LMMS Fact Sheet

For more information on LMMS, including videos and connecting with the project team please visit <http://www.lastmilemobilesolutions.com>

ii. Consideration of Open Source v Commercial v Custom-built software

	Benefits	Issues
Open source	<ul style="list-style-type: none"> ● Potential to be developed specifically for humanitarian needs ● Relatively cheap ● Provides source codes so that they can easily adapt the software ● Broad-based use 	<ul style="list-style-type: none"> ● Requires in-house expertise to take advantage of the source codes ● Lack of service support
Commercial off the shelf	<ul style="list-style-type: none"> ● Service support ● Robust software ● Readily deployable 	<ul style="list-style-type: none"> ● Developed for commercial needs – may not meet humanitarian needs ● Need to pay for modifications and licences
Custom-built	<ul style="list-style-type: none"> ● Develop a tool for humanitarian needs ● Control of processes and data 	<ul style="list-style-type: none"> ● Requires in-house IT service capacity and for future modifications ● Expensive ● Time consuming ● Requires expertise to modify ● Legal ramifications

ANNEX 7: CASE STUDIES

1. Electronic Voucher Scratch Cards– WFP and Splash Zimbabwe

In 2009 as part of their SPLASH (Sustainable Program for Livelihoods and Solutions for Hunger) program, WFP Zambia launched a mobile delivery and tracking system based on electronic vouchers, redeemable through the mobile phone. WFP made use of the technology platform provided by Mobile Transactions Zambia. Recipients are registered through uploading their National Registration Card into the system. After collecting their Voucher Scratch Card they can go to specific vendor outlets to redeem this for goods.

This has distributed 275,000 vouchers to over 150,000 chronically ill adults in Zambia to provide access to a basket of goods, with automatic reimbursement to vendors through the service provider's mobile payment system. A web-based dashboard accessed by WFP monitors account balance and redemption transaction patterns. In April 2011 use by WFP was expanded to approximately 10,000 households in Zimbabwe, this time through a service provided by a company called Redan, working in partnership with MTZL Vouchers were redeemed at the 'OK' supermarket chain.

WFP report benefits of this technology include the sustainability and efficiency of the delivery mechanism; improved information capture and audit trails; reduction of logistical and operational overheads; engagement of local retail outlets and on time payment of retail agents.

References: Omamo, S. et al (2010), WFP (2010), Interview: WFP Zimbabwe

2. Niger and wider impacts of mobile money transfer

Niger, a landlocked country located in West Africa, is one of the poorest countries in the world. Literacy levels are some of the lowest in the world and phone ownership is one of the lowest penetrations in SSA, at only 18% of adults (Gallup 2010). Despite this discouraging statistic in 2010 Concern, in an attempt to reduce operating costs and increase benefits to recipients, joined forces with the MNO Airtel to provide mobile phones and facilitate mobile money transfer to 4000 households affected by drought-related food insecurity. Other households received cash in envelopes. Concern partnered with Tufts University to investigate the impact of the mobile money transfer.

The switch to delivering cash transfers via mobile money considerably reduced travel time for recipients (valued at \$.92 in terms of saved time for agricultural wage labour which is equivalent to 2.5-3 kg of millet). It significantly reduced variable costs for the program. Other less anticipated impacts were also observed. From a comparison between the direct cash recipients and the mobile money recipients it was observed that the mobile money recipients purchased a greater variety of food types and non-food items and grew a wider variety of crops (including those primarily grown by women), indicating a greater impact on diet variety. Evidence also suggested that these households were selling non-durable assets less frequently.

All women recognised when they had received cash to their mobile money account. The majority sought assistance from relatives, neighbours and community animators to complete the cash-out process. Therefore accessing cash through the technology application was shown to be feasible even for illiterate households. However, programs aiming to ensure households can access wider benefits of this approach, such as financial inclusion, and would need to factor further training into the program.

Sources: Aker, J.C. (2011a), Tortora, B. and Rheault, M. (2011)

3. Save the Children's Experience with Smart Cards in Zimbabwe

In January 2011, Save the Children partnered with TN Bank in Karoi, Zimbabwe, to pilot the first technology-based cash delivery system for humanitarian response in Zimbabwe. Smart cards were used to deliver cash on a monthly basis 1,000 recipients of their Cash for Work program. Following market assessment and FGD with communities, TN Bank set up 18 local shops with POS devices. Recipients could purchase goods or obtain 'cash back' in these outlets or at the local TN Bank agent. As part of the program Save the Children provided recipients with training in savings and loans.

After comparison of six delivery options STC selected TN Bank's solution for convenience and security, and also since it was cost effective compared to costs of traditional bank accounts. TN also accepted a reduced KYC requirement for some households without ID. Save the Children paid \$6.5 per branded card and a reduced rate of 1% transaction cost. TN Bank covered the cost of POS. Transactions could be carried out in offline mode. Households appreciated the mechanism and have continued to use the system to save small amounts of money through the savings and loan component. Households are now paying the 2% transaction fee themselves. The demand for cash out services caused some liquidity issues for vendors, resolved by limiting card holders to cash out facility of 50% of the total value of the transfer.

Source: Save the Children (2010), Interviews: TN Bank, Save the Children Zimbabwe

4. Use of Pre-paid Visa Debit Cards in the Pakistan Floods

In late July 2010, Pakistan experienced flooding on an unprecedented scale. At its peak, flood water covered one fifth of the land area of the country. Early estimates of the damages totalled over \$10 billion, with over half of this damage affecting the agricultural sector, a key livelihood driver particularly in rural areas. Furthermore, there was significant damage to housing, with losses estimated at over \$1.5 billion. The devastation affected 20 million people.

The Government of Pakistan responded swiftly to the recovery and early reconstruction efforts by embarking upon an ambitious flood recovery program in the form of the Citizens' Damage Compensation Program (CDCP), which would grant unconditional cash transfers of approximately \$225 to flood-affected households. Delivering cash, immediately, to over a million households across a large, mainly rural population in a country where only 12% of the population had access to formal banking facilities was a challenge. In addressing this, the Government of Pakistan called on the banking industry to present solutions.

UBL Bank, Pakistan's second largest private bank, was selected as bank partner to implement the program. The program used UBL Bank's Omni branchless banking platform, recently developed for commercial purposes and delivered cash to recipients via Visa pre-paid debit cards, dubbed WATAN cards. Recipients could spend the money at stores or withdraw their cash at ATMs or agents specially set up to deal with the post-flood situation. Whilst there were understandably difficulties in deploying a system so new to people, rapidly and at such a large scale, the platform was able to deliver payments relatively effectively and securely.

Nevertheless, substantial commitments were required from UBL in terms of investments in agents (an increase from approximately 1800 to 4000) to cope with increased demand; significant investments in internal capacity; and the establishment of a new international supply chain to produce the required number of Visa cards. These investments enabled the distribution of 1 million cards in approximately 70 days.

UBL Bank's participation has reportedly cost UBL \$1.7m. However, UBL Bank considered the potential longer term benefits (the positive impacts on its public reputation as a socially responsible business and the opportunity to speed up the planned roll out of the Omni agent network and work on future G2P) to be a worthwhile investment. UBL Bank is a primary implementing partner for the Government of Pakistan's Benazir Income Support Program (BISP) which is now the largest cash transfer program in the country, paying approximately \$12 each month to more than 2.5 million women throughout the country. This is taking advantage of UBL's rapidly expanding network of over 6000 agents.

Sources: BFA 2011; Bold, C. (2010); Visa (2011); Interviews: UBL Bank, Visa Pakistan, CGAP

5. Haiti's experience with Mobile Money

The devastating earthquake that affected Haiti in 2010 left 250,000 people dead, 500,000 displaced and a cost to the economy estimated at up to \$13.2 billion. Aid agencies faced a critical need for rapid, secure and cost effective distribution of cash-based assistance to affected communities. Over 30% of financial services infrastructure was destroyed or badly damaged. Liquidity problems mounted and the alternative of manual cash distribution presented a security threat to staff and communities. It was considered by aid agencies that mobile money could offer a safer, faster and more affordable and faster alternative to distributing cash. However the leading MNO, Digicel, had no strategy for mobile money development whilst the plan of the leading competitor Voila was in its infancy.

In this context USAID partnered with the Bill & Melinda Gates Foundation to launch the Haiti Mobile Money Initiative (HMMI) an incentive based approach to initiate start-up and scaling of mobile money services. The rationale was development of mobile money tools that could provide both a rapid solution to the immediate needs of the disaster response but also establish longer term financial services to Haitians in a country where 85% of households have access to a mobile phone but only 10% of the population is served by the financial sector (in a study by USAID).

A \$10 million fund was launched in 2010, managed by USAID's Haiti Integrated Finance for Value Chains and Enterprises project (HIFIVE). The HMMI has a two-tier prize structure. The 'First to Market' award encouraged quick product launches, rewarding the first MNO to reach 10,000 transactions spread across 100 agents. The second prize has a longer timeframe, consisting of 'scaling' prizes for operators who meet targets in terms of number of transactions within 18 months.

Mobile money services were operationalized by both MNOs in December 2010. In January 2011 HMMI awarded Digicel and its partner, Scotiabank, the "First to Market" award of \$2.5 million for their product, Tcho Tcho Mobile. In August 2011 HMMI awarded Voila and their partner, Unibank, \$1.5 million for their product, T-Cash. By the end of July 2011 these services had reached 300,000 subscribers and completed nearly 1,000,000 transactions.

In a unique case for mobile money, the humanitarian context can be considered to have informed product development. NGO humanitarian cash transfer programs run by Mercy Corps and World Vision were integral to development of the two competing applications. Mercy Corps received a proportion of the HMMI technical assistance facility to support migration of a humanitarian agency to the mobile platform and document experiences. This is considered to have been an effective use of aid by agencies and donors. Donor lobbying to the regulators also succeeded in reducing the KYC requirements for accessing mobile money accounts, to

make them more appropriate to the post-disaster context. Since then 6 international NGOs in Haiti have piloted these tools.

The experiences in Haiti, subject to evaluation of the effectiveness of the prize components, indicate the potential for donors to proactively create incentives for the private sector to rapidly develop technologies to facilitate humanitarian response. It should be noted that products were available only at the early recovery phase of humanitarian intervention. It is unrealistic to expect complex technological solutions that require collaboration between phone companies, banks and humanitarian actors to be established within the timeframe of the emergency response.

Sources: Belosconi, L. et al (forthcoming); Bold, C. (2011b); Hausman, V. et al (2011); Interviews: Voila, Digicel, CGAP

6. Digital data gathering and collective data management in East Africa drought response

In 2011 aid agencies delivering humanitarian assistance in Somalia during the East Africa drought response formed a cash and voucher monitoring group to enable a coordinated approach to monitoring and evaluation. In order to realize joint, rapid monthly monitoring of assistance delivered through consortium members, donors were interested in using DDG technology. Donors worked with the support of FAO, since they had several years' successful experience with the use of data pens.

Use of the system was optional for each agency. Members expressed concern about the ramifications of using technology in the political context of Somalia, also around protection and security of their data in a web-hosted, shared database. Memorandums of Understanding were drafted with clauses relating to data protection. Agencies were assigned unique IDs, which enabled them to access their own data. The research institute leading the monitoring activities was able to access data of all group members but not the unique identifiers of recipient households. All NGO members have used the tool to undertake field data collection in areas where it was authorized by local authorities. In areas where there are certain restrictions placed on the activities of aid agencies, data collection was completed manually and transferred to the form upon return to the office.

Some of those involved reported time savings compared to traditional methods and consider that monthly reporting would not have been feasible without a DDG system. However, such benefits were not realized by all organizations working in very remote areas, given minimal internet access and the fact that the pen technology does not remove the paper data entry stage of data gathering. There were also technical difficulties experienced with the data pen. The difficulties faced are considered to be a factor of the speed of the set-up, whereby the solution provider was required to deliver the required service in a short space of time, customising the forms and the data-management requirements for the program in less than 10 days and where no discussion was held on the optimal tool for all members.

Cost of the solution comprising cost of 35 pens, development of forms and hosting and support services from the solution provider was a fraction of the \$40m program budget and reduces monitoring budgets of participating partners. Agencies using this technology for the first time will also need to invest additional funds in technical support beyond the cost of the pens, development of the forms and hosting.

The lesson from the NGO is that agencies wishing to use these tools must be aware of and invest in the necessary development, training, and testing as part of a preparedness effort prior to the onset of a crisis. The NGO will now be taking a more paced approach to DDG on a smaller scale in order to fully test and prepare.

Sources: Interviews: UNICEF, FAO Kenya, Horn Relief

7. World Vision and Upscale of LMMS

Last Mile Mobile Solutions (LMMS) is an innovative technology solution for the humanitarian sector designed and developed by World Vision (WV). WV collaborated with IT companies including Intermec Corporation, a hardware provider of mobile computers and FieldWorker Products Ltd., a specialist in mobile application development. LMMS's objectives are centred on delivering greater effectiveness, efficiency and accountability in the management of aid recipients and delivery of humanitarian services. LMMS digitally registers individuals and provides them with a service card with unique barcode and photo. The cards are used in retrieval of information associated with commodity distributions and a growing number of other services.

The process reduces the need for multiple registrations of households for different interventions. During distributions the system automatically calculates commodity or cash quantities due and allows for real time tracking of the assets. With mobile money, the system generates data files on the amount to credit to the mobile wallets held on the phones and generates pay slip reports. The electronic registration includes options to collect government issued ID numbers, recipient photos, geographic locations and mobile numbers and satisfies most KYC requirements. LMMS speeds up pre-distribution planning and the time spent performing actual distributions. The automated process controls against human error in calculations and against leakage, improving accountability of programs.

LMMS was piloted in 2008 in Kenya and Lesotho and has since been deployed in Zimbabwe, Haiti, Uganda, Zambia, and most recently in Niger. In 2011 WFP subcontracted WV to generate ID cards for cash programs in Uganda. The system has been applied to food, non-food item and cash distributions, targeted feeding and cash for work. Programs in Kenya, Haiti and Uganda have deployed the tool at a significant scale, targeting approximately 15,000, 48,000 and 51,000 households respectively. An independent study by Accenture Development Partners in Haiti found significant time and cost savings, with LMMS reported to have cut man-hours by a half compared to manual methodologies.

While this is undeniably a success story of how technological innovation has potential to facilitate more efficient and accurate humanitarian programming, WV's experience also highlights some of the challenges that act as barriers to wider adoption of technology.

- It takes concerted investment of time and resources to move from a pilot product to systematic adoption across country programs. This has required securing global buy in to the solution and to develop and resource a strategy for implementation. This also included capacity to provide support and extend proprietary software licensing globally.
- The investments in such things as outsourced development, consultancy, prototyping, proprietary licensing, legal agreements, internal development costs, field support, and assessments was considerable (\$2.2m). Ahead of external sharing, recapitalizing some costs and more critically supporting recurrent expenses associated with system maintenance and product life-cycle development is fundamental.

WV is developing plans for enabling broader sharing of the tool outside of the WV International network. This will likely be based on a cost sharing arrangement. Whilst the need for a system for aid management in the humanitarian sector is evident, the experiences underline the challenges of upscale that developers of custom built solutions may face, in the absence of collaborative strategy and resources for scale up.

Sources: World Vision (2010), World Vision (2011); Interviews: World Vision Haiti, World Vision Global; CALP Kenya

NEW TECHNOLOGIES

IN CASH TRANSFER PROGRAMMING AND HUMANITARIAN ASSISTANCE

Recent advances in new technology in low income countries mean there is now growing interest from donors, practitioners and governments in how technology can best serve humanitarian responses. Technology has potential to detect needs earlier, enlarge capacity of and speed up response, enhance specificity of transfers to match needs and enhance accountability while reducing opportunities for corruption and diversion. Changes in technological capacity particularly those relating to banking and mobile phone technologies are among the shifts that have enabled a broader consideration of the use of cash transfer programmes in emergencies.

CaLP commissioned Concern Worldwide to lead a consortium comprising Oxford Policy Management (OPM) and the Partnership for Research in International Affairs and Development (PRIAD) to review the current use of new technology in humanitarian aid applied to cash transfer programming, encompassing every stage of the programme cycle. The research was to explore (i) the preconditions for the use of each technological mechanism; (ii) user-friendliness of the technology for the beneficiary and for the agency; (iii) issues concerning accountability; and (iv) wider consequences. CaLP wished to highlight evidence of the cost effectiveness of new technology, the bottlenecks and barriers to upscale and any unmet needs of the humanitarian sector.

The researchers examined new technologies that can be applied to achieve various objectives within the cash transfer project management cycle: (i) delivering e-payments; (ii) communication with beneficiaries and field staff; (iii) data gathering; and (iv) data management. The report highlights the scope and scale of utilisation of such tools by humanitarian agencies to date, highlighting the benefits experienced and issues encountered as well as key lessons learned. It briefly discusses a number of cross-cutting issues including accountability, cost effectiveness, data privacy, wider impacts of introducing technology in programming and pros and cons of commercial, open source and in house custom built solutions. The paper highlights constraints to wider adoption of technology solutions and presents suggestions of 'next steps' for the humanitarian community and technology solutions providers to overcome these barriers and realise the potential of technology to enhance capacities of aid provision.



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