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# Extracting Key Lessons in Service Innovation*

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*This paper describes how Sagentia—working with Vodafone, Safaricom, and other organizations—played a significant role in the creation and delivery of a landmark mobile money transfer and payment service for emerging markets, starting in Kenya. In this profile we examine the organization aspects and approach that contributed to the success of the service: the lessons we learned as the technology provider and how the experience has informed and strengthened our service innovation processes.*

## Introduction

Development, deployment, and management of services (as distinct from products) is a differentiating factor for organizations competing in the global markets. But while services have begun to dominate much economic activity, processes surrounding their innovation and development are not widely studied or understood. In contrast, product innovation management practices and policies are better understood and for this reason are often applied to services projects. However, the product innovation approach may not be well adapted to the unique characteristics of a service innovation.

This case study explores the M-PESA ("M" for Mobile, "PESA" the Swahili for cash) mobile money transfer service innovation. M-PESA was delivered within a mobile network operator (MNO) organization and designed, developed, deployed, and managed in an emerging market environment. Specifically, the case study retrospectively maps M-PESA to stages of a service innovation framework. The aim is to identify generic elements that can be "codified" into a service innovation process as developed by Sagentia.

## The Road to Effective Service Innovation

For many people in emerging markets, financial inclusion is unachievable. The in-country banking infrastructure may be immature; where infrastructure exists, the cost of banking services is prohibitively high. Income is limited and unpredictable, and people rarely have bank accounts, let alone credit cards. Carrying and moving money around is often risky and unsafe, and there is a significant rural population, meaning access to a bank involves a journey of several days for many people.

The picture for mobile penetration is very different, however: of Kenya's population of 40 million around 55% own or has access to a mobile phone. By comparison, the banks only have 750 banking outlets and 3 million bank accounts between them countrywide (Mbugua, 2008).

It was Vodafone executive Dr. Nick Hughes who made the connection between the phenomenal growth of mobile phone use in emerging markets and the fact that mobile phones had the potential to deliver money in a fast, secure, and low-cost way.

Dr. Hughes's innovative solution was realized in March 2007 when M-PESA, a mobile phone-based money transfer service, launched in Kenya. It now has more than 14 million registered users and almost 24,000 registered reseller outlets. The service has transferred more than KES60 billion since it started. In October 2008 alone it reportedly transferred more than KES10 billion.

This initial service launched with a straightforward feature set: the ability to send and receive money and to buy airtime for yourself and for others. The feature set has grown to include

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Vodafone: The M-PESA service was conceived by and is owned by global mobile network services operator Vodafone Group plc. Vodafone drives the strategic growth of M-PESA globally and works closely with partner markets to deliver the service in country.

Safaricom: Kenyan-based mobile operator Safaricom (part of the Vodafone Group) is hosting the service on the ground in Kenya. They market the service and provide direct support to M-PESA's consumer and business customers.

Sagentia: Based in Cambridge, UK, Sagentia is a technology and product development company that works with clients from needs and market analysis through product design to transfer to manufacture. Sagentia designed, developed, and delivered the M-PESA service.


**Figure 1. Mobile Money Transfer Service M-PESA**

- paying bills, e.g., utility bills;
- receiving payments, e.g., salaries; and
- micro-finance services, receiving and repaying loans.

A low-cost international remittance service is currently being trialed. The service has subsequently been extended to Afghanistan and Tanzania (Figure 1).

## What Is Service Innovation?

### *Creating and Delivering Value*

We are familiar with service innovation examples such as music download, loyalty programs, franchise chains, ticket/check-in kiosks, and online tax returns. Service innovation can be described as a combination of technology innovation, business model innovation, social-organizational innovation, and demand innovation, with the objective of improving existing services (incremental innovation), creating new value propositions (offerings), or creating new service systems (radical or transformational innovation) (IfM and IBM, 2008).

The key components of service innovation can be distilled down to "participative" value delivery; this is summarized in Figure 2.

**BIOGRAPHICAL SKETCHES**

Dr. Stella Wooder was formerly operations director at Sagentia, which focuses on the generation, development, and rapid delivery of innovative services such as M-PESA. She has more than 15 years of experience in technical consulting in telecoms, retail, banking, and pharma. Her emphasis is on application development, databases, business intelligence, predictive modeling, neural networks, and management information systems. She holds a Ph.D. in physics from Imperial College, London.

Steven Baker is a consultant with more than 10 years of senior commercial experience building products and businesses in the high-tech sector. He has held a range of international marketing, sales, and strategy director roles in both spinouts and established firms. His work has spanned the definition, development, and delivery of hardware, software, and service propositions for clients ranging from technology-driven start-ups to tier 1 telecom manufacturers. He holds a master's degree in electrical and electronic engineering, is a Chartered Engineer, and is a member of the IET.

So if the service is considered to be:

- something that may or may not entail physical product delivery or consumption
- a value delivery mechanism that connects the enterprise to the customer
- the combination of a value proposition, a delivery mechanism, and a customer's experience

Then service innovation is simply innovation applied to one or more of the following areas:

- new concepts and/or value propositions
- new delivery mechanisms and/or business models
- new experiences

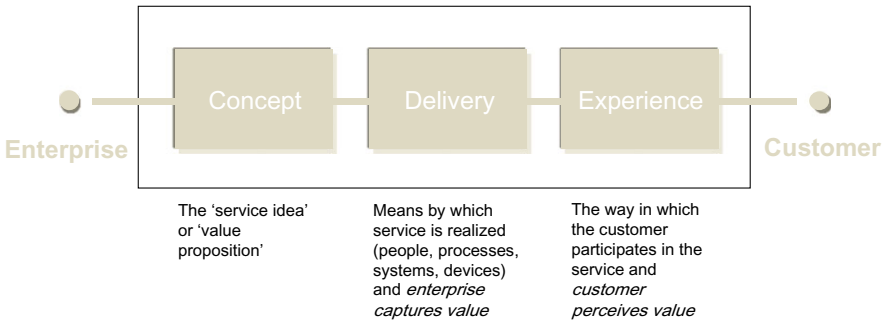


**Figure 2. Service Innovation—Value Delivery**

*A Service Innovation Framework*

Successful service or product innovation encompasses progress from the creative act (the so-called fuzzy front end) to the commercialization act (execution) and beyond that to sustainability and evolution of the innovation.

Our simple framework for service innovation is shown in Figure 3. This outlines the management of an innovation at each step of the service life cycle detailed in Table 1.

## Mapping the M-PESA Case Study to a Service Innovation Framework

We have mapped some of our experiences from the M-PESA program onto each of the key innovation stages of our service innovation framework. This exercise has identified a number of factors at the value creation phase, such as technology used, mechanisms for effective understanding of requirements, and creating rapid pilot populations, which were critical to the success of the program.

It has also helped define approaches to system design, which allowed us to remain flexible and responsive to ongoing requirements and functionality changes in later stages of the service development. Successful service innovation has a strong "ground-up social network" element and engages a broad base of participants. The best uses come from real users—but they need help to scale. We needed to ensure that our framework:

- Had the agility to support new and refined service uses;
- Was able to handle changes and differences in the business model. Not all emerging markets are the same. Customization—extending well beyond merely changing currency and language—needed to be implemented rapidly and easily to reflect the requirements of each new market; and
- Coped with evolving regulatory requirements and sophistication in commercial models.

Other highlights from our work on the project included how the team structure evolves as the project matures.

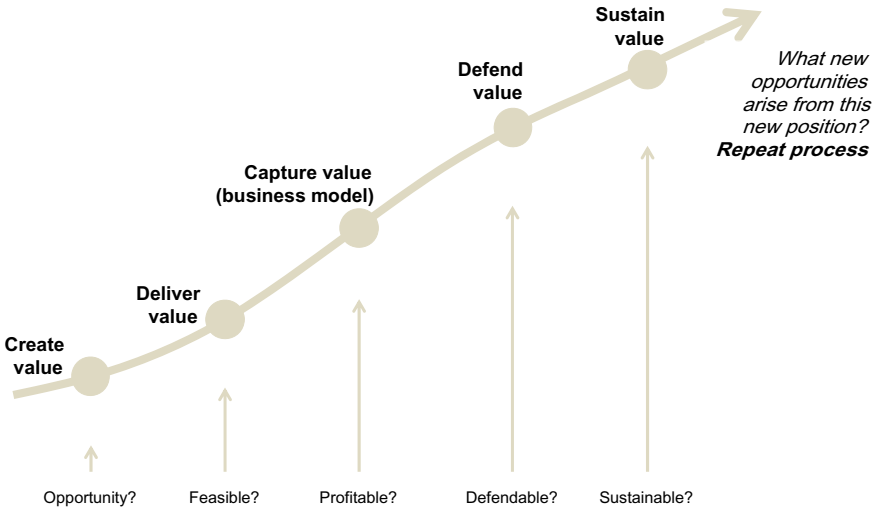


**Figure 3. An Outline Service Innovation Framework**

**Table 1. A Typical Service Innovation Profile**

| Innovation Stage | Description | Tools and Considerations |
|---|---|---|
| Create value | Discovery phase; beginning with the customer, i.e., understanding customer needs and building value around unmet needs. | Proven innovation tools such as day in the life of and journey mapping are effective discovery tools for service innovation.<br>Segmentation can deliver the focus needed to identify specific value-opportunities for particular customers or customer types. |
| Deliver value | Service concept phase; balancing the product and service to provide the right customer offering and the right business model (e.g., using services to differentiate commercial offerings).<br>This proposition stage can involve designing services, business models, technical implementations, and customer experiences that meet real customer needs. | Value net analysis can show clearly what relationships and partnerships can be brought to bear and can also reveal limitations that the enterprise may face in delivering its value proposition.<br>"Functional analysis"—the decomposition of today's products and services into their elemental parts—can reveal unseen capabilities that can be used by the enterprise to deliver the value proposition. |
| Capture value | Having created and delivered value to its customer, the enterprise must be able to understand control points and capture value; this task is essentially embodied in the business model. | "Service world" business models can include leasing, partial ownership, pay-as-you-go, and micropayments in addition to conventional "ownership" and subscription models. |
| Defend value | Develop phase; focus is on rapid prototyping, pilot trial and evaluation.<br>Assembling and managing the network of partners and performing the core development needed to quickly test customer reaction and refine service propositions. | Focus on fundamentals of value delivery, design, and deploy for service adoption. Work out how to trigger the "network effect."<br>Seek partnerships that maximize value delivery and lock out competitors.<br>Deploy loyalty schemes to further enhance value. |
| Sustain value | Deliver phase; involving deploying extensible systems—service innovation is continuous.<br>Preparing for commercial deployment; starting to scale up enterprise-grade service operation, including provision of a full managed service where appropriate. | With new capabilities, customers, and revenues, what new value-creation opportunities are presented? The tools used in the value creation and value delivery phase should be revisited. |

Key insights, viewed in the context of the service innovation framework, are presented in Table 2.

## *Create Value*

M-PESA is a classic example of how the application of existing technology can create an innovative service. The not-so-new short message service (SMS) might be viewed as "old" technology in Western markets. However, "recycling" this old technology allowed a transformational new service to be provided. The advantage of using a mature technology like SMS as the bearer for the service is that very few assumptions are made about the specification of the mobile handset that can be used. M-PESA is therefore accessible on as wide a range of handsets as possible. Importantly for an emerging market service, this included the ability to access M-PESA on even basic entry-level black-and-white display handsets, which were widely available in the markets we were focusing on.

Vodafone's Product manager, having spent significant time on the ground in Kenya, identified another valuable point—the need to keep it simple (Hughes and Lonie, 2007). Sagentia's experience in earlier projects has shown that innovative service development does not have to involve complex functionality or features from day one of the service launch. Ensuring there is a clear market-validated proposition is a key innovation step. In moving from pilot to commercial launch, a significant amount of the complexity was removed from the M-PESA system. This resulted in a "lighter" product to test and for users to subsequently acceptance-test. It also meant a "leaner" consumer proposition to take to market.

## *Deliver Value*

One of the most difficult aspects of delivering a new service is acquiring enough users to run a meaningful pilot from which feedback can be captured and the likely success of a commercial launched service gauged. In short, the service is not meaningful to prospective customers if there are no other users. But how do you acquire a critical mass of users in the relatively short time in which the pilot is conducted?

A significant contribution to the success of the M-PESA proposition was the use of Safaricom's existing

**Table 2. M-PESA and the Service Innovation Framework**

| Phase | Insight |
|---|---|
| Create value | The "cost of cash" in Kenya is high. Huge value will be created if the risk of cash handling can be greatly reduced. |
| Deliver value | Safaricom had two key assets to deploy. First, they had the operational ability to handle nationwide cash distribution through the existing network of airtime sales agents; traditional banks were unable to compete with the reach of such a network. Second, they had the technical ability to effect highly secure communication links between subscriber handsets. Taken together, Safaricom had unique control of two fundamental enablers for a nationwide money transfer service. |
| | Another significant factor was the use of a relatively small amount of "seed" money to put in place a team with the capability and skill to establish quickly where the value lay and to get a working service to the customer in a short time scale (N. Hughes, personal communication, May 2009). |
| Capture value | The mobile money transfer business model was designed to drive two important behaviors: (1) agents must be motivated to participate in the service to ensure effective cash management and (2) users must be motivated to adopt the service to trigger the "network effect" by which the service becomes increasingly useful as more users adopt it. The model also included the ability to deliver value to nonusers of the system as an additional means of driving adoption. |
| Defend value | The feature set for service launch was chosen to maximize value delivery. Indeed, it was pared back from the feature set that was initially offered in the pilot trial. Every feature was valuable to users, resulting in an offer that had high and immediate customer appeal. |
| | "Defending" value is by no means a "static" process. An iterative exercise was followed that teased out where the commercial value could be generated in the short term. The successful "send money home" proposition was identified, but only through separating out the core attributes of MFI loans (secure, fast, and convenient value transfer) and applying these to a peer-to-peer model. All in all, a high degree of agility was required in this stage of the innovation framework (N. Hughes, personal communication, May 2009). |
| Sustain value | Having established a valuable service and grown an enthusiastic customer base, scalability and extensibility of the M-PESA platform came to the fore, as new services could readily be added. The system could be enhanced by including utility bill payment, ATM cash withdrawal, and even international remittances. Such services could be delivered profitably once a user-base was established, further enhancing value delivery while at the same time raising the competitive bar. |

MFI, micro finance institution.

airtime reseller network to provide the on-the-ground activity. This included registering new customers and acting as the source for customers to make cash deposits and cash withdrawals. This network of resellers—several hundred in number—sell prepaid airtime, mobile phones and mobile phone accessories, and other goods. Using the "ready-made" airtime reseller channel was the route to ensuring that a significant customer population size for both the pilot stage and the fledgling service was achieved quickly.

Repeated training sessions were carried out with the newly appointed M-PESA agents. Vodafone's product manager spent extended periods of her time visiting the agent stores each day, helping them implement and work the M-PESA service. One significant stumbling block that was overcome in training was persuading agent assistants to withdraw cash from the till, to give to customers on the basis of a text message instruction!

Another substantial contribution to the success of the project was using a relatively small amount of "seed" funding to put in place a "crack" team that got quickly to where the value lay. This sort of project costing profile is not common in large companies. Often, large companies invest a lot of money on massive projects that do not get to the customer anywhere near as soon—and often fail as a result. In this case, Vodafone used a small amount of money to get something out there quickly. However, the downside risk of such an approach can be the "catch-up" investment needed to "industrialize" the rapidly developed service (N. Hughes, personal communication, May 2009).

### *Capture Value*

An important factor in launching a money transfer service such as this in an emerging market is coverage, particularly in remote and poorer areas. How should companies provide agent retail outlets with appropriate point of sale (POS) devices to allow them to service M-PESA customers? Traditional POS devices are expensive to acquire and to maintain, a level of investment that would be difficult for many agents to justify. The solution was to provide the dealers with a mobile handset with a modified menu customized to their needs. A basic-level handset was a low-cost solution to allow agent resellers to participate in the service.

In the early days of SMS, users could only send text messages to and receive messages from users on the same

mobile network. The subsequent move to interoperator SMS, i.e., sending and receiving messages across different mobile networks, helped drive the growth of SMS.

Similarly, M-PESA allows registered users of the service to send money to any mobile number. Phone users not registered for the M-PESA service, even users on other mobile networks, can receive money via M-PESA. A significant number of unregistered users subsequently go on to register for the M-PESA service. The transaction history of this migration shows that this type of "viral marketing" is effective in driving the growth of the service.

### *Defend Value*

One early decision that Vodafone needed to make was whether to buy an off-the-shelf product or to design and build from scratch. There are potential financial services software solutions that could provide much of the functionality required—the easiest option would be to buy a commercially available product. However, the existing financial platforms were limiting in a number of ways.

Commercial financial services platforms are primarily designed to be integrated with Western banking infrastructures. Functions and features are added to provide additional aspects such as mobile or Web-based interface and delivery capability. This software essentially provides an "additive" banking approach, i.e., an enhancement or extension to existing services, for example, by adding a new channel for customers to access their bank accounts (Jackson, 2009). For a number of reasons the M-PESA proposition required a subtly different software approach:

- This was not an adjunct to a banking service but a transformational banking service, the extension of banking and payment services to consumer segments outside of the banking services structure, i.e., to those without credit/debit cards or bank accounts; and
- This was an MNO-centric solution, not banking organization led. Functionality would need to integrate with MNO working practices and services such as prepaid airtime. MNO business is based on high volumes of low-cost transactions (i.e., low average revenue per user) rather than the high-margin, relatively small transaction volumes business that defines conventional banking services in emerging markets.

In addition, the user experience needed to be mobile telecom focused. The customer base was mobile phone users rather than banking service customers. They needed a service that had the familiarity and the immediacy of the mobile phone services they were used to. The decision was taken to build from scratch.

Having made the decision to build from the ground-up, there is a need to make sure that what has been built will cover all of one's needs.

Trialing, refining, and iteration is required to realize the true value of a created service innovation. Significant work gathering feedback and the subsequent adapting of the pilot needs to be undertaken.

The original proposal for the M-PESA service was to provide Kenyan Micro Finance Institutions (MFIs) with an efficient mechanism for the repayment of small loans by customers, specifically the ability to manage repayment using mobile phones for money transfer (Morawczynski, 2009). An early pilot was run with a local MFI organization which enabled the behavior and transaction patterns of customers to be analyzed. A number of revealing observations were made (Hughes and Lonie, 2007):

- People were effectively using airtime as currency, i.e., sending airtime purchased using M-PESA to friends and relations in rural locations; and
- Most Kenyans made similar transfers (i.e., from city/town to rural locations) using cash. These money transfers were made via a number of informal channels (e.g., family and friend networks, bus and matatu companies ["matatu" is a slang word for small transport vehicles such as mini-buses]). Perhaps not surprisingly, money and goods often failed to reach their intended recipient when these *ad hoc* methods were used.

Safaricom saw a gap that could be fulfilled with a "send money home" proposition. Sagentia was able to modify its design rapidly to meet the needs of this modified proposition.

### *Sustain Value*

As the technical service provider, Sagentia has understandably focused most of its innovation effort on the functional translation, design, architecture, and implementation aspects of the M-PESA Service. Most of this innovation has come about as a result of needing to:

- Deal with the lack of a roadmap and clear requirements in the early stages of the project;
- Reflect ongoing changes in business process in the architecture and functionality; for example, to respond to changes requested by the regulator in various

markets as they began to understand the implications of the service; and
- Respond to significantly larger than forecast levels of growth in customers using the M-PESA service.

Much of the technical innovation is buried deep in the service product; its subtleties are not always obvious. This section extracts some of these interesting if not novel approaches and examines their impact on the progress of the M-PESA service.

*Managing Near-Real Time Transacting.* A mobile-based money transmittance service like M-PESA allows money to be transferred almost instantaneously, at the speed of an SMS text message. In fact, users' expectations have been set by their texting experience, in which a response in more than 16 seconds is too long. This near-time transacting results in technical challenges that are perhaps not commonly experienced in services delivered by traditional banking infrastructure.

The underlying transaction model has been developed to manage transactional events according to the "context" of the message. In a handset-initiated transaction, the user will select the "send" option on the handset to submit a request (such as a "buy airtime" instruction) and will receive an acknowledgment within seconds. In the background, a number of activities relating to the transaction will occur (for example, to establish a connection with the airtime interface, check the validity of the transaction—is the customer authorized to make this request? Is his or her account still live? Is there sufficient credit? Will this transaction exceed the number of allowable transactions for the day?). The separate components of a single transaction request may sometimes take hours to complete their journey. However, from the customer's perspective the transfer of airtime will have happened almost instantaneously.

*Dynamic Mobile Menus.* The mobile handset is an integral part of the M-PESA proposition, for the consumers of the service and also for the agent resellers. For the consumer managing their account, customer, deposits, withdrawals, buying airtime, etc. are all carried out using menus displayed on the mobile phone. Agent resellers have mobile phone menus adapted to support different activities from those of the consumers; to be able to register customers and manage the store's M-PESA accounts, for example.

In one version of the M-PESA development, customers and agent resellers use an application that sits on the SIM card to access and use M-PESA. This application is tailored to the user, so they see what they need to see to use the service. However, rather than produce different SIM applications for the different types of user, consumer, or agent reseller, a default menu is provided on the SIM card. When the user accesses the M-PESA

**Table 3. Project Team Dynamics, Observations, and Challenges**

| Phase: | Start-Up | Maturing | Steady State |
|---|---|---|---|
| Characteristics | Small-focused team.<br>Entrepreneurial culture provides "ground-up" development of service.<br>Multitasking, scale on demand approach.<br>High degree of innovation during this stage. | Introduction of distinct project structure to reflect functional areas (e.g., development, deployment).<br>Begin to move away from *ad hoc* approach while maintaining fast reaction capability.<br>Project Office set up to deal with day-to-day planning, budgeting, and operations of the program.<br>Project managers and Super Users are key internal and external interfaces.<br>Build in service wrappers for steady-state (global provision) operations. | Mature, turn-key solution stage.<br>"Black box" approach to development and deployment.<br>High degree of heterogeneity; dedicated roles within functional areas. |
| Observations and challenges | Bias is heavily toward agility rather than process.<br>Many-to-many external communications—with a focused, small team communications remain clear and effective.<br>Development of deep technical product specialism. | Operations/maintenance of launched markets becomes key driver of process maturity.<br>Inefficient knowledge transfer from small to large team due to pace of the project.<br>Difficult to share knowledge across functional teams; reliance remains on a core cross-section of individuals.<br>Larger team—increased risk of confusion with external (and internal) communications. Project managers need to act "independently" but within constraints to ensure process and communications are maintained.<br>Effort to automate processes traded with rapid rollout requirements. | High degree of scripting, dependence on tools and automation of processes; this may lead to too much abstraction from system. |

service for the first time, the application will be configured and the user will receive the appropriate handset menu for them.

*Structure to Deliver.* During the life cycle of a service, the project organization and processes need to evolve, moving from a fast-moving, lean entrepreneurial structure (and culture) to one that is structured to execute a fast-to-market service. Our experience has been that this is one of the hardest transitions to make. The team dynamic over the course of the project and the key observations and challenges we encountered are outlined in Table 3.

## Lessons Learned

We have offered an outline of Sagentia's service innovation framework. Its purpose is to allow the management of an innovation at each step of the service development, i.e., from the discovery stage through to creation, delivery, and sustainability stages.

Mapping our M-PESA project experiences to the framework has allowed us to abstract valuable insights, which will be used to inform and refine each of these service innovation framework stages. Key lessons that were highlighted by our experience with M-PESA include:

- Learning in a detailed sense the needs of users in new markets and ensuring that it is possible to implement these needs and requirements as part of a pilot process;
- "Keeping it simple"; particularly in the early stages of the service, it is important to focus on a small set of compelling, marketable functions and features;
- Ensure that flexibility and agility, the ability to react and to respond to changes in the business model, are designed into the system; and
- For a service to succeed, it requires a critical mass of users as soon as possible; identifying mechanisms to motivate users to take up the service is an important part of the service innovation process.

The results of the study cannot claim to be generally applicable; however, it has allowed the "usefulness" of the conceptual stages in the service innovation framework to be empirically tested in a real-world example, and the vulnerabilities and strengths are better understood as a result.

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