Case study: Cash-based programming (CBP) in the food assistance sector

John Bessant
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Executive Summary

The purpose of this case study is to explore the pattern of innovation in the food supply and distribution area (i.e. not concerned with nutrition). In this and other case studies of the humanitarian innovation (HI) ecosystem we are using a framework for analysis based on a number of components, including:

- *Resources:* what resources - finance, time, knowledge, technologies - are available for humanitarian innovation, and how are these deployed?

- *Roles*: who plays what roles in innovation efforts and processes? What, specifically, are the roles of innovators, end-users, front-line workers, brokers, researchers, private sector and non-traditional actors?

- *Relationships*: what kinds of relationships and networks exist between actors in the innovation ecosystem (competitive, collaborative, contractual, commercial, etc.), and how do these shape innovation efforts?

- *Rules*: what formal and informal rules pertain to humanitarian work and humanitarian innovation specifically, and how do they serve to shape roles, determine relationships, resource allocations, and shape innovation processes?

- *Routines*: what are the specific ways in which innovation processes work in the sector, and how well do these work?

- *Results*: how do innovation results get determined, and by whom, and how does this impact on the success or otherwise of innovations?

Each of these components are then integrated into a systems map which has also been developed by the University of Brighton project team as a means by which the different elements and interactions (invention, development and adoption of innovations) of the innovation ecosystem can be better understood.

Research has been based on secondary sources and interviews with key players in the field, using a
snowball approach in which respondents are asked to nominate others who could contribute useful perspectives.

The dominant design in food aid emerged during the early 1960s with the development of a mechanism for transferring US surpluses to countries in need. During the following fifty years there was a pattern of sustained incremental innovation along a trajectory which saw the challenge as one of supply push and finding ways to improve the process, product and targeting. In parallel there has been the emergence of an alternative approach based around variations on a cash model – providing end users with the resources to meet their own needs through local market mechanisms. This model grew bottom up in a variety of contexts and for a long period was seen as a fringe activity without a strong evidence base and with relatively low acceptance.

The past decade has seen a major expansion of this cash-based approach, a move from the fringes to mainstream programmes and an accumulation of experience around issues of how to deploy such innovations at scale. There has also been extensive learning about the very different set of resources (especially skills and capabilities) and the parallel infrastructures needed to operate what is essentially a financial system.

Cash programming is now accepted as one of the powerful tools in the portfolio available to humanitarian agencies and policies and procedures are now in place to enable a growing proportion of funding to be channelled in this way. It is also serving as a template for other kinds of humanitarian assistance – for example in shelter, WASH and healthcare.

Innovation theory provides a number of lenses through which to interpret this case and provide insights into the workings of the humanitarian innovation ecosystem. For example the Abernathy/Utterback model of innovation life cycles highlights the ways in which a dominant design becomes embedded in a mature system and the role played by entrepreneurs in challenging that and recreating a fluid state from which a new dominant design emerges. Another helpful lens is Christensen's theory of disruptive innovation which sees radical innovation emerging at the fringes of the mainstream, driven by entrepreneurs experimenting and learning in that space. Early problems are solved and the innovation develops in maturity until it becomes attractive to mainstream markets – at which point it poses a challenge to existing incumbents.

A key characteristic of disruptive innovation is that the early stage of its emergence involves experimentation and learning at the fringe, driven by entrepreneurs. The process is one of fast failure and learning, gradually refining key elements of the innovation in the context of application. Recent models of *agile innovation* build on this, using concepts like rapid prototyping, minimum viable product, scrum teams and sprints to define a set of tools which enable fast cycles of experimentation and learning.

In the case of cash programming this was very much the observed pattern with small-scale entrepreneurial activity refining and defining a new model via a process of controlled experimentation with different delivery models, technologies and other elements. In particular the process took place at a time of rapid technological change where new developments (such as mobile payments and better online security) facilitated the building of a carrier infrastructure for cash programming.

The evidence base grew to a point where original objections were overcome – for example about whether end users could be trusted, how to avoid corruption, maintain security, etc. We can map this on to a classical S-curve and explain many of the features around slow take-up and then acceleration in terms of diffusion theory. In particular slow take-up and early resistance is not simply a matter of *mindset* although this is a powerful inertial force. Henderson and Clark's theory of architectural innovation highlights the big challenge to the underlying structures and competencies required to implement radically new models which requires both learning new ways of working and simultaneously letting go of old but no longer relevant approaches. Cash programming requires a new technological infrastructure with different skills, moving away from a supply and distribution model to one resembling more closely a financial system. It also

moves from a centralized mode towards a decentralized network model, with corresponding shifts in power and influence.

Arguably cash programming represents a *paradigm shift* in the underlying business and mental models around food; this is reflected in the change of terminology from *food aid* to *food assistance*. This has involved considerable adaptation on the part of mainstream incumbents and cash plays an increasingly important role in their thinking.

There are open questions about the future – for example the increasingly important role which technology might play in extending the range and application of cash programming. It is also clear that there are limits to the use of cash; it is not suitable under all conditions and agencies are beginning to develop guidelines to help make appropriate choices about assistance routes.

Overall the story highlights well the existence of an innovation ecosystem within the humanitarian sector. There are key players and institutions and connectivity across a network which supports what Christensen calls *sustaining innovation* – effectively doing what we do but better. But there are also points where experimentation takes place and new, radical options emerge; these tend to be at the fringes of the mainstream system and not well integrated, often driven by individual entrepreneurs acting in *maverick* mode. Finding ways to couple these two systems – the mainstream *do better* machine with its advantages of scale and the entrepreneurial fringe with its capacity for radical new thinking – is a significant challenge and opportunity for enhancing the ecosystem for the future.

The case raises some key policy issues:
- How to foster entrepreneurship and create enabling conditions for small-scale experiments and prototypes? How can new approaches ('lean start-up' and other 'agile' innovation methodologies) be rapidly deployed?

- How to finance high risk *start-up* ventures of this kind? And how to fund the next 'capital round' of development finance to scale these pilots?

- How to evaluate in light touch manner to ensure prototypes and learning can take place?

- How to deal with the adoption/diffusion challenge (particularly the *missing middle* in innovation) and improve mechanisms for *crossing the chasm*?

- How to work more effectively in an open innovation context – the challenge of *finding*, *forming*, *performing* with new networks bringing in very different players?

- How to build *ambidexterity* into mainstream ecosystem players such that experiments and exploration at the periphery can be amplified

    It concludes with some recommendations to help configure the HI system to enable this including:

- Provision of support for developing and retraining entrepreneurial talent across the sector

- Provide identifiable sources of sufficient venture capital to enable experimentation to pilot/prototype

- Review and promote awareness of range of options around building internal entrepreneurship capability in HI

- Review and transfer models for structures for 'corporate entrepreneurship' from other sectors to HI

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Acronyms

AIM	Advanced Institute for Management Research
ALNAP	Active Learning Network for Accountability and Performance
ATM	Automated Telling Machine

CALP	Cash Learning Partnership
CBP	Cash based programming
CTP	Cash transfer programming
CFF	Cash for Food
DFID	(UK) Department for International Development
ECHO	European Union Directorate General for Humanitarian Affairs
EEC	European Economic Community
FDA	(US) Food and Drug Administration
HI	Humanitarian innovation
ICT	Information and communications technology
MVP	Minimum viable product
NGO	Non-governmental Organization
NORAD	Norwegian Agency for Development Co-operation
ODI	(UK) Overseas Development Institute
R&D	Research and development
UN	United Nations
UNICEF	United Nations International Children's Emergency Fund (now known as UN Children's Fund)
USAID	United States Agency for International Development
WASH	Water, Sanitation, Hygiene
WFP	World Food Programme

Introduction

The purpose of this case study is to explore the pattern of innovation in the food supply and distribution area (i.e. not concerned with nutrition). It seeks to understand and map the innovation ecosystem in action and link to the emerging systems dynamics model being explored by the research team.

Research has been based on interviews with key players in the field, using a *snowball* approach in which respondents are asked to nominate others who could contribute useful perspectives. In additional a wide range of literature, including extensive *grey* material in blogs and websites, has been drawn upon.

Within the case there is a clear emerging narrative which can be mapped on to models of innovation drawn from theory and compared with experience in other sectors. Of particular relevance is the concept of *dominant design* and the way this shapes the innovation agenda. In their theory of innovation life cycles Abernathy and Utterback draw attention to three different states characterizing innovation at different points in an industry. The first is a *fluid state* in which there is considerable experimentation around ideas and potential applications, a space in which entrepreneurs play a key role. The second state sees the emergence of a *dominant design* which gradually brings together the most successful elements of these entrepreneurial experiments into a model which sets the trajectory for the future. Finally in the third (*mature*) state the pattern of innovation shifts to becoming one about improving along this trajectory, largely via incremental innovation. However at key points novel ideas, technologies or opportunities emerge which a new generation of entrepreneurs experiment with and which can trigger the emergence of a new fluid state and the eventual appearance of a new dominant design.

Arguably this is the pattern in the CBP case, with an earlier dominant design around food aid giving way to a current model which has a competing dominant logic and one which may challenge the fundamental nature and operation of future innovation across the sector. Whilst there will always be situations in which CBP is not possible or inappropriate the evidence suggests a strong case for its continuing diffusion, substituting for an increasing proportion of 'conventional' food aid. This shift has wider implications for the delivery of humanitarian support in fields like healthcare, WASH and shelter.

Concepts and frameworks

In this and other case studies of the humanitarian innovation ecosystem we are using a framework for analysis based on a number of components, including:

- *Resources:* what resources - finance, time, knowledge, technologies - are available for humanitarian innovation, and how are these deployed?

- *Roles*: who plays what roles in innovation efforts and processes? Are there observable patterns? What, specifically, are the roles of innovators, end-users,

front-line workers, brokers, researchers, private sector and non-traditional actors?

- *Relationships*: what kinds of relationships and networks exist between actors in the innovation ecosystem (competitive, collaborative, contractual, commercial, etc.), and how do these shape innovation efforts?

- *Rules*: what formal and informal rules pertain to humanitarian work and humanitarian innovation specifically, and how do they serve to shape roles, determine relationships, resource allocations, and shape innovation processes?

- *Routines*: what are the specific ways in which innovation processes work in the sector, and how well do these work? What are the dynamics of these routines - e.g. linear, predictable; non-linear, unpredictable?

- *Results*: how do innovation results get determined, and by whom, and how does this impact on the success or otherwise of innovations?

Each of these components are then integrated into a systems map which has also been developed by the project team as a means by which the different elements and interactions (invention, development and adoption of innovations) of the innovation ecosystem can be better understood.

Overview of the sector

The dominant design for food aid emerged during the early 1960s with the development of a mechanism for transferring US surpluses to countries in need. In 1963 the World Food Programme (WFP) was formed as a UN agency with the mission of eradicating hunger and malnutrition.

WFP and similar agencies and connected NGOs have evolved and continue to innovate in several dimensions – for example in product innovation ("Plumpy Nut"), process innovation (with significant developments in logistics and programming), and in *position* innovation, working in a wide variety of contexts. The pattern of innovation across this is essentially contained within a paradigm which has historically seen the challenge as one of supply push and finding ways to improve the process, product and targeting.

In parallel with the maturing of this dominant design has been the emergence of an alternative approach based around variations on a cash model – providing end users with the resources to meet their own needs through local market mechanisms. This 'cash-based programming' (CBP) model grew bottom up in a variety of contexts and for a long period was seen as a fringe activity without a strong evidence base and with relatively low acceptance.

Since 2004 there has been growing mainstream acceptance of CBP as a complementary but powerful mechanism. It is recognized that cash programming is not suited to all conditions but has much to offer and the discourse has shifted from whether to one of where and how?

The past decade has seen a major expansion in CBP, a move from the fringes to mainstream programmes and an accumulation of experience around issues of how to deploy such innovations at scale. There has also been extensive learning about the very different set of resources (especially skills and capabilities) and the parallel infrastructures needed to operate what is essentially a financial system.

Cash programming is now accepted as one of the powerful tools in the portfolio available to humanitarian agencies and policies and procedures are now in place to enable a growing proportion of funding to be channeled in this way. It is also serving as a template for other kinds of humanitarian assistance – for example in shelter, WASH and healthcare.

Arguably CBP represents a *paradigm shift* in the underlying business and mental models around food; this is reflected in the change of terminology from *food aid* to f*ood assistance*. This has involved considerable adaptation on the part of mainstream incumbents and cash plays an increasingly important role in their thinking.

There are open questions about the future – for example the increasingly important role which technology might play in extending the range and application of cash programming. It is also clear that there are limits to the use of cash; it is not suitable under all conditions and agencies are beginning to develop guidelines to help make appropriate choices about assistance routes.

One aspect of the future pattern is the possibility that increasing experience with using cash in a variety of other humanitarian contexts might lead to its eventual adoption as a fundamentally new model for the whole sector. Instead of agencies like WFP acting as intermediaries there could be a much more direct link between donations and end-users facilitated by cash-based systems (especially given technological improvements to infrastructure to enable safe movement of money to the right people at the right time). This kind of *disintermediation* would certainly come under the heading of disruptive innovation

Exploring the innovation ecosystem through the case of cash-based programming

This case study focuses on food as a key priority area in humanitarian innovation. It does not explore the nutrition side but concentrates on the food supply/security issue, although there are some long-term implications for nutrition strategy. Our focus is on the way in which the innovation ecosystem operated over a sustained (70 year) period and the lessons which this offers about how to enable and support innovation in the future.

In the case we try to bring a number of innovation management frameworks to bear to help understand the pattern of innovation in this area and to suggest areas for further development.

The core of the story is the emergence during the 1990s of an alternative model to the dominant design for food aid based on delivery. Instead of shipping food and distributing it (or procuring it locally and distributing it), cash programming allows for end –users or those close to them to

meet needs more accurately and efficiently. Cash programming (CBP) covers a range of options including vouchers, smart cards and mobile payments) and is now a mature innovation widely accepted and used across the humanitarian community. It is not a substitute for other models for food assistance and there are many situations in which its use would be inappropriate (for example where local markets are not functioning). Instead it forms a part of a wider portfolio of models which can be used on a contingency basis.

In a recent review of the now strong evidence on CBP NORAD [1] suggest that there are several reasons why cash has become an important tool:

- its use reflects how most economies function; money is the prime instrument of exchange which people use and cash can therefore integrate humanitarian response with the local economy.

- in-kind food distribution emerged as a way of combining humanitarian concern with the need to dispose of Western food surpluses. With the decline in surpluses and escalating commodity and transport prices this model is a less cost efficient option and patterns of where and how food is procured are changing.

- early thinking on food assistance assumed the problem was a lack of *availability* but the view has changed to seeing it as a lack of *accessibility* - an inability to generate demand. Food and other resources are often available but people lack the purchasing power to access them.

- the nature of crisis itself may be changing; much of the experience is not rapid onset but complex, protracted and chronic. Evidence suggests that the use of in kind assistance may reinforce dependence whereas cash offers a greater possibility for stimulating markets and restoring livelihoods and productive capacity.

A key theme in the case is the need for humanitarian agencies to adapt their portfolio of competencies to take advantage of new innovation opportunities.

A brief history of innovation in food assistance

Early days
Concern about providing food to those in need is an age-old theme and there are many early examples of recognizable food aid programmes. The USA's food assistance programs began in 1812 when James Madison sent emergency aid to earthquake victims in Venezuela, the American Relief Administration provided a $20 million feeding program in Russia during the 1920s and the post-WW2 Marshall Plan provided large quantities of food aid commodities to the people of Western Europe.

However the origins of a systematic and large-scale response can probably be dated back to the 1950s. A combination of accumulated surpluses in developed countries like the US and the EEC

and the desperate plight of many in famine-afflicted areas led to the development of food aid programmes. The US model laid the foundations with the Agricultural Trade Development Act signed by President Dwight D. Eisenhower on July 10, 1954. Early in his administration, President John F. Kennedy underlined the importance of this approach by renaming it "Food for Peace" and placing it in the newly created U.S. Agency for International Development. In 1963 the World Food Programme (WFP) was formed as a UN agency with the mission of eradicating hunger and malnutrition. The formation of the EU following the signing of the Treaty of Rome in 1958 enabled European-level efforts along these lines to emerge.[3]

A supply and distribution ecosystem emerged with major agencies like WFP linking donors of money and food with large NGO delivery partners (like World Vision, CARE and Oxfam) handling distribution (the *last mile* challenge). By the 1970s the systems for delivering such aid were well-developed and there was extensive innovation to support the core mechanisms in place. Process innovation focused on improving warehousing and consolidation, on transport and logistics and on distribution management. These arrangements were increasingly co-ordinated and systematised. (For example, EuronAid was a logistics consortium set up in 1980, which became the main interlocutor between the EC and European NGOs for the delivery of EU food aid). Product innovation worked on improving nutritional value and position innovation was concerned with extending the range of targets towards which aid could be delivered and learning and adapting systems for those contexts.

The 1980s – gradually changing the pattern

The 1980s saw a gradual shift in approach, in part triggered by the decline in agricultural surpluses in the developed countries and in part by recognition that local markets could often be a viable source of supply.[4] (There was also growing concern that large food aid deliveries had a depressing effect on local markets). Emphasis shifted towards procurement rather than delivery and this period saw a move away from the importation of food surpluses for free distribution, towards internal or regional purchases to stimulate markets (including the monetisation of imported grains for local markets). Agencies like WFP began to receive an increasing proportion of donations in the form of money rather than kind and to develop a capacity to monitor prices and suppliers on the international market stage and to make connections between these. This required significant changes in the competencies and infrastructure within WFP and other agencies to augment their skills and capabilities in these new areas.

> **Box 1: The CFF programme**
> One of the first documented cases of the use of cash was the UNICEF cash for food (CFF) programme in Ethiopia, operated between 1984-5. Almost 95,000 people comprising 18,900 households were targeted with cash transfers at 14 sites in seven of Ethiopia's administrative regions. Sites were selected according to a number of criteria, including accessibility, a settled and non- scattered population, and the availability of a marketable surplus. Special attention was paid to vulnerable categories, such as female-headed households and large families. Cash was paid monthly to the beneficiaries through representatives and peasants' associations, enabling them to obtain food from neighbouring markets, rather than from more distant food-aid distribution sites. While the programme included a community-development component (all recipients were expected to participate regularly in community-based work schemes), the emphasis was on relief, rather than on work. The CFF programme was planned to last for eight months until the next harvest, but at some sites it was in place for two years.
>
> The UNICEF evaluation of the programme reports its achievements as *considerable*. The evaluation included a comparative analysis of the costs involved; it estimated that, at a total of $5.5m, the cost of the CFF programme was roughly half that of World Food Programme (WFP)-supplied grain. Perhaps the two major advantages of the programme over a relief distribution were the speed and relatively low cost of delivery.

At the same time there were a small number of experiments with a radical alternative – using cash directly to enable the purchase of food on local markets. These emerged for many reasons – sometimes (as in the Eritrea crisis) it became dangerous to ship food because the convoys were attacked. Instead mechanisms evolved to allow surreptitious movement of money to crisis zones to enable some form of food assistance to be provided. There was also growing recognition that even if food was provided as aid recipients would sometimes trade this on local markets for things which they needed more – in essence food was being used as a currency with which to procure other supplies of goods or services. In other examples entrepreneurial field operators looked to explore a different approach, recognizing the potential of giving end-users the cash with which to procure their own food resources.

It is important to recognize that the underlying idea was not new – for example, Clara Barton, one of the founding figures of the American Red Cross, helped to organize cash relief following the Franco-Prussian War of 1870–71 and similar programmes were organized in response to the Galveston floods in Texas in 1900 [5]. In 1948 the British administration's response to the famine in Sudan was to distribute cash, coffee and train tickets and in India they responded to famines by providing waged labour [6]. Cash relief interventions were also implemented in famines in Tanganyika, Rhodesia and colonial China [7] and Dreze and Sen also point out that they were an important feature of famine response in the 1980s in Botswana, Ethiopia and Cape Verde.

There was also discussion around the theoretical ideas of cash vs. food aid going back to the 1970s but whilst the principle was recognized it was not until the mid-1980s that actual experiments with the practice began. These were very much isolated bottom-up pilots, pioneered by entrepreneurial agents working in the field and taking advantage of local autonomy to explore novel approaches. The individuals involved were loosely connected in an informal network and so some degree of experience-sharing and accumulation of core models for cash-based programming began to emerge.

The 1990s – early experimentation towards a new model

The period of the 1990s could be described as a limited expansion of experimentation, with a number of different models being tried in different locations. All had in common the idea of moving away form direct delivery of food aid and towards using cash as a way of empowering local players to procure what they needed. Various different models emerged, from programmes tied to specific objectives like cash for work through to more open-ended schemes. And different modalities were tried, ranging from vouchers and cards to direct cash payments.

The emerging model of cash-linked interventions suggested a simple typology:[1]

- Unconditional cash transfers which make no demand on the beneficiary

- Conditional which impose a requirement on the beneficiary – for example in exchange for work, attending school, or purchase of specific items

- Vouchers in which a token, coupon or other instrument is used to procure items designated by the issuer

The experience of such experiments also highlighted the many hurdles to be overcome in establishing a viable cash model. For example, issues of distribution and control, of security and of developing an underpinning infrastructure in terms of technology and skills. There was also a need to improve understanding of the ways in which local markets operated in order to avoid distorting effects from cash interventions.

One other important factor in the 1990s was the growing understanding of the *context* within which food and other assistance was being place [8]. In particular the Vulnerability Assessment Method and other approaches began to influence the ways in which major agencies like WFP and delivery NGOs like Save the Children and CARE began to operate[9]. Tools for assessment of needs became sharper and more sophisticated, allowing assistance to be more carefully targeted and matched; effectively aid became less of a *blunt instrument.* A key part of this shift in thinking was the recognition of the end-recipient as a key agent in the process and the need to built a detailed understanding of how they lived their lives. By the 1990s this was becoming a cornerstone of assistance programmes – for example DFID began using a Sustainable Livelihoods framework whilst USAID had a similar framework in place.

Also relevant was the growing concern in regions like Ethiopia with long-term dependency on food aid. Growing research around this problem suggested a trap into which many were falling; for example a 2002 IDS report by Stephen Devereux (based on extensive work in the late 1990s in north eastern Ethiopia) suggested that 30% of families would never reach subsistence levels on their own [10]. This added to the concern to intervene in more targeted ways and particularly to build some long-term development capacity. An example would be the Productive Social Safety Net, a World Bank programme instituted by the Ethiopian Government in 2005 which supports communities through a mixture of food and cash in return for labour. This now provides assistance to about 12 million beneficiaries.

The early 2000s - Maturing of the concept

In 2001 David Peppiatt, John Mitchell and colleagues published an influential paper summarizing the accumulated evidence from ten years of such small-scale experiments and demonstrating that there was a solid case for considering cash programming as an option in food assistance [11].

The emerging view of the risks and benefits surrounding the cash option are summarized in table 1.

Benefits	Risks
Potential for faster delivery and lower transaction costs	Flexibility of cash means risk: how can donors ensure that their aid is going where it is intended?
Potential beneficial impact of a cash injection on local markets and trade.	Cash may stimulate a local economy but it may also lead to inflation and increased prices, potentially penalising people not included in the programme.
Deals with problem of identifying requirements, since beneficiaries are in a position to determine these themselves.	Targeting more difficult, since cash is of inherent value to everyone, and does not allow for self-selection.
The range of food items that can be purchased may be wider and more appealing than the standard food-aid basket.	Security issues, even in relatively stable environments. In conflict-related emergencies beneficiaries of a cash distribution may also be targeted by belligerents
	Potential losses from inflation, *leakage*, etc.

Table 1: Risks and benefits in cash programming
(Based on Peppiatt et al [11] and Bryson and Hansch,[12])

This prompted other reviews and syntheses of evidence and effectively brought the potential of this radical innovation to the attention of senior figures in the mainstream agencies [13]. Key networks like the Humanitarian Policy Group began to shape the discussion and provide a focus for sharing of evidence and experience. Early advocates began to press for more exploration and by 2003 the concept had become a legitimate area for research and action; the agenda had shifted from *"should we work with cash?"* to *"how do we work with cash?"* But although there was growing interest and activity – particularly amongst *early adopters* like Oxfam, British Red Cross, DFID, Adeso or the Swiss Development Corporation – the overall level of activity was still low.

For example a report for ODI in 2005 commented that '*cash and voucher approaches remain largely underutilised in the humanitarian sector. A review of all of the 2004 United Nations consolidated appeals, …. reveals almost no use of cash or vouchers.*' (13).

During this period considerable learning took place about the challenges of designing and implementing viable cash systems. The need for new skills, the importance of new knowledge sets, the potential of new technologies and the opportunities opened up by a potential change in the underlying *dominant logic* of food assistance were increasingly recognized and explored. The core idea of cash as an alternative to in-kind assistance moved from a *one size fits all* concept to an increasingly configurable one, with the potential for shaping to meet different operating contingencies.

2004 and a 'tipping point'

The landscape shifted dramatically with the 2004 Tsunami; the huge scale of the crisis prompted a massive response and a significant injection of resources into the humanitarian aid system. (For example the UK's Disasters Emergency Committee received donations valued at over £300m) Combined with negligible damage to food production and marketing systems beyond the immediate coastal areas this sparked widespread experimentation with and evaluation of cash and vouchers as alternatives to in-kind food deliveries.

There was a need for urgent response but also a huge problem of scale. Being seen to do something and fast became a high priority; this provided both an opportunity to put cash to the test on a large scale and the resources with which to do so. Arguably during this period thinking shifted in the dominant logic from providing in-kind food aid as the default to seeing cash as the default option.

Major programmes based on cash were implemented in a variety of locations, accelerating the opportunities for learning and refining the approach in different contexts and using different configurations. In some ways the Tsunami could be seen as a *prism* through which the idea of cash programming became diffracted, spreading out in terms of operating models, delivery systems, target populations and enabling technologies. Some were centralized and linked to large-scale formal programmes like cash for work whilst others were more *bottom-up* configured with considerable input from end-users. Some were food-focused; others linked their programmes to a wider set of needed resources including shelter. This was an important phase in the maturing of the concept since it highlighted the importance of a deep understanding of context in designing, configuring and implementing effective cash programmes.

An important contribution here was the role of CALP – the Cash Learning Partnership. The origin of this group was an informal experience sharing network collating and curating the emerging body of knowledge around cash programming. It was formalised in 2005 with Oxfam, Save the Children and the British Red cross as founders and has grown to be a key institution in the humanitarian innovation landscape supporting capacity building, research and information sharing around CBP.[1]

A 2005 review by the Overseas Development Institute (ODI) found that cash transfers were under-utilized but that the provision of cash by aid agencies was on the rise [13]. This suggested that cash and vouchers, where appropriate, could be used as alternatives and complements to most types of in-kind assistance, including food aid, shelter materials, non-food item kits, seeds and tools and livestock. The report concluded that:

> " ... *a strong body of evidence is starting to emerge to indicate that providing people with cash or vouchers works. It is possible to target and distribute cash safely, and people spend money sensibly on basic essentials and on rebuilding livelihoods. Cash transfers can provide a stimulus to local economies, and in some contexts can be more cost-effective than commodity-based alternatives....*"

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[1] For more details see their website: http://www.cashlearning.org/

Harvey updated his report in 2007 reviewing a growing number of studies including some experiences in developed countries (for example cash tools were used in the Hurricane Katrina and German flood contexts) [5]. The field was maturing with more data and evidence about many different contexts and the emergence of policy tools such as checklists to help target where, when and in what form CBP would be appropriate. In parallel with this the range of technological options to enable cash programming had expanded, especially with the growing use of mobile money across cellular phone networks. The experience of M-PESA in Kenya opened a wide range of new complementary possibilities around how cash systems could be quickly established and operated [14].

The acceleration of learning around how cash could work was matched by a gradual shift in perceptions of the obstacles to using this approach. Partly the problem was one of institutional *lock-in;* major agencies had huge commitments and infrastructures geared around in-kind assistance and reconfiguring parts of these systems involved significant change as the very different needs (in terms of infrastructure and capabilities) began to be explored. For example, the need to better understand markets, the requirements of capabilities around IT, financial security and money transfer mechanisms, the need to adapt implementation and evaluation frameworks, etc.

Major agencies began to experiment and learn from pilot programmes alongside their *mainstream* activities. Increasingly they began putting in place policies to take CBP on board – for example in 2006 Oxfam published its guidelines on Cash Transfers in Emergencies and these were followed other key players like the International Red Cross and Red Crescent Movement, Action Contre la Faim and Horn Relief (now Adeso).

Within the WFP in 2007 the Executive Board shifted its policy to acceptance of the principle of giving cash directly to beneficiaries, although not all donors were strongly supportive. The compromise was to commit to a pilot programme and to cap the size of such pilots to $3m or less for each operation. By 2008 the Executive Board had also agreed to endorse the use of a broader toolbox of measures including both in-kind and cash programming. It also recognized the potential to link CBP with their *purchasing for progress* approach which sought to develop capacity amongst local farmers and small traders. The EU DG for Humanitarian Affairs (ECHO) wrote a similar set of policy guidelines in 2008, based on lessons learned through a review of 180 CBP projects.

Another important element was the rise of private sector interest in this space. Driven partly by a concern for corporate social responsibility but also by a recognition of the significant potential in *bottom of the pyramid* markets a number of organizations had begun to forge strategic partnerships with development and humanitarian agencies. Their participation – for example Vodafone with DFID around M-PESA or MasterCard with the WFP – brought valuable technical and organizational expertise in designing and implementing large-scale cash systems.

2010 and moving to scale

Further impetus was given to the use of cash in the aftermath of the Haiti earthquake in 2010. This was characterized by a very high level of cash-based interventions; local food markets began functioning soon after the disaster and the government stopped food distribution

interventions after only three months. However the lack of formal distribution systems (such as ATMs and key parts of the physical banking infrastructure) meant an upsurge in alternative methods of cash distribution. Some were *low tech* involving human agents or physical collection at bank branches but there were limits to the scale and location of these operations, especially in rural areas. For this reason the use of mobile phone enabled cash transfers was widely adopted, demonstrating the considerable potential of such approaches in rapidly setting up and scaling viable systems.

During the past five years the expansion has continued, both in CBP projects themselves and in learning around specific aspects of the approach – for example about delivery mechanisms (Harvey et al., 2010), gender (Brady, 2011), scaling up cash transfer programmes (Austin and Frize, 2011), nutritional impact (Bailey and Hedlund, 2012) and comparative impacts of food aid and cash transfers (Hidrobo et al. 2012; Hoddinott et al., 2013, Schwawb et al., 2013, Gilligan et al., 2013). CBP has moved from being a fringe experiment to centre-stage, characterized as a key innovation in humanitarian response in reports by the Active Learning Network for Accountability and Performance (ALNAP) and DFID (Ramalingam et al., 2009; Ashdown, 2011). The response to the 2011 Somalia famine was significant because it effectively broke the *scale barrier* – it was the first time that international aid agencies used cash and vouchers at scale in a humanitarian response with an estimated $77m committed in this form by 2012.

Within WFP pressure from donor agencies like DFID who were advocates of cash programming led to a further revision of policy and in 2010 a special group (the Cash for Change unit) was established by the Executive Director to enable the move from food aid to food assistance and to explore the use of CBP at scale. The shift in policy reflects a view that all tools within the toolbox were of equal potential value and their selection should be driven by end user needs. The earlier limits (less than $3m) on the scale of CBP initiatives were lifted and similar changes have taken place within ECHO (where there had been a limit of €100k on projects). Between 2008 and 2011 WFP increased its CBP portfolio by a factor of ten, from 5 projects to 51. The WFP 2008-2013 strategic plan began to describe it as a food assistance agency, and WFP has stated that it intends to provide 30-40% of its assistance in the form of cash and vouchers by 2015.

A significant development in 2012 was the formal partnership between WFP and MasterCard which has provided considerable expertise around infrastructure building to enable large-scale cash-based activity – for example the provision in 2013 of a card-based system in Syria.

Another signal of the acceptance of cash and vouchers as mainstream humanitarian tools is the Food Assistance Convention. Through this international treaty, which entered into force in January 2013, countries commit to providing certain amounts of annual food assistance. But unlike its predecessor (the Food Aid Convention), food aid is no longer the only tool through which countries can achieve their commitments; cash and vouchers are considered as contributions.

A recent study for the Norwegian NORAD organization summarized key lessons learned in the cash programming space – see table 2 [1].

Cash based mechanisms are a credible or preferred alternative to in kind assistance	While originally an alternative to food assistance, transfers are now being used to meet basic needs (food and non-food), nutrition, shelter, rebuild livelihoods, social protection, disaster risk reduction and return and integration, among other activities. Effectiveness is established through a large body of documentary evidence.
Many assumptions about risk are not supported by evidence, or have been proven more nuanced than anticipated.	For example, there is strong evidence that cash based instruments can be used for insecure environments. Prevailing assumptions about the misuse of resources, corruption and gender discrimination have also been proven inadequate and varying across contexts.
Cash-based approaches are highly context and event specific.	Appropriateness is determined by the characteristics of the crisis and the presence of certain enabling conditions. There are contexts where cash will not be appropriate.
The importance of analysis, assessment, monitoring and evaluation.	Availability of checklists and other policy tools to help ensure focus on understanding contextual needs including how households function, how local markets operate, how financial service infrastructure could support a CBP intervention and key human resource requirements for CBP implementation.
CBP needs a context in which commodities for basic and recovery needs are available locally	Cash improves access when there is a failure in demand but it is not effective when there is a failure in supply.
CBP needs a functioning private market operating at an adequate level to provide the goods needed to support basic needs.	Adequate supply is not sufficient; CBP will not be appropriate where markets do not exist. Whether the crisis is rapid onset or chronic will play an important role determining if markets are functioning or can be revived
Beneficiaries need to have been consulted on options for assistance	
The security situation needs to enable CBP operations to take place, including delivery and movement of cash and goods.	
Some form of financial infrastructure exists to enable CBP	Multiple options are available for delivering cash to beneficiaries including bank accounts, mobile phones, vouchers and prepaid cards, etc.
The cash based approach challenges stakeholders to adapt at multiple levels.	At the level of implementation, the approach requires different kinds of human resources, costs and programme systems. In the larger context, the demand for greater national ownership and the transfer of 'control' to beneficiaries changes, and in some cases reduces, the role of implementing entities
Many assumptions about risk are not supported by evidence, or have been proven more nuanced than anticipated.	

Table 2: Key lessons learned in CBP

Table 3 below summarizes the timeline and key features of this brief history and shows the acceleration during the past ten years.
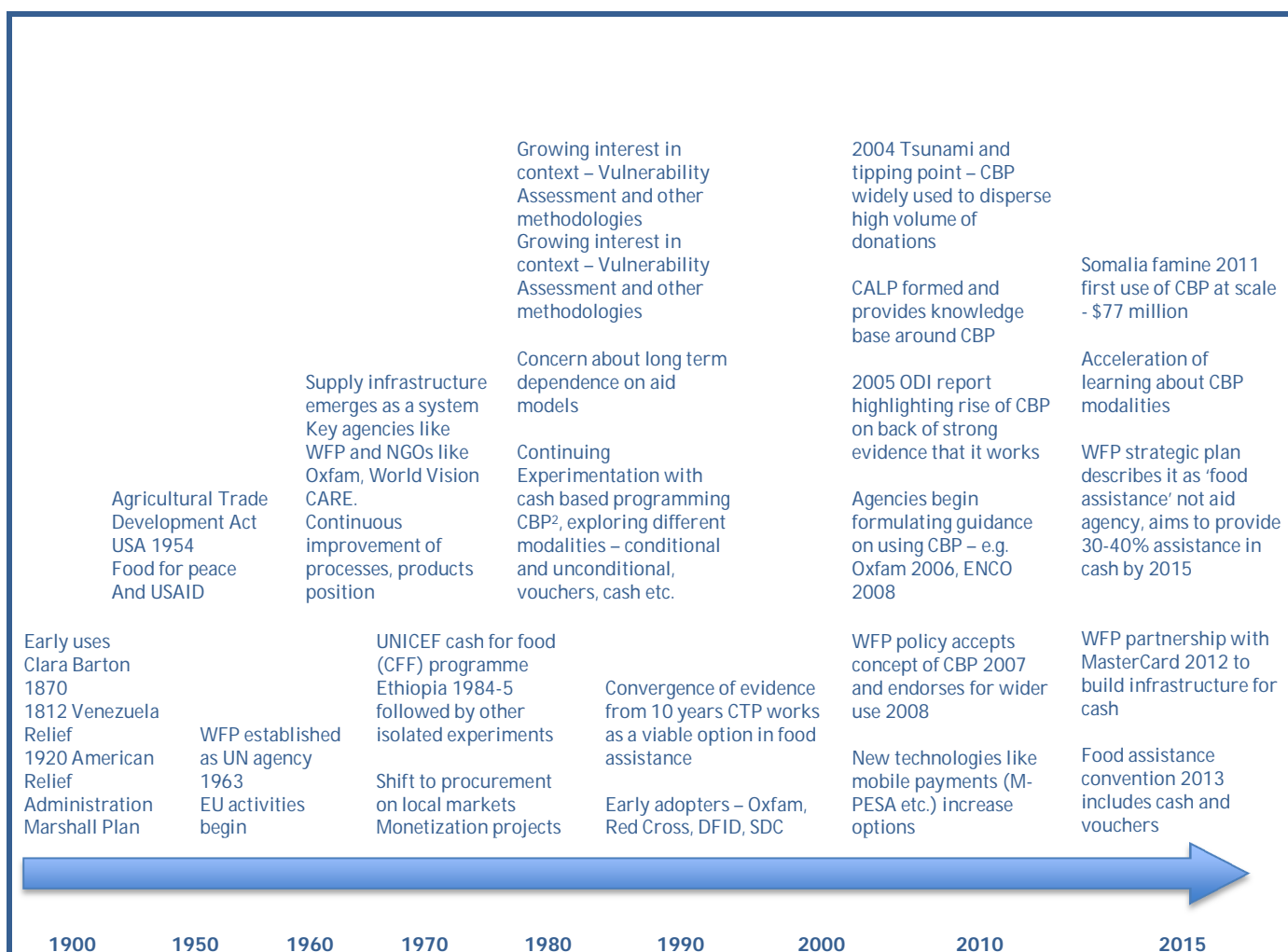
1900	1950	1960	1970	1980	1990	2000	2010	2015
				Growing interest in context – Vulnerability Assessment and other methodologies Growing interest in context – Vulnerability Assessment and other methodologies Concern about long term dependence on aid models Continuing Experimentation with cash based programming CBP[2], exploring different modalities – conditional and unconditional, vouchers, cash etc.	2004 Tsunami and tipping point – CBP widely used to disperse high volume of donations CALP formed and provides knowledge base around CBP 2005 ODI report highlighting rise of CBP on back of strong evidence that it works Agencies begin formulating guidance on using CBP – e.g. Oxfam 2006, ENCO 2008		Somalia famine 2011 first use of CBP at scale - $77 million Acceleration of learning about CBP modalities WFP strategic plan describes it as 'food assistance' not aid agency, aims to provide 30-40% assistance in cash by 2015
		Supply infrastructure emerges as a system Key agencies like WFP and NGOs like Oxfam, World Vision CARE. Continuous improvement of processes, products position						
	Agricultural Trade Development Act USA 1954 Food for peace And USAID							
Early uses Clara Barton 1870 1812 Venezuela Relief 1920 American Relief Administration Marshall Plan	WFP established as UN agency 1963 EU activities begin		UNICEF cash for food (CFF) programme Ethiopia 1984-5 followed by other isolated experiments Shift to procurement on local markets Monetization projects		Convergence of evidence from 10 years CTP works as a viable option in food assistance Early adopters – Oxfam, Red Cross, DFID, SDC	WFP policy accepts concept of CBP 2007 and endorses for wider use 2008 New technologies like mobile payments (M-PESA etc.) increase options		WFP partnership with MasterCard 2012 to build infrastructure for cash Food assistance convention 2013 includes cash and vouchers

Table 3 Timeline and key features.

The future...

One last point relates to the emerging future landscape within which CBP will operate. Continuing shifts in both the enabling technological infrastructure and the experience and thinking around the relevance and viability of CBP approaches suggest that this will increasingly come to play a role in humanitarian assistance not only in food but on other key areas like shelter, water and sanitation and health. A recent study for CALP by King's College explores a number of key trends and the emerging future challenges for CBP and whether the approach and the ways in which it is operationalized are *fit for the future* [15].

They highlight the continuing need for building a strong evidence base and particularly for exploring further the contingency model within which CBP can be adapted and configured for specific and often very different contexts. They also highlight the central role which information and communications technology (ICT) is likely to play in this space with the rise not only of new modalities (such as cyber currencies) but also the vulnerability of financial systems

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[2] CBP – Cash Based Programming and CTP – Cash Transfer Programming are both used in the literature

which are increasingly based on ICT platforms. The report concludes that

> " ... the continued relevance of CTP and its ability to adapt to this scale of change
> demands a far better understanding of ICT – one that goes well beyond technology as
> a 'tool' ......the rapid pace, scale and type of change that the ICT sector will generate
> will have transformative effects on the very meaning of 'cash', the ways it is used and
> who ultimately controls it. Not only are there increasing sources of cash but there are
> also emerging alternative systems for CTP delivery."

Exploring the humanitarian innovation ecosystem through this example

Figure 1 presents a model we developed during our literature review and we can map the case study experience on to this. Zone 1 (exploit) and zone 2 (bounded exploration) both involve innovation taking place within an established frame – essentially the space defined by the dominant design. There can be significant or incremental innovations along this trajectory but they represent a bounded kind of exploration. In the food context typical examples of *exploit* would be improvement innovations around logistics and distribution and of *bounded exploration* around sourcing food locally rather than shipping it in.
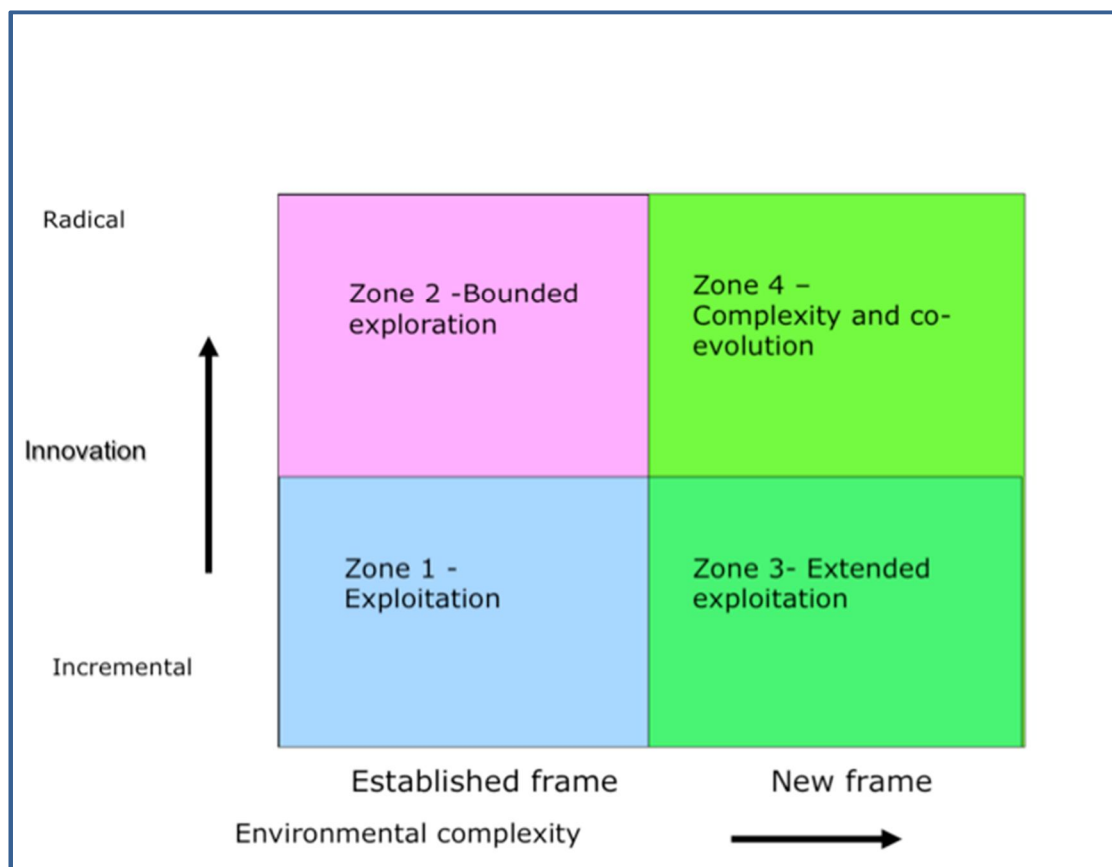

Figure 1: A map of innovation space [16]

Cash programming represents an excursion into the right hand side of the model. It involves reframing – bringing new elements to bear and recombining them in different ways. The new elements were bringing in end users as active beneficiaries able to act autonomously through the enabling mechanisms of cash, plus the new technologies assembled to provide them with such cash securely. Since the model was not really defined at the outset this represents a case of zone 4 – co-evolution – innovation in which interaction and learning is taking place to gradually allow a new dominant design to emerge.

(In complexity theory terms these experiments were creating small-scale attractor basins around which processes of feedback and amplification took place, gradually refining the emergent model).

It is important to see the process of learning and co-evolution – there was no *master plan*. Experiments varied – for example, some were conditional programmes (e.g. cash for work, cash) whilst others were unconditional. Modalities varied, from vouchers and smart cards through to early days when field agents had suitcases stuffed full of banknotes under their beds in hotel rooms! There are some similarities with the *lean startup/agile* model for entrepreneurial ventures which sees a process of fast learning using prototypes – *minimum viable product* – as boundary objects around which learning and refinement can take place, allowing the entrepreneur to *pivot* towards the most appropriate solution for the context.

This is very much space within which *mainstream* innovation management routines are inappropriate; it is the territory of entrepreneurs who are flexible, risk-taking and fast to learn. Table 4 highlights some of the key differences in the approach needed on the left hand (type 1) and right hand (type 2) side of the figure 1 space

Type 1	Type 2
Clear and accepted set of rules of the game	No clear rules – these emerge over time. High tolerance for ambiguity
Strategies path dependent	Path independent, emergent, probe and learn
Clear selection environment	Fuzzy, emergent selection environment
Selection and resource allocation linked to clear trajectories and criteria for fit	Risk taking, multiple parallel bets, tolerance of (fast) failure
Operating routines refined and stable	Operating patterns emergent and *fuzzy*
Strong ties and knowledge flows along clear channels	Weak ties and peripheral vision important

Table 4: Different approaches to innovation

Another important point is the gradual emergence in zone 4 of a new system. For example, WFP commented that they began to see the convergence of separate activities into a systems model. They had moved their mainstream food aid towards local procurement and then began thinking about how to
develop capacity amongst local farmers (the *Purchasing for progress* initiative) and this was a mix of instruments including education and insurance for weather and other risks. The idea was to help them generate small surpluses which they could sell on a local market – but this required a connection to demand. So WFP worked with traders to procure amongst local markets to create this – but in turn this demand required cash to fuel it. So the CBP activities provided the third intersecting element in the system which allows for development of viable local markets with both demand and supply side elements.

Lenses from innovation theory

A number of other frameworks from innovation theory are also helpful in interpreting this case and these are discussed below. (More extensive discussion and details of the underlying theories are in appendix 1)

Dominant designs

We have already mentioned the concept of *dominant design* and its applicability to this case. Since the 1960s innovation in food aid followed a dominant logic but during the 1980s entrepreneurs began experimenting with an alternative model. This pattern was typical of the mature stage in the Abernathy/Utterback model, with co-existence of experiments below the radar screen and the dominant design [17]. Significantly the entrepreneurs were often working within established agencies rather than lone mavericks but their approach used the limited space and resources available to them to try different modes of providing food security based on CBP. These experiments represented a parallel fluid state which did not really challenge the mainstream dominant design until the publication in 2001 of a review of the accumulated evidence around CBP. This served to attract interest and the mainstream players began a more systematic exploration, crucially exploring the challenges of scaling up the emerging CBP dominant design. Once again at this point the requirement of a new complementary set of competencies emerged around financial transfers, security, IT.

The current picture is one in which there are two parallel but complementary dominant designs and a growing understanding of the mechanism governing effective selection. In the period 2008 – 2011 WFP increased its range of CBP projects from 5 to 51 and was distributing around US$208m; by 2015 it expects almost a third of its assistance programmes to be delivered in the form of cash, vouchers and new kinds of "digital food".

Disruptive/peripheral innovation

Another helpful lens through which to view this experience is Christensen's theory of disruptive innovation which sees radical innovation emerging at the fringes of the mainstream, driven by entrepreneurs experimenting and learning in that space [18]. Early problems are solved and the innovation develops in maturity until it becomes attractive to mainstream markets – at which point it poses a challenge to existing incumbents. Disruption involves a shift in the nature of the market to a new innovation trajectory and a shake-up in the players involved, with many new entrants exploiting the new approach and existing incumbents struggling to adapt to very new ways of working.

The early pattern in the emergence of cash programming followed this template but arguably there has not yet been significant disruption of the mainstream. Although initially skeptical and unconvinced the mainstream began to explore and experiment, adoption accelerated and what began as a radical innovation programming is being assimilated. In this sense it resembles a competence enhancing rather than a competence-destroying wave of radical innovation [19] ; however the challenges cash poses to the dominant logic and associated infrastructures may mean it has a long-term disruptive effect.

A key characteristic of disruptive innovation is that the early stage of its emergence involves experimentation and learning at the fringe, driven by entrepreneurs. The process is one of fast failure and learning, gradually refining key elements of the innovation in the context of application. Recent models of *agile innovation* build on this, using concepts like rapid prototyping, minimum viable product, scrum teams and sprints to define a set of tools which enable fast cycles of experimentation and learning [20].

In the case of cash programming this was very much the observed pattern with small-scale entrepreneurial activity refining and defining a new model via a process of controlled experimentation with different delivery models, technologies and other elements. In particular the process took place at a time of rapid technological change where new developments (such as mobile payments and better online security) facilitated the building of a carrier infrastructure for cash programming.

The evidence base grew to a point where original objections were overcome – for example about whether end users could be trusted, how to avoid corruption, maintain security, etc. (Overcoming the *not invented here* reaction is a well-known challenge in the diffusion of radical innovation). We can map this on to a classical S-curve and explain many of the features around slow take-up and then acceleration in terms of Roger's variables [21]. Importantly these provide useful clues for how diffusion of radical innovations like CBP could be accelerated in the future by working with aspects of the ecosystem.

In particular slow take-up and early resistance is not simply a matter of *mindset* although this is a powerful inertial force. There is also a big challenge to the underlying structures and competencies required to implement radically new models which requires both learning new ways of working and simultaneously letting go of old but no longer relevant approaches. Cash programming requires a new technological infrastructure with different skills, moving away from a supply and distribution model to one resembling more closely a financial system. It also moves from a centralized mode towards a decentralized network model, with corresponding shifts in power and influence.

Lessons from this might be:

- How to encourage small-scale pilots and work with the periphery

- How to enable *fast-failure/*prototype learning from such experiments

- How to keep the lessons coming back from the periphery to the mainstream

- How to support entrepreneurial idea generation around radical new and potentially disruptive models

- How to resolve the 'innovator's dilemma' – of riding both the current mainstream horse and the emerging new one which may be pulling in a different direction?

Architectural and component innovation

Innovation can involve change along a trajectory which builds and reinforces existing knowledge sets. This can involve radical as well as incremental change but its ability to create value depends on having the knowledge competencies to handle and exploit it. Henderson and Clark's key contribution to innovation theory was to show that when change is at a component level this works well but when there is a shift in the underlying knowledge architecture it poses problems [22]. (See appendix 1 for more).

Organizations need to be aware of the nature of the change and if they are wishing to exploit architectural innovation then they need to let go of existing knowledge and rebuild new competencies, embedded in networks, procedures, etc.

An important aspect of the cash-based approach is the significant shift in the knowledge architecture required to enable it. In Henderson and Clark's model this represents an *architectural* rather than a *component* innovation and requires building very new knowledge and operating networks to enable it – for example, acquiring skills in IT, in financial transfer infrastructures, in security, etc. Understanding the mechanisms whereby such new knowledge architectures are both identified and then resourced is an important element of learning about the way the humanitarian innovation ecosystem operates and how it could be developed to work more effectively in the future. (For example, the role played by key external partners like MasterCard and Vodafone is a useful learning point for the future in terms of knowledge brokerage). But it also begs the question of how such significant changes are managed in terms of changing the skills profile, the number and location of staff, the organizational structures to support the new model, etc.

The messages for the HI ecosystem here would seem to be around making sure there is good understanding of the nature of major innovations and the underlying knowledge architecture issues. Questions might include:

- How to identify and build new knowledge competencies – finding, forming and performing in new networks?
- How to stimulate early learning about the likely knowledge requirements?
- How to find key partners?

Ambidextrous organizations

In Christensen's original model of disruptive innovation the *innovator's dilemma* is about change management – how to handle the transition to something radically new within an established incumbent model. His conclusion was that this is impossible – the challenges opt mindset, to operating structures, to partner networks with markets and suppliers, etc. are too big to overcome within an existing model and instead the future lies with new entrant entrepreneurs. Subsequent development of the theory suggests that it is possible to resolve the *innovator's dilemma* (of managing simultaneously sustaining innovations and allowing for the emergence of disruptive innovations) but only through structures which permit a high degree of internal entrepreneurship within incumbent institutions

One answer to the above question comes in the theory around building ambidextrous capability within established organizations [23]. (See appendix 1 for more) This refers to the capacity to work in mainstream innovation mode but also to retain some capacity to explore at the periphery and to license entrepreneurial exploration and fast failure-driven learning. In the corporate sector this is a well-known challenge and a range of solutions are available [24]. They range from setting up dedicated venturing units and internal groups with a licence to break *out of the box* (the *skunk works* model) through to building a context in which there is space and permission to explore and experiment (as 3M have done for many years and for which Google are now widely cited) [25-27].

The underlying theme is the same – building a capacity for entrepreneurial search within the context of an established organization. An important theme in this is making sure there are links between the two different modes of innovation activity; today's exploratory venture needs to have a path to becoming tomorrow's mainstream.

In the case study there was some evidence of ambidexterity; the pilot projects exploring CBP in the 1990s were funded by existing agencies and one of the first was by a large player, UNICEF. Whether it was the explicit policy of these agencies or, more likely, the actions of key individuals who took advantage of a loose licence to explore needs further investigation. The UNICEF case, for example, seems to have been linked to a particular Project Officer with an entrepreneurial approach who could support a novel project on the ground.

Key questions for developing the humanitarian innovation ecosystem here would be:

- How and how far can ambidextrous capability be built in HI institutions?
- How can well-established models from the corporate sector be adapted and deployed to foster this?
- What are the modalities around selection of particular options?
- How can effective communication between the two modes of innovation be maintained?

Adoption/diffusion theory

A major area of innovation studies has been concerned with trying to understand how and why new ideas diffuse across populations. Central to this discussion has been the work of Everett Rogers who offers a helpful set of models as a framework [21]. His core model sees the S-curve of adoption as being explicable in terms of a communication model in which the key variables are the message (perceived characteristics of the innovation), the promoter (innovator characteristics), the recipient (adopter characteristics) and the context in which the process is taking place. Appendix 1 provides more details.

Further work based on this model was done by Geoffrey Moore and his exploration of the problems of transferring between early (and enthusiastic) adopters and the mainstream – *crossing the chasm* – has been influential [28].

In the case study it is clear that the process of diffusion followed an S curve with a very shallow slope in the early days. It took over ten years before the experiments and enthusiasm of early adopters was able to *cross the chasm* to mainstream acceptance; thereafter there seems to have been an acceleration.

We can explain this in terms of Roger's characteristics; first the perceived characteristics of the innovation itself:

- Relative advantage – how far is the new thing better than that which it will replace? It took a long time to accumulate sufficient evidence to show not only that cash worked but that it was a significant improvement under certain conditions

- Complexity – the difficulties in the early stages of creating a viable model for CBP probably held it back until a dominant and robust design emerged

- Observability – the small scale nature of experiments and their geographical dispersion meant that there wasn't a critical mass of visible impact in the early stages

- Trialability – to some extent this helped get the ball rolling but the limited number and limits on size of project may have acted as restrictions

- Compatibility – this is probably the main area where the CBP innovation ran into difficulties since it was incompatible with a mindset and also with the competencies infrastructure of the mainstream

In terms of innovator characteristics the problem was the limited number of entrepreneurs and their peripheral status; these experiments were taking place at the edge and in the field. Lines of communication and exposure to key adopters may have been limited in the early stages.

Adopter characteristics surfaces the problem of compatibility; the dominant design of food aid brings with it a mindset and associated set of routines which are self-reinforcing. The challenge posed by CBP was that it required letting go of this mindset and rewiring the organizations to be able to work effectively with the new approach. It took time and was almost certainly a barrier in the early stages.

Overall there are a number of useful insights about how radical innovations of this kind might be accelerated in terms of adoption and diffusion. In particular:

- How could innovator characteristics be presented differently to reduce negative perceptions?

- How could compatibility issues be identified and taken account of in the design of innovation pilots?

- How can peripheral entrepreneurs/innovators be brought closer to mainstream adopter decision-making?

Agile innovation/ lean start-up methods

One field of growing interest in innovation management links to the idea of *agile innovation* and *lean start-up* methods [20, 29, 30]. Drawing on experience in entrepreneurship the argument here is that rather than plan for large-scale long-term projects an approach based on frequent short experimental cycles should be adopted. Since uncertainty is very high at the outset of a project it makes no sense to try and plan for it; instead a series of fast experiments gathering data is used. These provide the opportunity to test out ideas and to adapt them in the face of feedback experience gained in the context of application. The approach has some key concepts:

- Minimum viable product (MVP) – a prototype of the core idea which can be used as the basis of a learning probe to gather information about its relevance, applicability or otherwise

- Pivot – in response to the feedback from a MVP experiment the core idea can be adapted and revised to make it more compatible with the application context (market)

- Fast failure – the underlying philosophy of agile methods is that there will be failure – some experiments will not work. But by carrying them through in controlled fashion the learning can be gathered and fed into design of the next cycle, gradually converging on solutions which are appropriate, compatible in context and delivering value to that market.

Viewed through this lens the CBP approach in its early days was very much about a series of experiments carried out by individual entrepreneurs. What was missing, except on an informal level, was any mechanism to share and capture the learning from these and an over-arching strategic vision towards which such experiments were being directed. Arguably the capacity for working in lean/agile mode exists but there would need to be more extensive development of a formal approach within the HI ecosystem to support this.

Improving the ecosystem

Overall the story highlights well the existence of an innovation ecosystem within the humanitarian sector. There are key players and institutions and connectivity across a network which supports what Christensen calls *sustaining innovation* – effectively doing what we do but better. But there are also points where experimentation takes place and new, radical options emerge; these tend to be at the fringes of the mainstream system and not well integrated, often driven by individual entrepreneurs acting in '*maverick'* mode. Finding ways to couple these two systems – the mainstream *do better* machine with its advantages of scale and the entrepreneurial fringe with its capacity for radical new thinking – is a significant challenge and opportunity for enhancing the ecosystem for the future. Much could be learnt from observing how other sectors deal with this challenge and there is also potential for lessons learned in the HI context to have a wider impact in terms of thinking about innovation management. In particular how to harness the laboratory for radical innovation which crisis conditions create could be of considerable wider relevance.

It raises some important policy questions:

- How to foster entrepreneurship and create enabling conditions for small-scale experiments and prototypes?

- How to develop skills within entrepreneurs to operate in this mode?

- How to finance high risk *start-up* ventures of this kind? And how to fund the next 'capital round' of development finance to scale these pilots?

- How to evaluate in light touch manner to ensure prototypes and learning can take place?

- How to enable brokerage to key new knowledge and resources when there is architectural innovation

- How to build *ambidexterity* into mainstream ecosystem players such that experiments and exploration at the periphery can be amplified

It also raises the question of whether the current ecosystem has the *right* elements and interconnectivity to facilitate the emergence of similar radical innovations in the future. If not what needs to be done in terms of configuring the system to enable this?

Findings about the innovation ecosystem

In this and other case studies of the humanitarian innovation ecosystem we are using a framework for analysis based on a number of components, including:

- *Resources:* what resources - finance, time, knowledge, technologies - are available for humanitarian innovation, and how are these deployed?

- *Roles*: who plays what roles in innovation efforts and processes? Are there observable patterns? What, specifically, are the roles of innovators, end-users, front-line workers, brokers, researchers, private sector and non-traditional actors?

- *Relationships*: what kinds of relationships and networks exist between actors in the innovation ecosystem (competitive, collaborative, contractual, commercial, etc.), and how do these shape innovation efforts?

- *Rules*: what formal and informal rules pertain to humanitarian work and humanitarian innovation specifically, and how do they serve to shape roles, determine relationships, resource allocations, and shape innovation processes?

- *Routines*: what are the specific ways in which innovation processes work in the sector, and how well do these work? What are the dynamics of these routines - e.g. linear, predictable; non-linear, unpredictable?

- *Results*: how do innovation results get determined, and by whom, and how does this impact on the success or otherwise of innovations?

Resources

In the context of food assistance the resources for innovation have traditionally been with the mainstream agencies and resource allocation is largely determined by them. In keeping with the mature phase model the overall level of resource to support innovation within the system is not high and tends to be concentrated around incremental improvement innovation – *doing what we do but better*. This effectively sets up a filter around the strategic portfolio of innovation – ideas which fit the frame will be supported but those which lie outside may not.

Significantly the early stage experiments around CBP were not high cost and often found their resources at local level rather than as formal budget lines in a mainstream agency. This changed with the 2004 Tsunami where there was a sudden and massive expansion of the resources available and for the first time significant development work on CBP could be funded.

A question is thus raised for the humanitarian innovation ecosystem about *venture capital* – is there a budget available to support entrepreneurial ventures, R&D in *odd* directions, etc.? If so where is it held and how is it allocated? In the corporate sector this would be a mixture of a *blue sky* R&D commitment plus some form of corporate intrapreneurship programme.

Another key resource issue is the availability of relevant skills and processes to support the innovative activity. Where this is concentrated on the mainstream the accumulation of competencies is sufficient but when there is a major shift – an architectural innovation – then this poses a challenge. In order to make CBP work agencies need very different capabilities and supporting infrastructure which takes time to build – effectively constructing a banking system from scratch. This may require them seeking resources from outside their normal channels – for example, WFP's work with MasterCard helped accelerate their capacity building, providing knowledge and experience, access to IT and other infrastructure, supplying skills and expertise, etc.

The question for the HI ecosystem is an important one. For other radical innovations of this kind where would the necessary new competencies come from and how might they be assembled quickly? What are the processes for identifying relevant competencies early enough to start building them? What lessons are there from foresight and other exercises which the corporate sector uses to prepare itself for such radical and architectural shifts?

Finally the whole discussion in the corporate sector of *open innovation* is predicated on the principle that even in the largest organization *not all the smart people work for us*. This drives a new approach to innovation in which knowledge flows become important, and where making connections and building relationships can ensure access to a much wider range of knowledge and other resources. The question is raised for the HI system as to how far it has – or could – embraced both the principles of open innovation and the various ways in which this can be enabled? The cash example suggests that the links with external players like MasterCard and Vodafone were important in bringing new and complementary perspectives.

Roles

The case highlights some key roles which helped effect a radical change in the sector. Underpinning it was a change in the type of people working within the sector, upskilling and specializing so that from the 1980s onwards people were coming into the sector with high level analytical skills and diverse specialist experience – a professionalization of the field. Whilst this strengthens the core capability within agencies it does run the risk of marginalizing another key role – that of the entrepreneur. Several comments suggested that the early stage experiments in CBP were undertaken by the kind of people – mavericks – who might find it more difficult now to work within professional bureaucracies. (This is a familiar story in the corporate sector and reflects the above discussion around *ambidexterity*. 3M, for example, celebrate their mavericks in a *Hall of Fame* designed to send a message about the continuing value of such agents in enabling breakthrough thinking in the company).

Another key role was played by special interest groups/communities of practice who consolidate and diffuse key knowledge and experience. CALP – the Cash Learning Partnership – was established in the wake of the 2004/5 Tsunami disaster to gather lessons and experience around CBP. It has close links with many major agencies which means that there are good communication channels to move accumulated knowledge out to policy and practice. The availability of such a reference point – a kind of R&D/ knowledge centre- undoubtedly helped the move from pilot to scale during the past ten years. It raises the question of how such centres/communities of practice can be established to support the emergence of novel and radical innovations elsewhere in the HI system?

Another key role was played by external organizations willing to share knowledge and experience to provide an injection of key competencies. WFP's links with MasterCard and Vodafone's involvement with M-PESA are examples of this kind of partnership. Finding such partners, forming working relationships with them and developing a performing long-term partnership seems to have been important in the CBP story and the question raised for the wider HI ecosystem is around how to enable such finding, forming, performing? [31] This reinforces the point about learning to work in an *open innovation* context and there is a link to the above discussion of identifying early what the emerging knowledge architecture will be and targeting search for partners in this direction.

One other key role seems to have been that of early advocates and champions who promote the adoption of radical innovation. Two examples were mentioned – the role of DFID as an early and enthusiastic supporter of the CBP approach in its discussions with WFP, and the internal role played by the Policy Division within WFP putting pressure on their Executive Board to get agreement to the pilot programmes which began the internal learning around CBP.

Relationships

As suggested above the food aid system was effectively steered by a small group of large agencies working with a dominant design. Characteristic of such a *mature* phase is the presence of relationships based on *strong ties* – close and mutually supportive links. This is similar to Christensen's concept of an established value network. Such models support incremental and sustaining innovation – but the evidence is that where radical change takes place, especially around discontinuous shifts in technology or markets, the strong ties model may actually be an

inhibitor. Rather than strategic alliances there may be a need for *strategic dalliances*– exploring and testing out very different relationships with a set of peripheral actors.

As we have seen the emergent model took place outside the mainstream system and involved ad hoc and serendipitous links across a broad network. It was only after the initial fluid phase moved towards a dominant design that the key players could be identified and strengthening of ties with them began. The emerging lesson for the HI system is the need for capacity to network widely and explore with *lightweight links* - new areas which may create new and even competing value networks.

A second issue around relationships is the link between core and periphery. Experience in the corporate sector suggests that this is where internal entrepreneurship often stumbles; individuals and groups are licensed to explore and get out of the box, but in doing so they lose their connection with the mainstream. By the same token too tight a rein on *licensed entrepreneurs* may limit their exploration to incremental rather than radical innovation. Good practice builds on regular communication and engagement between the two.

Rules

A key issue around rules is the strong need for evidence within the HI sector. Arguably this is a double-edged sword – on the one hand it ensures that radical innovations are well-tested and evaluated before adoption at scale. But on the other the need to accumulate such *gold standard* evidence slows down the process of moving to scale. In the case of CBP it is clear that evidence was critical; because of their novelty, programmes using cash and vouchers were heavily researched, monitored and evaluated. ALNAP concluded that research and evaluation was instrumental in the acceptance of cash transfers [32, 33]. In the early stages the role of evidence was to determine whether cash transfers could be a feasible response in emergencies and also to counter the sceptical view held in many quarters about whether recipients would spend the money for the good of their family and whether cash could be provided securely. Pilots were also designed to compare cash transfers with in-kind assistance, namely food aid, to understand their comparative advantages. These studies and evaluations collectively established that cash transfers could be feasible, appropriate and effective.

It is clear that evidence played a key role also in shaping the understanding of the approach, moving it from a *blunt instruments* to a set of sharp tools which could be configured for different situations and meet a variety of different needs. It was also central in the move to scale; for example, WFP commissioned 4 major studies to help them build the platform for the move to scale. There is a link to the *relationships* discussion above; the availability to respected and specialized organizations like CALP and other NGOs helped ensure credibility in the process of building a strong evidence base but also ensured the communication of that evidence to key decision-makers.

Arguably the rich tradition of evaluation in the sector helps because the evidence accumulated is so strong and collected via multiple methods. There are some similarities with sectors like pharmaceuticals or food and drink where innovation processes are designed around key agencies requirements like FDA. The risk is that such a strong rule-based framework can slow or even stifle innovation.

Routines

As indicated earlier the mainstream for food aid developed routines for innovation which enabled extensive change within the main paradigm. Product innovations improving nutrition value, process innovations in transport, logistics, warehousing and position innovation in moving to new markets and learning to procure locally all resulted from organized innovation approaches.

What appears from the case is that the ability to work entrepreneurially and to explore was not a part of those routines. Rather the experiments emerged bottom-up – a little like small start-ups exploring and opening up new territory. The co-existence of these was possible because the mainstream was so big and the experiments so far from the centre that they were effectively under the radar screen.

The issue raised is how to build parallel routines to enable ambidexterity on a continuing basis. (See AIM report on *Dealing with discontinuity* for more on this [34]). Increasing attention is being paid to approaches based on the *agile innovation* model in which fast cycles of planned experimentation are used to move forward on radical concepts. The essence of the approach is one of rapid prototyping and learning – *fail fast to succeed sooner* is a common mantra. The value of this is an acceleration of uncertainty reduction and a rapid focusing in on a robust solution compatible with the content in which experimentation takes place. Designing planned experiments and early testing of *minimum viable product* is a powerful methodology for learning – but whilst it is suited to software start-ups the question of its ethical appropriateness in the humanitarian crisis situation is raised.

Results

See above discussion under *Rules* for a consideration of the key role played by evidence in the sector as a whole and particularly in tipping the balance from experimental work at the edge to mainstream adoption at scale.

Mapping the CBP experience to a systems model

Figure 2 offers a simple systems model for linking events and activities in the humanitarian sector around innovation. Innovation does not emerge randomly but results from the interplay of these elements; managing humanitarian innovation as a system requires an understanding of these interactions. Taking this view highlights linkages between elements and feedback loops which can reinforce or dampen innovative activity and offers another framework which we can use to analyse the case study; in particular it helps focus on where the system (as a network of multiple actors) might be strengthened.
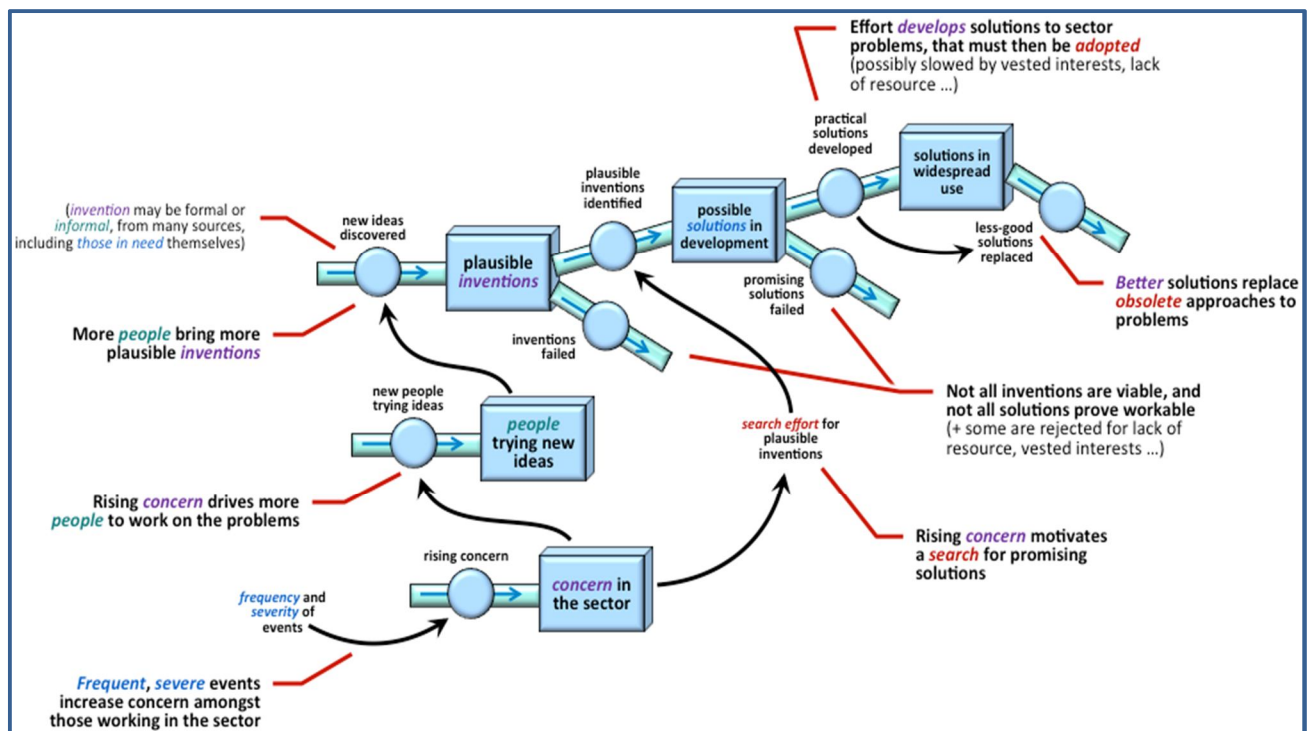
Figure 2: Systems model

Concern

People will both look for potential new solutions to a challenge, and try inventing solutions **if there is substantial concern** amongst the relevant stakeholder groups. Typically, a substantial disaster event or situation will cause this level of concern to rise. The more frequent and severe are those events, the more the level of concern will rise, but if no such event has occurred for some time, concern will wane as those involved shift attention to other issues. Arguably the role of the Tsunami in 2004 was to heighten the level of concern in a *mature* sector and trigger the urgent search for new ideas to deal with problems on this scale.

Inevitably concern is a powerful driver in the humanitarian field and it drives a search for plausible inventions as indicated in the above model. But the idea of a dominant design is that the search process is focused in a particular area – it is bounded by the frame of the dominant design. Legitimate solutions are those in that space and as long as plausible inventions fit that they will feed into the system. The difficulty for radical innovation is in coming from outside that *legitimate* search space. Arguably increasing the *concern* force will not necessarily lead to radical innovation because the search effort is constrained within the dominant design – there is no capacity for searching beyond the lamp-post. This argues for some modifications to the innovation ecosystem to allow for peripheral vision mechanisms.

Trying new ideas

A high level of concern motivates new **people or groups to try new ideas** that may solve the challenge. These may include the affected communities themselves, Aid workers directly involved, others with previous experience of the challenge, or groups with no direct connection but with sufficient interest and knowledge to work on new ideas (including academic and for-profit organizations).

In the CBP case we can see two parallel sources of innovation ideas. One is the *mainstream* players with well-established mechanisms for articulating and targeting a stream of largely incremental innovations. The other involves a group of *maverick* entrepreneurs working at the edge of the mainstream system trying radical new ideas. These could feed in to become plausible inventions but their take up is throttled by a variety of factors – particularly lack of evidence base, *not invented here* and other resistance on part of mainstream and the persistence of a dominant design which frames the problem and solutions in a particular way. A new approach faces big problems in entering the core innovation system as pictured on the top line here. It is not – as the text above has it – a *failed invention* but rather a *resisted* one....

The challenge here is to find ways to encourage trying different ideas – the entrepreneurial rule-breaking approach. The CBP story is very much one of maverick exploration of a radical idea at the edge of the mainstream – the challenge for our ecosystem model is how to amplify the number of entrepreneurs and enable them to connect to the mainstream system rather than work on the outside. There may also be an issue around capacity-building – how to equip entrepreneurs with tools and skills to do that role more effectively.

One option here might be to encourage the use of formal *agile m*ethods and create space and structures which allow for fast cycle experimentation and learning. Another implication for improving the innovation ecosystem is to ensure provision of incubation structures and mechanisms – safe and supportive environments where licensed experiments take place and which can find their way through into the mainstream

Plausible inventions
As suggested above, the issue here is that what counts as *plausible* is defined by dominant design in terms of legitimate search space and by incumbent resource controllers who can stifle experimentation by withholding resources. The challenge to the ecosystem would be to find ways to amplify/enhance the experimental/*blue sky* R&D budget and match it with enthusiastic and challenging entrepreneurs.

Possible solutions in development
The issue here is around prototypes and controlled experimentation. There might be a good case for a *lean startup* approach which allowed for early stage experimentation and failure to drive fast learning. The current mode for the sector is evidence-based and slow and steady, minimal risk seems to be the characteristic mode – so solutions will find it hard to get to development. An input to the ecosystem would be some form of incubator programme which allowed and put boundaries around the experiments and pilot scale developments.

Solutions in widespread use
The pattern in this case was a take-up accelerated only when there was a significant body of accumulated evidence from different contexts. When the main agencies got behind the idea there was a big shift and resources flowed to further accelerate the process. Important also to recognize some of the issues required in moving to scale – for example pilot projects could

survive with various modes of cash delivery/provision but a full scale process requires the significant development of a financial management infrastructure and he acquisition of skills and other elements to support this infrastructure. WFP/MasterCard are now major players and it is unlikely that many of the pilots could have moved to large scale without this kind of big resource.

Conclusions and discussion points, implications for managing the innovation ecosystem

The case has highlighted a number of features of the humanitarian innovation ecosystem. Two concluding points to emerge are:

1. This is typical of many large incumbent organizations but it raises what Christensen calls *the innovator's dilemma*. That is, there is a need to support mainstream sustaining innovation but also to explore at the periphery to identify what may become disruptive innovations. which challenge the mainstream mode of operation. The process through which this happens is, by its nature, risky and uncertain and will be characterized by failure. Entrepreneurs working in this space need to manage this process of learning and build on the learning – *intelligent failure* to make the underlying concept robust and scalable.

2. Managing these two approaches within the same organization is difficult; the challenges of *ambidexterity* are well documented. But there is also evidence form the wider sphere of innovation management experience that effective mechanisms exist for enabling these activities to operate in parallel and complementary fashion. This raises challenges for the design and operation of the humanitarian innovation ecosystem. These include:

   - There is an ecosystem in place, a linked set of actors who co-ordinate to create, develop and diffuse new ideas. It operates in network mode rather than as a linear system but within the mainstream food aid paradigm has worked well for a sustained period

   - That said there is a challenge around radical innovation. The ecosystem lacks a formal structure to enable entrepreneurial exploration; if anything it acts to dampen out any initiatives, which move against the mainstream. There is little in the way of mechanisms neither for developing peripheral vision nor of agencies to operate them. There is a lack of resource – what might be termed *adventure capital* – to permit exploration. There is a bias against entrepreneurs who are often seen as *mavericks* acting outside the rules. And the system also has an innate conservative character in the need for extensive evidence before radical innovation is adopted and implemented

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identify what may become disruptive innovations. which challenge the mainstream mode of operation. The process through which this happens is, by its nature, risky and uncertain and will be characterized by failure. Entrepreneurs working in this space need to manage this process of learning and build on the learning – *intelligent failure* to make the underlying concept robust and scalable

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  - How to identify and enable entrepreneurs to work at the edge and with appropriate f*ast learning* tools?

  - How to support entrepreneurs – training in key skills?

  - How to find and mobilize entrepreneurs, especially from recipient countries?

  - How to apply new methodologies like lean start-up (which emphasizes fast learning from multiple experiments) in the HI context?

  - How to provide relevant venture funding for entrepreneurial projects

  - How to deal with the adoption/diffusion challenge (particularly the *missing middle* in innovation) and improve mechanisms for *crossing the chasm*? (Addressing the big question of why it took so long from 1990s experiments to adoption at scale?)

  - How to work more effectively in an open innovation context – the challenge of *finding, forming, performing* with new networks bringing in very different players?

  - How to identify and build new knowledge competencies and stimulate early learning about the likely knowledge requirements?

  - How to enable brokerage to key new knowledge and resources when there is architectural innovation

  - How to link back to the mainstream and build an internal culture which remains supportive of entrepreneurial projects – the *ambidexterity* challenge?

  - How to evaluate in light touch manner to ensure prototypes and learning can take place?

Building structures to enable such *ambidexterity* is an important part of the ecosystem approach - making sure there are both agencies/institutions carrying out these different roles and also that there is effective coupling between them. Central to this is enabling entrepreneurial behaviour to co-evolve in parallel with mainstream focused innovation activity. As Schumpeter pointed out, the role of the entrepreneur is

"*to reform or revolutionize the pattern of production'* [35] and, as Rosenberg and Birdzell (1986) comment *'....new enterprises are useful devices for experimenting with innovation, because they can be established on a small, experimental scale at relatively low cost and therefore in large numbers, and their efforts can be intensely focused on a single target."* [36]

They have greater flexibility to experiment, uninhibited by the biases, standard operating procedures, bureaucracy, cultures, strategic commitments, and other rigidities common in established organizations of all kinds.

The kind of emergent model for ambidexterity also places emphasis on the role of users in context who can help shape and configure innovations so that they are suitable for wider diffusion; the process is essentially one of co-evolution. There is also a need for and opportunity within *open innovation*; exploration of new insights and ideas across sectors is a key feature.

Putting in place robust mechanisms to enable experimentation and subsequent capture and sharing of learning is central to the development of a system which can be replicated. The underlying process is one which relies heavily on converting tacit knowledge to formally codified forms which become available for others to use in what eventually becomes a standard operating model.

Table 5 suggests a process model for enabling peripheral innovation to sit alongside the mainstream and foster ambidexterity.

Stage	Characteristic activity
Crisis	Creation of a driving entrepreneurial vision which simultaneously articulates the need for change and for radically different solution involving a new trajectory
Observatory	Extensive search in novel directions to find relevant approaches which could be adapted – requires ability to abstract problem and solution thinking to a higher level and brokerage mechanisms to make connections
Laboratory	Experimentation around core ideas and creating in context a new system through recombination of proven elements from elsewhere
Prototyping	Development of a scale version of the system which allows for testing and configuration in context with users. Also provides a *boundary object* which can demonstrate potential and engage key agents in further development and diffusion
Scaling and diffusion	Codification of core model into a *standard* transferable package which can be replicated. Importantly this allows for further innovation and continuous improvement via channels which integrate emerging ideas into the *standard operating model*.

Table 5: Suggested process model for enabling peripheral innovation

Crisis conditions set stretch targets and force search behaviour in new directions; they also cue attentional responses to new signals rather than filtering them out. In the cases the ability to find a passionate entrepreneur at the centre may not be coincidence – their role is to have the vision but also the passion to infect others and bring them into the vision.

Exploration of potential new directions involves the observatory stage, in which search behaviour is enabled in novel ways. This corresponds to open innovation search patterns and

may well require brokerage, cross-sector linkages, working with users, foresight, ethnography and multiple other approaches and often involves deliberate recruitment of *outsiders* to bring alternative experience and perspectives. It also requires the ability to abstract the core problem to a higher level such that potential solutions in other sectors/worlds can be perceived as relevant.

The laboratory stage involves experimentation with the original idea to adapt it to the new context. By its nature this process involves failure and fast learning and user input is critical in shaping and configuring a robust solution. Whilst the initial idea may be radical its shaping and development involves integrating a wide range of small scale incremental improvements in a process of experimentation, learning, capture and codification.

In the prototype stage there is further need for high user engagement and development of robust configurations which will actually work and be accepted. At this stage it is important to have a working model of the system level innovation which can act as a *boundary object* demonstrating the operation and advantages of the new approach but also allowing input from potential adopters in further shaping and developing the ideas.

Finally widespread diffusion depends on the codification of the new system into a transferable model – a *standard package*. This does not mean that further innovation will not take place; indeed it is characteristic of the examples given that continuous improvement is embedded in their design. But the basic model has become standardized and codified to the point that it can be handed on to others who have not had direct experience and sufficient detail of the *standard operating mode* available to enable them to set up and operate in a different context. This part of the process is assisted by the fact that users and players have been involved in co-creating and especially configuring the model.

Recommendations

Amongst activities which could be undertaken to strengthen and develop the HI ecosystem would be:

- Provision of support for developing and retaining entrepreneurial talent across the sector. This could include training and skills development, support infrastructures (incubators, etc.), venture funding, mentoring and the setting up of learning communities of practice

- Provide identifiable sources of sufficient venture capital to enable experimentation to pilot/prototype

- Review and promote awareness of range of options around building internal entrepreneurship capability – harnessing entrepreneurial talent within the Humanitarian Innovation Ecosystem

- Review and transfer models for bringing radical innovation inside (structures for corporate entrepreneurship)

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Appendix 1: Details of relevant innovation theories

The innovation life cycle

We need to recognize that innovation opportunities change over time. In new industries – like today's biotech, internet-software or nano-materials – there is huge scope for experimentation around new product and service concepts. But more mature industries tend to focus more around process innovation or position innovation, looking for ways of delivering products and services more cheaply or flexibly, or for new market segments into which to sell them. In their pioneering work on this theme Abernathy and Utterback developed a model describing the pattern in terms of three distinct phases (see figure below).
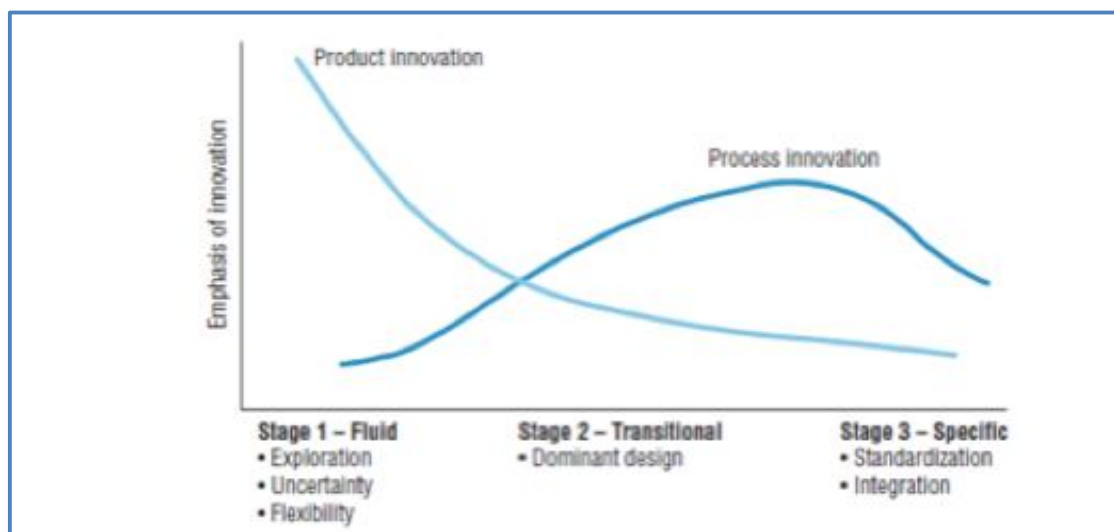

Figure 3: The innovation life cycle

Initially, under the discontinuous conditions which arise when completely new technology and/or markets emerge, there is what they term a *fluid phase* during which there is high uncertainty along two dimensions:

- The target – what will the new configuration be and who will want it?

- The technical – how will we harness new technological knowledge to create and deliver this?

No one knows what the *right* configuration of technological means and market needs will be and so there is extensive experimentation (accompanied by many failures) and fast learning by a range of players including many new entrepreneurial businesses.

Gradually these experiments begin to converge around what they call a *dominant design* – something which begins to set up the rules of the game. This represents a convergence around the most popular (importantly not necessarily the most technologically sophisticated or elegant) solution to the emerging configuration. At this point a *bandwagon* begins to roll and innovation options become increasingly channeled around a core set of possibilities – what Dosi calls a *technological trajectory*. It becomes increasingly difficult to explore outside this space

because entrepreneurial interest and the resources which that brings increasingly focus on possibilities within the dominant design corridor.

This can apply to products or processes; in both cases the key characteristics become stabilized and experimentation moves to getting the bugs out and refining the dominant design. For example, the nineteenth-century chemical industry moved from making soda ash (an essential ingredient in making soap, glass and a host of other products) from the earliest days where it was produced by burning vegetable matter through to a sophisticated chemical reaction which was carried out on a batch process (the Leblanc process) which was one of the drivers of the Industrial Revolution. This process dominated for nearly a century but was in turn replaced by a new generation of continuous processes which used electrolytic techniques and which originated in Belgium where they were developed by the Solvay brothers. Moving to the Leblanc process or the Solvay process did not happen overnight; it took decades of work to refine and improve each process, and to fully understand the chemistry and engineering required to get consistent high quality and output.

A similar pattern can be seen in products. For example, the original design for a camera is something which goes back to the early nineteenth century and – as a visit to any science museum will show – involved all sorts of ingenious solutions. The dominant design gradually emerged with an architecture which we would recognize – shutter and lens arrangement, focusing principles, back plate for film or plates, etc. But this design was then modified still further – for example, with different lenses, motorized drives, flash technology – and, in the case of George Eastman's work, to creating a simple and relatively *idiot-proof* model camera (the Box Brownie) which opened up photography to a mass market. More recent development has seen a similar fluid phase around digital imaging devices.

The period in which the dominant design emerges and emphasis shifts to imitation and development around it is termed the *transitional phase* in the Abernathy and Utterback model. Activities move from radical concept development to more focused efforts geared around product differentiation and to delivering it reliably, cheaply, with higher quality, extended functionality, etc.

As the concept matures still further so incremental innovation becomes more significant and emphasis shifts to factors like cost – which means efforts within the industries which grow up around these product areas tend to focus increasingly on rationalization, on scale economies and on process innovation to drive out cost and improve productivity. Product innovation is increasingly about differentiation through customization to meet the particular needs of specific users. Abernathy and Utterback term this the *specific phase.*

Finally the stage is set for change – the scope for innovation becomes smaller and smaller whilst outside – for example, in the laboratories and imaginations of research scientists – new possibilities are emerging. Eventually a new technology emerges which has the potential to challenge all the by now well-established rules – and the game is disrupted. In the camera case, for example, this is happening with the advent of digital photography which is having an impact on cameras and the overall service package around how we get, keep and share our photographs. In our chemical case this is happening with biotechnology and the emergence of

the possibility of no longer needing giant chemical plants but instead moving to small-scale operations using live organisms genetically engineered to produce what we need.

Table 6 sets out the main elements of this model

Innovation characteristic	Fluid pattern	Transitional phase	Specific phase
Competitive emphasis placed on ...	Functional product performance	Product variation	Cost reduction
Innovation stimulated by...	Information on user needs, technical inputs	Opportunities created by expanding internal technical capability	Pressure to reduce cost, improve quality, etc.
Predominant type of innovation	Frequent major changes in products	Major process innovations required by rising volume	Incremental product and process innovation
Product line	Diverse, often including custom designs	Includes at least one stable or dominant design	Mostly undifferentiated standard products
Production processes	Flexible and inefficient - aim is to experiment and make frequent changes	Becoming more rigid and defined	Efficient, often capital intensive and relatively rigid.

Table 6: Stages in the innovation life cycle

Although originally developed for manufactured products the model also works for services – for example the early days of Internet banking were characterized by a typically fluid phase with many options and models being offered. This gradually moved to a transitional phase, building a dominant design consensus on the package of services offered, the levels and nature of security and privacy support, the interactivity of website, etc. The field has now become mature with much of the competition shifting to marginal issues like relative interest rates. Similar patterns can be seen in Internet VOIP (Voice over internet protocol) telephony, on-line auctions like eBay and travel and entertainment booking services like expedia.com.

We should also remember that there is a long-term cycle involved – mature businesses which have already gone through their fluid and transitional phases do not necessarily stay in the mature phase forever. Rather they become increasingly vulnerable to a new wave of change as the cycle repeats itself – for example, the lighting industry is entering a new fluid phase based on applications of solid-state LED technology but this comes after over 100 years of the incandescent bulb developed by Swann, Edison and others. Their early experiments eventually converged on a dominant product design after which emphasis shifted to process innovation around cost, quality and other parameters – a trajectory which has characterized the industry and led to increasing consolidation amongst a few big players. But – as the *dimming of the lightbulb* case on the website shows - that maturity has now given way to a new phase involving different players, technologies and markets.

The pattern can be seen in many studies and its implications for innovation management are important. In particular it helps us understand why established organizations often find it hard to deal with the kind of discontinuous change discussed earlier. Organizations build capabilities around a particular trajectory and those who may be strong in the later (specific) phase of an established trajectory often find it hard to move into the new one. (The example of the firms which successfully exploited the transistor in the early 1950s is a good case in point – many were new ventures, sometimes started by enthusiasts in their garage, yet they rose to challenge major players in the electronics industry like Raytheon.) This is partly a consequence of sunk costs and commitments to existing technologies and markets and partly because of psychological and institutional barriers. They may respond but in slow fashion – and they may make the mistake of giving responsibility for the new development to those whose current activities would be threatened by a shift.

Importantly, the *fluid* or *ferment* phase is characterized by co-existence of old and new technologies and by rapid improvements of both. (It is here that the so-called *sailing ship* effect which we mentioned earlier can often be observed, in which a mature technology accelerates in its rate of improvement as a response to a competing new alternative.)

Whilst some research suggests existing incumbents do badly when discontinuous change triggers a new fluid phase, we need to be careful here. Not all existing players do badly – many of them are able to build on the new trajectory and deploy/leverage their accumulated knowledge, networks, skills and financial assets to enhance their competence through building on the new opportunity. Equally whilst it is true that new entrants – often small entrepreneurial firms – play a strong role in this early phase we should not forget that we see only the successful players. We need to remember that there is a strong ecological pressure on new entrants which means only the fittest or luckiest survive.

It is more helpful to suggest that there is something about the ways in which innovation is managed under these conditions which poses problems. Good practice of the *steady-state* kind described above is helpful in the mature phase but can actively militate against the entry and success in the fluid phase of a new technology. How do enterprises pick up signals about changes if they take place in areas where they don't normally do research? How do they understand the needs of a market which doesn't exist yet but which will shape the eventual package which becomes the dominant design? If they talk to their existing customers the likelihood is that those customers will tend to ask for more of the same, so which new users should they talk to – and how do they find them?

The challenge seems to be to develop ways of managing innovation not only under *steady-state* but also under the highly uncertain, rapidly evolving and changing conditions which result from a dislocation or discontinuity. The kinds of organizational behaviour needed here will include things like agility, flexibility, the ability to learn fast, the lack of preconceptions about the ways in which things might evolve, etc. – and these are often associated with new small firms. There are ways in which large and established players can also exhibit this kind of behaviour but it does often conflict with their normal ways of thinking and working.

Worryingly the source of the discontinuity which destabilizes an industry – new technology, emergence of a new market, rise of a new business model - often comes from outside that

industry. So even those large incumbent firms which take time and resources to carry out research to try and stay abreast of developments in their field may find that they are wrong-footed by the entry of something which has been developed in a different field. The massive changes in insurance and financial services which have characterized the shift to online and telephone provision were largely developed by IT professionals often working outside the original industry. In extreme cases we find what is often termed the *not invented here* – NIH – effect, where a firm finds out about a technology but decides against following it up because it does not fit with their perception of the industry or the likely rate and direction of its technological development. Famous examples of this include Kodak's rejection of the Polaroid process or Western Union's dismissal of Bell's telephone invention. In a famous memo dated 1876 the board commented, '*this "telephone" has too many shortcomings to be seriously considered as a means of communication. The device is inherently of no value to us.*'

Appendix 2: Discontinuous innovation

Most of the time innovation takes place within a set of rules of the game which are clearly understood, and involves players trying to innovate by doing what they have been doing (product, process, position, etc.) but better. Some manage this more effectively than others but the *rules of the game* are accepted and do not change.

But occasionally something happens which dislocates this framework and changes the rules of the game. By definition these are not everyday events but they have the capacity to redefine the space and the boundary conditions – they open up new opportunities but also challenge existing players to reframe what they are doing in the light of new conditions. This is a central theme in Schumpeter's original theory of innovation which he saw as involving a process of *creative destruction.*

Change of this kind can come through the emergence of a new technology or it can come through the emergence of a completely new market with new characteristics and expectations. In his famous studies of the computer disk drive, steel and hydraulic excavator industries Christensen highlights the problems which arise under these conditions. For example, the disk drive industry was a thriving sector in which the voracious demands of a growing range of customer industries meant there was a booming market for disk drive storage units. Around 120 players populated what had become an industry worth $18bn by 1995– and - like their predecessors in ice harvesting - it was a richly innovative industry. Firms worked closely with their customers, understanding the particular needs and demands for more storage capacity, faster access times, smaller footprints, etc. But just like our ice industry, the virtuous circle around the original computer industry was broken – in this case not by a radical technological shift but by the emergence of a new market with very different needs and expectations.

The key point about this sector was that disruption happened not once but several times, involving different generations of technologies, markets and participating firms. For example, whilst the emphasis in the mini-computer world of the mid-1970s was on high performance and the requirement for storage units correspondingly technologically sophisticated, the emerging market for personal computers had a very different shape. These were much less clever machines, capable of running much simpler software and with massively inferior performance – but at a price which a very different set of people could afford. Importantly although simpler they were capable of doing most of the basic tasks which a much wider market was interested in – simple arithmetical calculations, word processing and basic graphics. As the market grew so learning effects meant that these capabilities improved – but from a much lower cost base. The result was, in the end, just like that of Linde and his contemporaries on the ice industry – but from a different direction. Of the major manufacturers in the disk drive industry serving the mini-computer market only a handful survived – and leadership in the new industry shifted to new entrant firms working with a very different model.

Discontinuity can also come about by reframing the way we think about an industry – changing the dominant business model and hence the *rules of the game.* Think about the revolution in flying which the low cost carriers have brought about. Here the challenge came via a new business model rather than technology – based on the premise that if prices could be kept low a large new market could be opened up. The power of the new way of framing the business was

that it opened up a new – and very different – trajectory along which all sorts of innovations began to happen. In order to make low prices pay a number of problems needed solving – keeping load factors high, cutting administration costs, enabling rapid turnaround times at terminals – but once the model began to work it attracted not only new customers but increasingly established flyers who saw the advantages of lower prices.

What these – and many other examples – have in common is that they represent the challenge of discontinuous innovation. None of the industries were lacking in innovation or a commitment to further change. But the ice harvesters, mini-computer disk companies or the established airlines all carried on their innovation on a stage covered with a relatively predictable carpet. The trouble was that shifts in technology, in new market emergence or in new business models pulled this carpet out from under the firms – and created a new set of conditions on which a new game would be played out. Under such conditions, it is the new players who tend to do better because they don't have to wrestle with learning new tricks and letting go of their old ones. Established players often do badly – in part because the natural response is to press even harder on the pedal driving the existing ways of organizing and managing innovation. In the ice industry example the problem was not that the major players weren't interested in R&D – on the contrary they worked really hard at keeping a technological edge in insulation, harvesting and other tools. But they were blindsided by technological changes coming from a different field altogether – and when they woke up to the threat posed by mechanical ice-making their response was to work even harder at improving their own ice harvesting and shipping technologies. It is here that the so-called *sailing ship* effect can often be observed, in which a mature technology accelerates in its rate of improvement as a response to a competing new alternative – as was the case with the development of sailing ships in competition with newly-emerging steamship technology.

In similar fashion the problem for the firms in the disk drive industry wasn't that they didn't listen to customers but rather that they listened too well. They build a virtuous circle of demanding customers in their existing market place with whom they developed a stream of improvement innovations – continuously stretching their products and processes to do what they were doing better and better. The trouble was that they were getting close to the wrong customers – the discontinuity which got them into trouble was the emergence of a completely different set of users with very different needs and values.

Appendix 3: Ambidexterity and Internal entrepreneurship

All organizations begin as small start-ups and exploit the advantages of entrepreneurial spirit – agility, risk-taking, being able to spot opportunities and being flexible in finding ways to exploit them. As they grow so repeating the innovation trick becomes a matter of building structures and processes to make things happen. Innovation becomes more organized and operates as a system.

Such innovation systems offer a powerful engine for delivering growth based on innovations within core areas, exploiting technical and market knowledge to advantage. But they also run the risk of becoming too focused on the current business and of losing the entrepreneurial capacity to explore at the edges of the current business, finding unlikely opportunities and connecting them back to the mainstream.

This tension – between *exploit* and *explore* - is well-known and common to all organizations. Smart businesses recognize the need for a capacity to operate in both worlds – to develop what is called *ambidexterity* in their innovation approach. (Ambidextrous people can work with equal facility using either hand whereas most people have a dominant had which they use for most tasks). They seek to build on their core strengths in their mainstream innovation systems but also to build a capacity to explore in different ways, to recapture the *venture spirit* which characterized their early foundation.

Innovation as a framing problem

Just as human beings need to develop mental models to simplify the confusion which the rich stimuli in their environment offers them, established organizations make use of simplifying frames. They *look* at the environment and take note of elements which they consider relevant – threats to watch out for, opportunities to take advantage of, competitors and collaborators, etc. Constructing such frames helps give the organization some stability but it also defines the space within which it will search for innovation possibility.

In practice these models often converge around a core theme - although organizations might differ they often share common models about how their world behaves. So most firms in a particular sector will adopt similar ways of framing – assuming certain *rules of the game*, following certain trajectories in common. And this shapes where and how they tend to search for opportunities – it emerges over time but once established becomes the *box* within which further innovation takes place.

It's difficult to think and work outside this box because it is reinforced by the structures, processes and tools which the organization uses in its day-to-day work. The problem is also that such ways of working are linked to a complex web of other players in the organization's *value network* - its key competitors, customers and suppliers - who reinforce further the dominant way of seeing the world.

Powerful though they are, such frames are only models of how individuals and organizations think the world works. It is possible to see things differently, take into account new elements,

pay attention to different things and come up with alternative solutions. This is, of course, exactly what entrepreneurs do when they try to find opportunities - they look at the world differently and see opportunity in a different way of framing things. And sometimes their new way of looking at things becomes a widely accepted one - and their innovation changes the game.

Rather like the drunk who has lost his keys on the way home and is desperately searching for them under the nearest lamp-post *because there is more light there*, firms have a natural tendency to search in spaces which they already know and understand. But we know that the weak early warning signals of the emergence of totally new possibilities – radically different technologies, new markets with radically different needs, changing public opinion or political context – won't happen under our particular lamp-post. Instead they are out there in the darkness – so we have to find new ways of searching in space we aren't familiar with.

How can this be done? By luck, sometimes – except that simply being in the right place at the right time doesn't always help. History suggests that even when the new possibility is presented to the firm on a plate its internal capacity to see and act on the possibilities is often lacking. For example, the famous 'not invented here' effect has been observed on many occasions where an otherwise well-established and successful innovative firm rejects a new opportunity which turns out to be of major significance

The figure below shows a simple map of the search space for organizations seeking to innovate. Zone 1 corresponds to the *exploit* area we looked at earlier where we are working in familiar territory and looking to exploit the knowledge base which we already have. Zone 2 is about exploring but within the context of our existing frame, pushing the frontiers but in directions we are familiar with. Zone 3 brings in new elements and combinations and requires a different and more open approach to search. And zone 4 is where the different elements interact with each other to make a complex system which is extremely difficult to explore in systematic fashion.
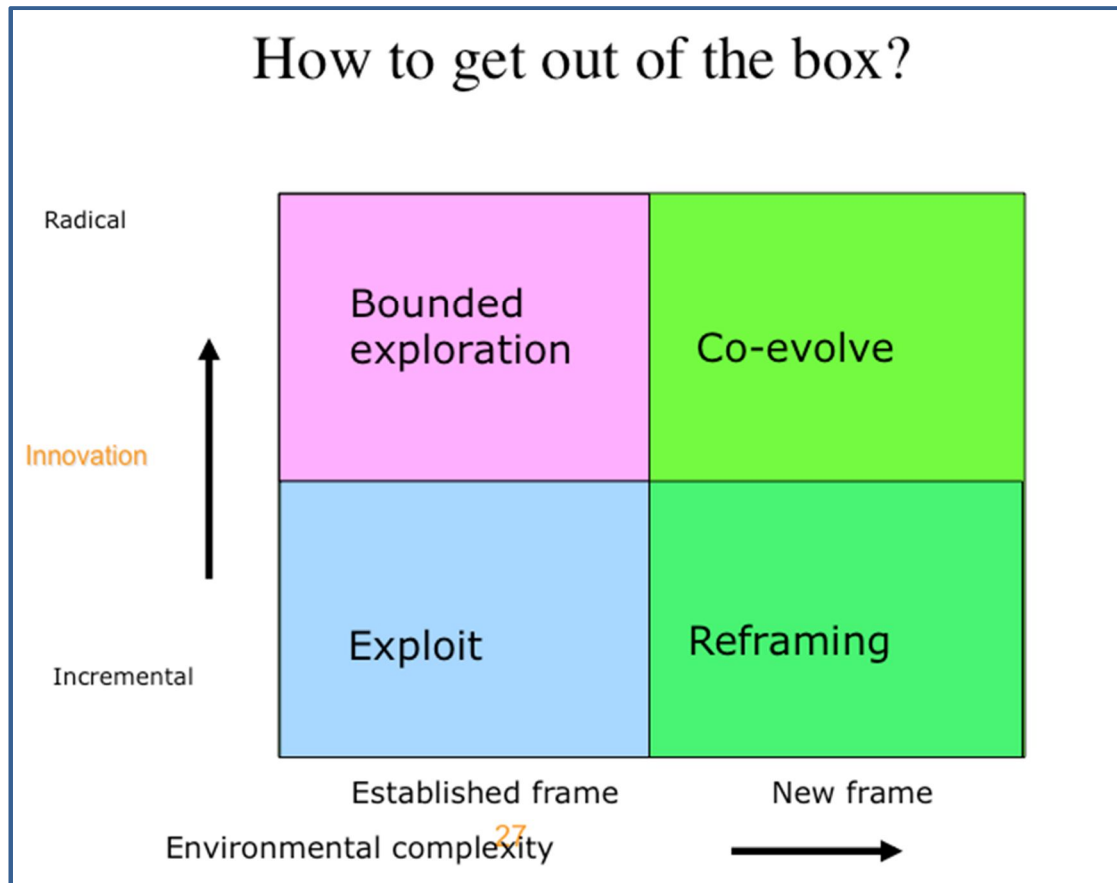
Figure 4: How to get out of the box

The challenge for established organizations is that while they may have built very effective systems for working in zones 1 and 2 they require very different capabilities to deal with the right hand side of the picture. In these areas the key skills are those of an entrepreneur, able to work flexible in unclear and fuzzy environments and experiment with possibilities in that space. The kind of characteristics needed here include:

Flexibility – able to reframe, to see differently
Explorer – open to new possibilities, challenge, adapt, change
Agility – able to move amongst different options, link different worlds
Ambiguity – tolerant of *fuzzy* front end
Risk-taking – prepared to experiment and fail
Probe and learn approach to strategy

Building internal entrepreneurial capacity

So how can an organization recapture a venture spirit and build internal entrepreneurial capacity? Many different approaches have been tried and we can usefully position them along a spectrum of options, as in the figure below.
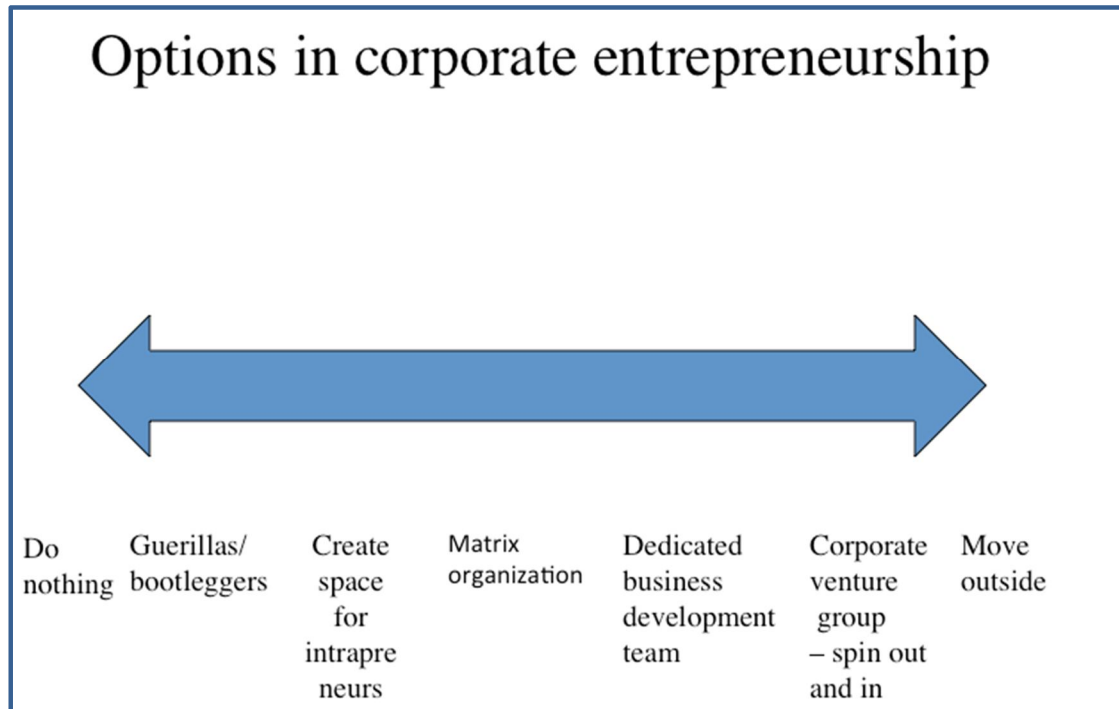
Figure: 5: Options in corporate entrepreneurship

The range runs from allowing people a little free time and the licence to think differently at one end through to setting up dedicated teams and structures and even spinning out a separate agency with the responsibility to act as an entrepreneurial satellite to the main business.

Each of these options has strengths and weaknesses and table 7 below tries to summarize these.

Option	Strengths	Weaknesses	Examples
Guerrillas/bootleggers. Most organizations will have some people who are *natural* entrepreneurs and who may, from a mixture of frustration or enthusiasm, try to change things. They represent a potential source of innovation, especially if they can be identified and encouraged.	Natural motivation for change and the willingness to explore and take risks with new ideas.	Limited numbers and may find it difficult to operate in the corporate environment. Lack of time, resources and networking means they may end up frustrated and unable to achieve anything. In the worst case they may become so frustrated they leave and sometimes set up their new venture outside the business.	Some studies of frustrated entrepreneurs who end up having to leave the company because they could not get support; in some cases the new ventures they found are direct competitors to their original organization. More positive is the incidence of *intrapreneurs* – internal entrepreneurs who achieve something radical in spite of the mainstream system. They often work in their spare time and take pleasure from challenging the mainstream system. Examples include Novopen in diabetes care,
Create space for intrapreneurs Allow individuals some element of time and space within which they are encouraged to explore new ideas This can be a long-term arrangement or a short-term campaign. For example many internal innovation contests (like *driving e-novation*) are an attempt to mobilize such a venture spirit and to create the conditions within which people can surface novel ideas.	Multiple minds looking at wide range of options – diversity and volume. People will often bring their own energy and time to the projects on which they work.	Limited resource commitment means that it may take a long time to create new venture. Relies heavily on individual energy and effort to match the commitment by the organization. Links to key people, resources, networks and knowledge may not be easily available in this *bottom-up* approach.	3M and their famous 15% policy, linked opt key successes over many years. Examples include masking tape, Scotch tape and Post-It notes. Google allowing engineers to work 20% of their time on personal projects. Examples of innovations arising from this include Gmail BMW encouraging *bootleg* projects – they call them *U-boot projects* which operate below the radar screen and are unofficially supported. The 3 series estate was developed by such a team in its early days. DeLaRue and their *sabbatical* approach – also BAe Systems – encouraging new thinking and circulation. *Driving e-novation*
Matrix organization allowing people a significant part	Allows more time and offers the	Higher cost and formal resource commitment	Temporary project teams working to create

of their time to play an entrepreneur role alongside their main role.	potential to create mixed teams and combine knowledge sets	Conflicts between core and entrepreneur roles Bounded exploration because of time limits an pressures of the mainstream projects – someti hard for team members to reach *escape velocit*
Dedicated entrepreneur development team	Full-time commitment and potential to create knowledge sets and networks. Can bring in outsiders to enhance diversity Gives the group sufficient time, resources and a licence to search and explore Freedom and flexibility Small startup culture	Resource costs and tensions between the entrepreneurial group and the expectations of of organization. Connections back to the mainstream may get l and the team enjoy a different *lifestyle* of which others are jealous and which separates them o Problems of knowledge transfer and assimilati back into mainstream Challenges of building a wider network of connections internally and externally beyond t team members Risks and expectations sometimes out of align – short term expectations for results Problem of where to begin search beyond the post and the difficulties of framing new ventur
Corporate venture groups - Spin out These are a full-time part of the organization with the responsibility to use the resources (knowledge, finance, systems, etc.) f the organization in novel ways and to open up new lines of business. They aim to spin out new ventures – as start-up businesses, as licences sold to others, as acquisition targets for others, etc.	Offers ways of using the organizations' resources in novel fashion. External focus, exploring new markets for knowledge and new business connections. Key part of an open innovation strategy	Costs of running a dedicated unit Risk of new ventures not succeeding Problems of finding new networks and connec Intellectual property management
Corporate venture groups - spin in These mirror the above (and are often combined) but their focus is bringing in novel ideas from outside via licensing, merger/acquisition.	Acquire *ready made* entrepreneurial culture and novel ideas	Finding relevant targets Assimilation problems – how to bring the knowledge into the mainstream Culture clash between old and new *Elephant effect* where the rules, structures and operating procedures of the mainstream busin

		stife the entrepreneurial culture of the acquis... like an elephant accidentally sitting on a mous...
Venture banking, where the group acts like a venture capital arm of the mainstream business, providing risk funds to support internal and external exploration		

Table 7: Options in corporate entrepreneurship

Appendix 4: Architectural and component innovation

A key contribution to our understanding of managing innovation comes from the work of Rebecca Henderson and Kim Clark who looked closely at the kinds of knowledge involved in different kinds of innovation. They argue that innovation rarely involves dealing with a single technology or market but rather a bundle of knowledge which is brought together into a configuration. Successful innovation management requires that we can get hold of and use knowledge about components but also about how those can be put together – what they termed the architecture of an innovation.

We can see this more clearly with an example. Change at the component level in building a flying machine might involve switching to newer metallurgy or composite materials for the wing construction or the use of fly-by-wire controls instead of control lines or hydraulics. But the underlying knowledge about how to link aerofoil shapes, control systems, propulsion systems, etc. at the system level is unchanged – and being successful at both requires a different and higher order set of competencies.

One of the difficulties with this is that innovation knowledge flows – and the structures which evolve to support them – tend to reflect the nature of the innovation. So if it is at component level then the relevant people with skills and knowledge around these components will talk to each other – and when change takes place they can integrate new knowledge. But when change takes place at the higher system level – *architectural innovation* in Henderson and Clark's terms – then the existing channels and flows may not be appropriate or sufficient to support the innovation and the firm needs to develop new ones. This is another reason why existing incumbents often fare badly when major system level change takes place – because they have the twin difficulties of learning and configuring a new knowledge system and *unlearning* an old and established one.

Figure 6 illustrates the range of choices, highlighting the point that such change can happen at component or sub-system level or across the whole system...
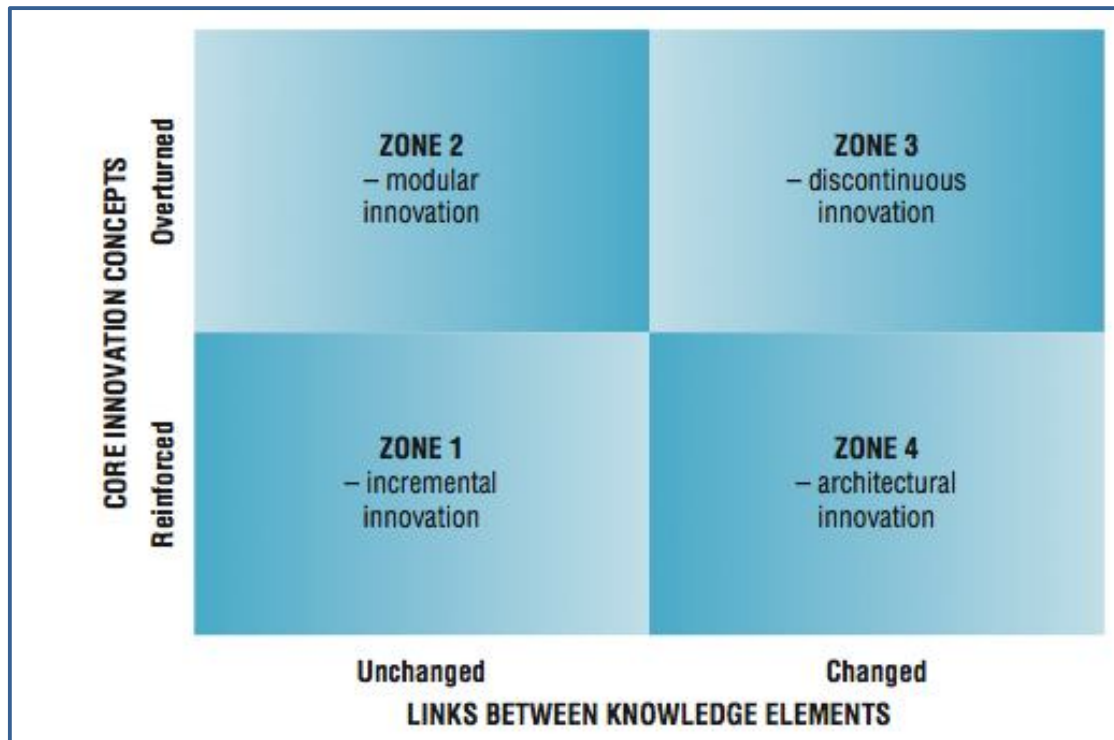
Figure 6: Component and architectural innovation

A variation on this theme comes in the field of *technology fusion*, where different technological streams converge, such that products which used to have a discrete identity begin to merge into new architectures. An example here is the home automation industry, where the fusion of technologies like computing, telecommunications, industrial control and elementary robotics is enabling a new generation of housing systems with integrated entertainment, environmental control (heating, air conditioning, lighting, etc.) and communication possibilities.

Similarly, in services a new addition to the range of financial services may represent a component product innovation, but its impacts are likely to be less far-reaching (and the attendant risks of its introduction lower) than a complete shift in the nature of the service package – for example, the shift to direct-line systems instead of offering financial services through intermediaries.

Many businesses are now built on business models which stress integrated solutions – systems of many components which together deliver value to end-users. These are often complex, multi-organization networks – examples might include rail networks, mobile phone systems, major construction projects or design and development of new aircraft like the Boeing Dreamliner or the Airbus A-380. Managing innovation on this scale requires development of skills in what Mike Hobday and colleagues call *the business of systems integration*.

Appendix 5: Accelerating diffusion

This tool is designed to help understand the ways in which innovations diffuse across a population – and how to use this knowledge to accelerate the process. People don't simply accept changes – new products or services, new processes, new business models. Instead there is a pattern in which some are enthusiastic early adopters whilst others may take a long while to make up their minds. Whether we are talking about toothpaste or high technology machinery the same pattern will appear and it takes the form of an *S-curve* – see figure 7 below.
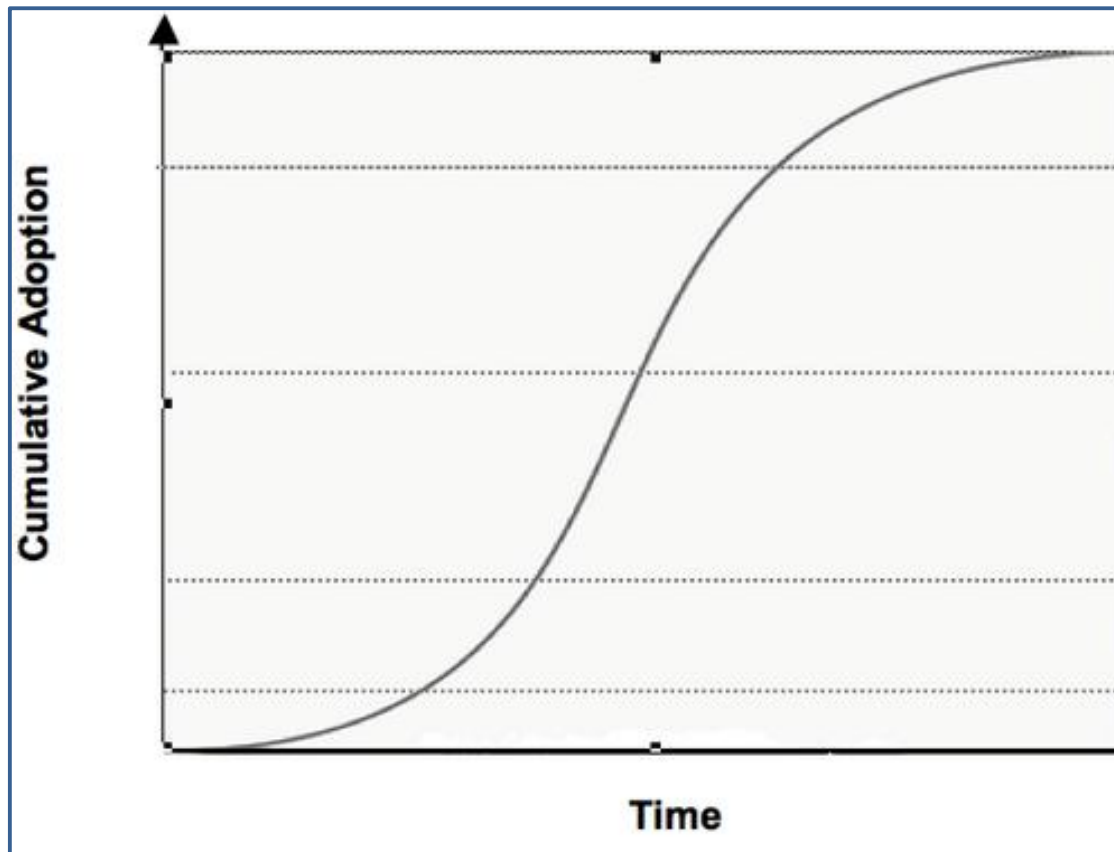

Figure 7: The S-Curve for innovation adoption

The key question is not whether or not this happens but rather what affects the slope of that curve? The steeper the curve the faster diffusion takes place. Extensive research suggests a number of factors which influence it and we can use our knowledge of these to manage the process of introducing a new idea. Much of the work on how we can accelerate adoption and diffusion comes from the work of Everett Rogers and this tool is based on his approach.

The first stage is to recognize that diffusion can be seen as a process of communicating a new idea and that process has several elements:

A source – someone trying to introduce it
A receiver – the target recipient
A message – the innovation itself
Various channels along which the message can be communicated
The effect that message has
Feedback
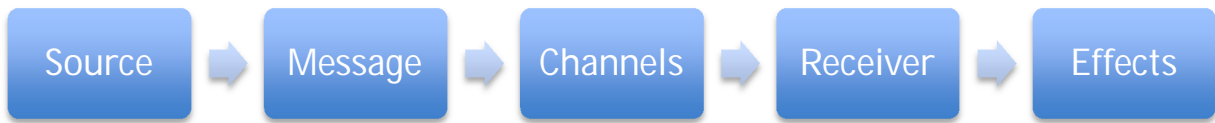
He suggested that the process of adoption involved such communication and followed a pattern where receivers learn about something new, they evaluate it and make a decision to adopt or not. They then implement that decision and either continue using the innovation or abandon it.
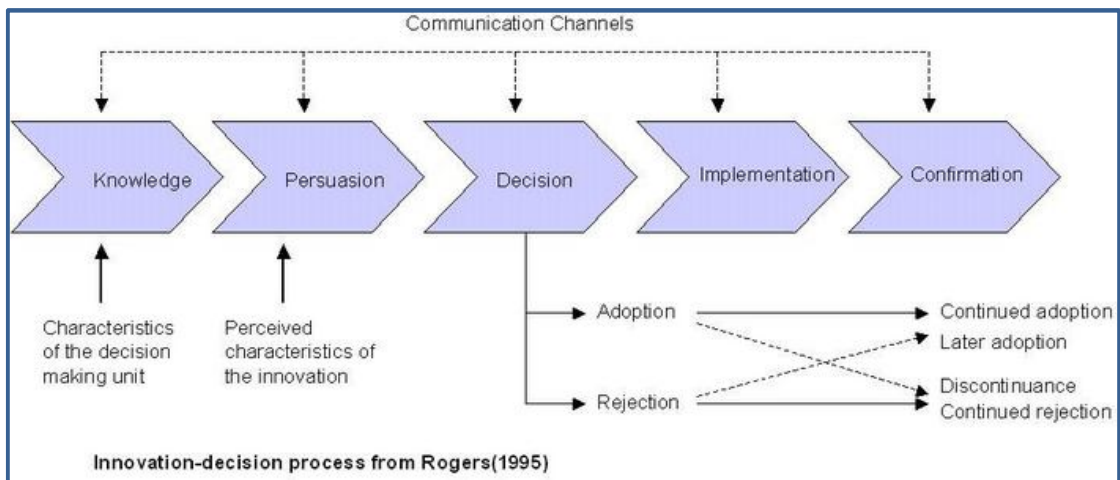

Figure 8: Innovation-decision process from Rogers (1995)

We can see the key elements of each stage in table 8:

Stage	Definition
Knowledge	Here the individual is first exposed to an innovation but lacks information about the innovation. If we want to accelerate diffusion we might increase the availability of knowledge or use different channels to enhance the likelihood of the individual becoming aware of the innovation.
Persuasion	In this stage the individual is interested in the innovation and actively seeks information/detail about the innovation. Here we can help shape the perception of the innovation by providing information, reassurances about negative aspects and accentuating the positive benefits.
Decision	This stage involves the individual taking the decision to adopt or reject. We can influence this, for example by staging the risk so they don't have to commit completely – for example by offering a trial version or a trial period of use. The *freemium* model for software is a good example of this where adopters can try before they buy.
Implementation	Here the individual gains experience of using the innovation and modifies his/her perceptions based on that experience. Providing after-sales support and service are ways of helping ensure that this experience is positive and the innovation remains useful. Customer help lines and bundling in after sales support and troubleshooting can play a key role.
Confirmation	Here the decision to stay with the innovation or to abandon it takes place. Confirmation is important because the individual is then likely to be a reference point for others in what is a social process. Equally if they abandon the innovation this can slow down wider diffusion.

Table 8:Key stages in innovation decision process

Using what we know to accelerate diffusion

Looking more closely at these elements we can make use of characteristics which we know are influential in accelerating or retarding adoption. They provide levers which we can use to shape and present ourselves (as *sources*) and our innovation (the *message*) in ways which appeal to particular *receivers*.

Innovation characteristics

The key point here is that different people perceive the characteristics of an innovation (the *message*) in different ways and this is a subjective judgment. Whether or not our innovation is the best new thing since the invention of sliced bread is not the issue – it is how others perceive it which matters. So it helps to understand the key dimensions or characteristics of an innovation and how we can manage and shape perceptions around it. This is what advertisers do in their attempts to persuade us to adopt new products or services. Rogers lists five innovation characteristics and these provide a helpful checklist (table 9):

Influential factors in adoption	Key checklist questions
Perceived relative advantage	Do we have evidence to prove a difference in performance on some dimension? Can we emphasis those features in our presentation of the message?
Observability	Can we show the benefits – seeing is believing? Can we make visible the advantages of our innovation?
Complexity	Can we present our idea in simple form? Can we make the idea easy to understand and communicate?
Trialability	Are there opportunities to *test drive* the new idea before making a full commitment? How can we divide up the risk in adopting our idea – for example a trial version, a trial period? Can we engage users in co-developing a prototype so they can shape and try it and bring their ideas into its design?
Compatibility	How well does the new thing fit into our current world? For example, does it fit physically, does it challenge cultural values and norms, does it disrupt behaviour patterns or power relationships, etc.?

Table 9: Rogers' innovation checklist

(b) Adopter characteristics

Not everyone is as enthusiastic about new things – as Rogers highlighted in his review of many studies. Typically there is a distribution across any population – see the figure below:
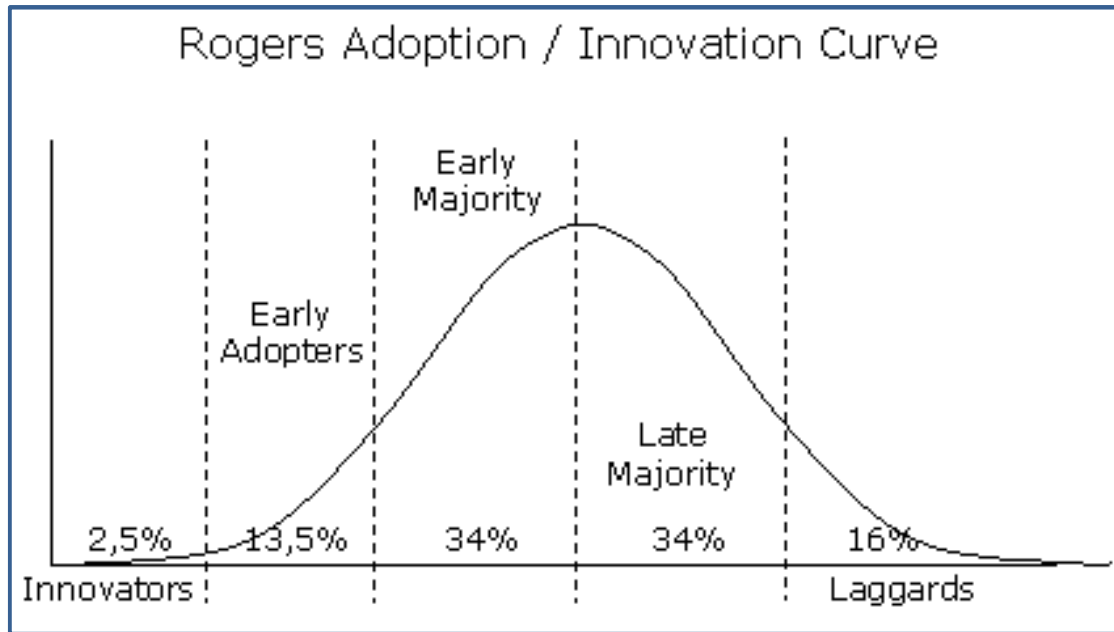
Figure 9 Rogers Adoption/Innovation Curve

The exact numbers are less important than understanding that there will be different approaches by different people. So we could benefit from understanding these different segments and how to work with them to accelerate diffusion.

The first group – the *innovators* – are very favourably disposed to new ideas – they embrace and enjoy them. Included in this group are those user *innovators* who are so keen to have the new thing that they contribute their own ideas and prototypes! What we know about these people is that they are highly motivated – they really want the innovation – and they are tolerant of it not being perfect. That's important because they are a good source of ideas and a good test-bed for prototypes which are not perfect – for example, beta-testers of new software. But the downside is that they are *socially marginal* – that is, they are seen as being on the edge of their social groups rather than at their centre. So their influence on others is not necessarily high in terms of persuading them to adopt.

That role belongs to the second group – the *early adopters*. These people are also in favour of new things but only after they have evaluated and explored them. But they are seen as socially central which means that they are people who others follow – and persuading them to adopt will provide a role model and strong influence on others. For this reason marketing groups seek out and target early adopters in different communities.

Early and late majority are, as the name suggests, the mainstream along the S-curve and the *laggards* are those who will be very late in adoption or may never adopt.

In terms of useful lessons about promoting adoption the message here is to try and understand the world of the potential adopter and find ways to speak their language, view the innovation through their eyes and present its features in terms which they will see as favourable and a good fit with their world. This can include their social values, their working practices, their prior experience; it plays on their perception of the *compatibility* characteristics of the innovation. It means that it is important to find ways of understanding the innovation from their perspective and using this to design and implement it.

Also important here is the role of *opinion leaders* – people who are early adopters but whose position in the social system means that they have influence on the thinking and behaviour of others. Identifying and working with such people is a core part of strategies to accelerate diffusion. Test marketing, trials and other tools targeted at influencing this group are often used and advertising (*persuasion* in Roger's model) often features such opinion leaders.

Innovator characteristics

The other side of the communication process is the innovator – the one trying to persuade someone to adopt a new thing. Research here suggests that a number of factors are relevant but one of the most important is that people are more likely to adopt something new from someone who they perceive to be like them. So finding a common language, being aware of the world in which they operate, matching as far as possible with their values and beliefs will be an important aspect in enabling adoption.

For example, someone trying to sell a new technology from a university environment may meet with resistance from a potential adopter who feels there is a big gap between their two worlds. Or an advertiser aggressively promoting a new financial service may be perceived as untrustworthy and so bias a potential adopter against the idea. Research suggests that adoption is more likely to occur when the *innovator* trying to introduce the new idea is perceived as being *one of us* – an idea called *homophily*. This goes some way to explaining the *not invented here* effect where innovations are rejected by a group because they originate from outside the group. It goes back to a field of psychology called *social identity theory* which highlights our tendency to split into the *in group* (to which we belong) and the *out group*; essentially we trust new ideas from people in our group and are suspicious of those coming from outside.

In terms of promoting adoption this raises a number of factors we can work with:

Source credibility – how to give the impression the *innovator* is credible and trustworthy? For example advertisers often use doctors to promote innovations since they are perceived as reliable and trustworthy and also authoritative in terms of their knowledge base

Homophiliy – how to give the impression that the innovator is like the adopter? Ideas spread fast when they are perceived as coming from credible *people like us.*

Compatibility – how to ensure that the innovator understands the adopter's context and the ways in which they are likely to perceive the innovation and how well it fits?

Opinion leadership – innovations diffuse as part of a social process so finding and working with opinion leaders – early adopters – can accelerate it. By definition such people are already in the social system and have high credibility and so can accelerate adoption.

One powerful way of dealing with this issue is to engage adopters in the design and implementation of the innovation. User-led innovation is a powerful source of new ideas and these can not only improve the innovation itself but also accelerate its diffusion. For example in *change management* (where the challenge is introducing process innovation, changes in the way and organization works) a powerful tool is involving users to design or modify the change so they accept and embrace it. The innovation becomes *their innovation* and they have an interest in making sure it is implemented and works well. Similarly working with early adopters can provide useful information about how to shape an innovation so that it is a better *fit* with the majority of the marketplace.

Environment and infrastructure

Innovations do not exist in a vacuum; they are located in a physical, social, economic and political context. These factors can create favourable or unfavourable conditions which affect rates of adoption. For example, trying to encourage people to adopt a vaccination against 'flu would be easier to do in a context where there was a 'flu epidemic and people were concerned for their health. Equally promoting the adoption of energy saving technology in the home would be more difficult if the economy was booming and people were not concerned with cost savings around the home.

One important area where context affects adoption is in innovations which depend on *network effects*. That is the more people use something the more potential it has for others. Mobile phone networks, social media platforms, mobile money systems and the Internet are all examples of this. When there are few connections in the network there is little incentive for others to join, but when a critical mass is reached then the process accelerates and the network develops *emergent properties*. People start experimenting and discovering new uses to reinforce the core idea but also extend it; Facebook is a good example here. For organizations trying to promote innovation biding early traffic across networks – for example by offering a discount to early adopters – is an important strategy.

Another version of this challenge is the infrastructure around electric vehicles. They offer significant energy and pollution-elated benefits but their widespread adoption is held back by the lack of an infrastructure to support charging or battery replacement. Promoting this kind of innovation depends on pump-priming investments in such infrastructure.