



Mobile in Retail

Getting your retail environment ready for mobile

A GS1 MobileCom White Paper



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1 Executive Summary

We live in a mobile world

More than 4 billion people – over half the planet – are equipped with mobile phones. Today, many people are moving from ordinary mobile phones to internet-enabled smart phones as powerful as computers. Consumers now are using these smart phones to:

- create and store shopping lists
- scan product bar codes to compare product characteristics
- access coupons and promotions

And that's just the tip of the iceberg; only the imagination limits the services that could be available. Physical retailers and product manufacturers now have a unique opportunity to shape how consumers experience these new technology possibilities.

This white paper is designed to give you the information you need to take full advantage of mobile both within stores and across the other channels you use.

Good for consumers

For consumers, mobile has the potential to:

- **Make life easier.** Mobile services integrated into the shopping experience – such as self-scanning and mobile payment – help consumers to get what they want more quickly. Even simple services such as mobile shopping lists can help consumers manage their lives better.
- **Make life more meaningful.** Giving consumers the right information and tools at the right time helps them to make good choices. Mobile services like extended packaging allow consumers to choose products that are aligned with values such as health and well-being, respect for the environment and ethical choices.

Good for business

By using mobile technology to meet consumer needs for information and services, retailers and product manufacturers can:

- **Increase sales.** There is a clear link between relevant information provided at the point-of-sale and purchase decisions. Put simply, better information means more sales.
- **Increase customer satisfaction and loyalty.** Consumers will reward those businesses that best meet their needs for information and services. Mobile allows increased personalisation – meeting consumer needs even better.
- **Add value to physical products and experiences through digital services.** As consumers spend increasing amounts of time online, mobile can become the “glue” that ties physical products and stores to the digital world.



Mobile Services: how consumers can interact with retailers

What next?

To take full advantage of these opportunities, retailers need to ensure that they understand the strategic role that mobile will play in their organisation and then assemble the right mix of people to ensure that strategy is well executed.

Identify the people in your organisation that need to be involved and share this document with them. It will help you define:

- The ways in which mobile can **improve consumer experience** inside and outside stores
- The range of **technology choices that are available** today and in the future
- The **investment decisions that need to be made** to benefit most from mobile technology

The Recommendations in section 5 will give you more specific paths to follow to ensure you benefit the most from using GS1 standards.

Join GS1 MobileCom

GS1 MobileCom is a cross-industry initiative involving manufacturers, retailers, mobile industry companies and solution providers. Its goal is to ensure:

- all consumers to have access to trusted product information and related services via their mobile phones
- all stakeholders to use open standards to make this possible and so ensure interoperable, scalable and cost-effective applications
- collaborative mobile commerce applications to be enabled by an open infrastructure.

Members of GS1 MobileCom developed this White Paper.

To join, call +32 2 788 78 00, e-mail mobilecom@gs1.org or visit www.gs1.org/mobile

2 Introduction

Terms like *mobile commerce* and *mobile marketing* have created a huge buzz. If businesses could use mobile phones to reach consumers anytime, anywhere, it would fundamentally change how they do business.

However, today mobile still represents a tiny channel for most companies. Juniper Research estimates most consumer products companies spend less than 1% of their total advertising budget on mobile.

This will change; and the change will likely be even faster and more dramatic than the initial wave of mobile phone adoption that today means over 4 billion people use a mobile phone. The success of Apple's App Store, providing mobile applications for the iPhone, shows how quickly technology can be adopted by consumers.

This white paper explores how consumers equipped with modern mobile phones connected to the internet will impact retail stores and how anyone making, promoting or selling products in a brick and mortar retail environment can prepare for it. Some of the questions we seek to answer are:

- What consumer needs can be identified and met using mobile phones in retail environments?
- How can mobile phones support richer, more enjoyable, more efficient and more relevant shopping experiences?
- What changes need to happen in retail stores to support this?

Experts say that retailers change their point-of-sale terminal installations every 5 – 7 years on average. This means that mobile technology must integrate with existing infrastructure to be accepted by retailers and that investment choices made by retailers today must have a long-lasting impact.

However, research conducted by RIS in 2009 showed that only 30% of retailers had a mobile commerce strategy in place. This white paper aims to give the right level of business and technical information for brands and retailers to make the right strategic decisions around mobile and for the mobile industry to understand where the retail sector wants to take mobile.



Our 2008 “Mobile Commerce: Opportunities and Challenges” White Paper looked at the potential for mobile technology to change the way that businesses and consumers interact. It identified a number of characteristics of mobile technology that we believe will drive more personal and direct interactions and will support what the Global Commerce Initiative has called “shopper dialogue”. The main conclusion was that open standards are foundational to driving the vision that consumers will use their mobile phones to link the physical and virtual worlds anytime, anywhere.

Download the White Paper at www.gs1.org/mobile/wp

How is this white paper structured?

This white paper contains three main sections:

- **The retail store – a vision for the future**
Explores multiple ways in which the shopping experience can be improved with a mobile component.
- **What's possible today?**
Shows what options are available today and why limitations exist. Suggests which mobile services to prioritise and the impact on retail infrastructure.
- **How to make it happen**
Gives recommendations and next steps for all those stakeholders to get to the future state as soon as possible.

How was this white paper developed?

GS1 facilitated interaction between brands, retailers and mobile industry companies to explore the questions above and document the answers in a coherent form that represents the needs of each stakeholder. A full list of participating companies is available on the back cover of this document.

What is the audience for this white paper?

This white paper is intended for anyone involved in mobile commerce value chain. In particular, it is aimed at marketing, innovation and IT employees of retailers and manufacturers as well as mobile operators and solutions providers interested in the use of their technology in the retail sector.

About terminology

We've tried to avoid as many technical terms as possible. *FMCG* (Fast Moving Consumer Goods), *CPG* (Consumer Packaged Goods) and *Grocery* are used interchangeably. *Retail store* is used throughout this document as a generic term for any store format where FMCG are sold, but particularly supermarket and hypermarket formats. *Consumers* and *shoppers* are used interchangeably. *Application* is used to describe software installed on the mobile phone that interacts with the network to deliver a service to consumers. *Point-of-sale terminal* and *checkout* are used interchangeably. *1D bar codes* is used to mean linear bar codes from the EAN/UPC symbology family. *2D bar codes* is used to mean non-linear matrix bar codes. *Mobile bar codes* is used to mean bar codes that can be read by mobile phones (using the camera on the mobile phone and software to decode the content of the bar code). *RFID* and *contactless* are used to refer to any technologies using radio frequency to transmit data. All GS1 related terms are explained at www.gs1.org/glossary/.

3 The retail store: a vision for future

Most retail stores are complex environments that have developed gradually over the past fifty years. There are two levels to that complexity.

Firstly, the move to the self-service format from the service format that preceded it was a massive cultural change. For consumers, self-service meant choice, convenience and value. However, it also involved learning how to find their way around a new environment. Over the years, retailers have learned how to design that environment to better meet shopper needs and to drive sales. A large amount of literature is available to describe industry best practices in this area.

Secondly, the technical infrastructure that supports most retail stores has grown enormously. In the 30 years since the first GS1 bar code was scanned, complex IT systems have developed as retailers have automated processes to drive efficiency and to gather data to better inform business decisions. The point-of-sale terminal, with its integrated bar code reader and its ability to handle multiple payment methods, is the most visible aspect of this infrastructure; and the one most likely to touch consumers. As a result of these technology choices, consumers benefit by getting what they need more easily or leaving the store more quickly.

Retail touch points

To understand how mobile technology can be integrated into retail stores, we've identified a number of consumer touch points that most retail stores have today. These are the places that consumers interact with the store and are listed below:



Retail Touch Points: how consumers interact with retailers

Mobile Services for Consumers

In the future, all of these touch points could have a mobile element. From our work in the mobile space, we can identify the following emerging applications that will enable shoppers to have richer interactions:



Extended Packaging

Consumers access additional information about products through their mobile phone



Coupons

Mobile phones used to capture, manage and redeem coupons and discounts



Loyalty

Mobile phones replace physical loyalty cards and provide personalised mobile services



Advertising & Promotions

Advertising and promotional information is sent directly to mobile phones



Payment

Mobile phones are able to make payment anywhere, anytime including at retail checkouts.



Self-scanning & Self-checkout

Consumers in supermarkets use their mobile phone to scan products as they do their shopping, enabling them to check out without assistance.



Store Location

A map is displayed on a mobile phone showing where stores are located where consumers can buy a product



In-store Navigation

Consumers find products more easily while in a store



Shopping Lists

Consumers can build a shopping list on their mobile phone and access it when doing their shopping



Mobile eCommerce

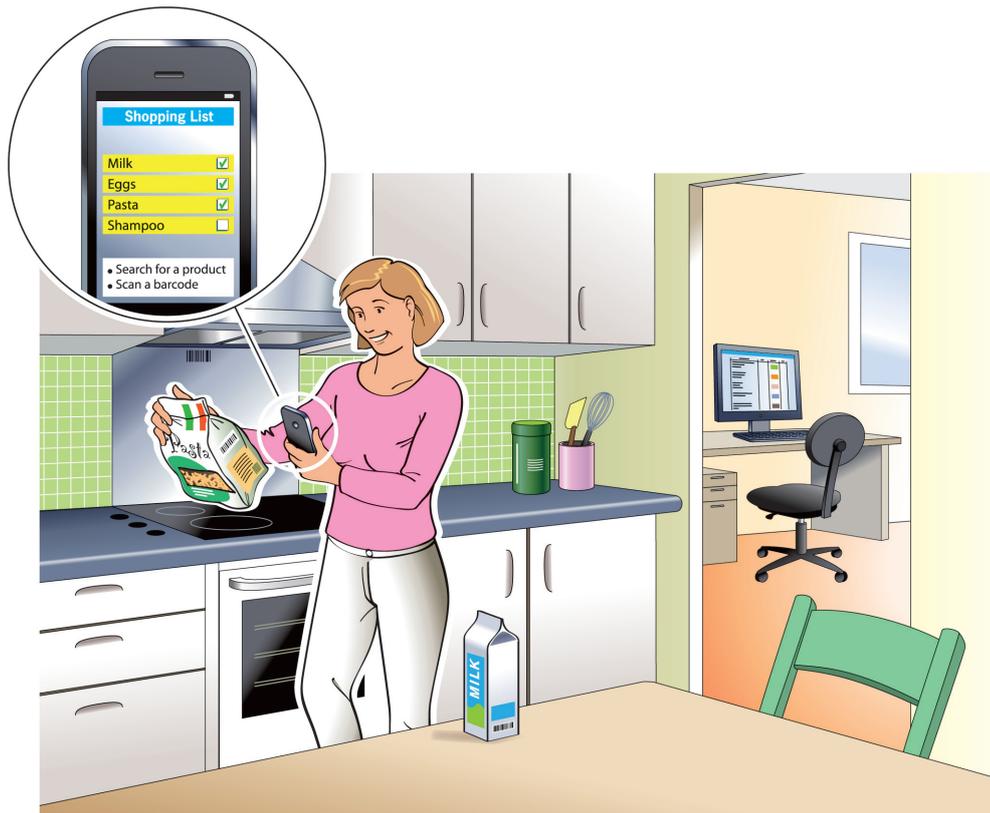
Consumers can browse, order and pay for products directly from their mobile phone, anytime, anywhere.

In addition, many of these applications can be combined either with other channels to create seamless cross-channel experiences or with each other to create integrated digital experiences. Integrating the location of the consumer provides another dimension that can further enhance relevance of these applications. For more information about the applications listed above, see our *Mobile Commerce: opportunities and challenges* white paper (www.gs1.org/mobile/wp)

Consumer journey through the mobile-enabled store

With its expertise in standards for the supply chain based on identifying products and services uniquely, we believe GS1 can play role by providing standards for most of the services above. To help you understand how these services can become part of the retail environment, we've developed an imaginary journey though the store of the future.

Pre-store planning



At home, consumers can:

- Plan their future shopping trip via their PC and/or mobile phone
- Use their mobile phone to easily add items to their shopping list by scanning bar codes on products

On the go, consumers can:

- Easily add items to their mobile shopping list when they think of them
- Share their mobile shopping list with other family members
- Request and receive relevant coupons and promotions (either directly or through interaction with out-of-home advertising)

Outside store

Consumers can:

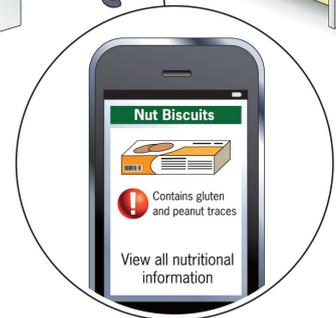
- Get information about special offers before going into the store
- Get additional information that can shape their shopping trip (such as recipes and recommendations)
- Get coupons and promotions



In the aisle/at the shelf

Consumers can:

- Self-scan items as they are added to the basket
- Get more detailed or personalised information about products using extended Packaging
- Gather in-store coupons and reductions
- Order products that are out of stock
- Add additional items to shopping list or wish list
- Interact with digital signage in-store using their mobile phone as a “remote control”



Checkout

At the checkout, consumers can use their mobile phone to:

- Self-checkout
- Redeem coupons and promotions
- Pay
- Identify themselves and get access to loyalty scheme benefits
- Store points and redeem offer linked to a loyalty scheme



Many of these individual capabilities are already feasible; however the full vision of a mobile-enabled retail store is not yet in place. It captures what would be possible in the future if certain mobile technologies achieved mass consumer penetration and if retailers were able to invest in exploiting the opportunities that each of these technologies offers.

Retailers and product manufacturers must start working on mobile now to shape the technology and not be overtaken by rapid changes. The following section explores what is possible today and how we expect these technology options to develop in the coming years.

4 Current services and their development

In most markets today, all the services described in the previous section are possible in a real-world environment. However, there are a number of limitations to bear in mind:

- **not all consumers** are equipped with mobile phones or subscription plans that enable them to take advantage of all the services described
- differences between handsets and networks can mean **high costs** to develop services for a large number of consumers
- use of **proprietary technologies** makes integration with existing systems difficult and costly
- differences in **supporting infrastructure** in retail store are a barrier to mass market rollouts

As a result many implementations today are limited in scope. They:

- are offered at a local level (sometimes involving just a handful of stores)
- target only a limited group of tech-savvy consumers
- happen in one country rather than multiple countries
- involve one brand rather than multiple brands
- are at pilot stage rather than being fully operational
- are disconnected from other similar initiatives within a company
- are confusing for consumers who need to learn multiple ways to use technology to achieve similar goals

The participants in the GS1 MobileCom initiative want to see the benefits from this technology being available to all.

Forecasts

This section shows the situation today and in the future for the applications considered in this white paper.

Application	Today	Future	Next Steps
Extended Packaging 	<p>Mainly available on camera phones with a data connection via downloadable applications</p> <p>Some SMS-based applications exist. A few retailer implementations are already on the market (see Appendix II for more details)</p>	<p>More robust and more integrated services</p> <p>Phones will more commonly come with pre-loaded bar code scanning software</p> <p>Standard ways to access trusted product data</p> <p>Personalised services based on consumer preferences</p> <p>Integration of brand and retailer initiatives due to open standards</p>	<p>Companies using existing standards to get started</p> <p>Standards for bar codes on shelves and displays.</p> <p>Standards/foundations for product information exchange</p>
Coupons 	<p>Retailer only and brand-to-retailer trials using SMS, bar codes and RFID</p> <p>Basic POS integration</p> <p>Lack optimised systems to redeem coupons by a mobile display at POS</p>	<p>Brand and retailer integration</p> <p>Interoperability with POS, loyalty, shopping list, personalisation capabilities and location-based services</p>	<p>Understanding consumer preferences. Develop business case and standardisation project in GS1 MobileCom to enhance the reconciliation process.</p>
Loyalty 	<p>Some proprietary solutions available</p>	<p>Loyalty schemes that are fully integrated into mobile phones</p>	<p>Explore need for standards in this area</p>
Advertising & Promotions 	<p>Significant activity but normally only involving individual brands</p>	<p>Initiatives driven by brands and supported in-store by retailers</p>	<p>Explore benefits of open standards based on work around Extended Packaging</p>
Payment 	<p>Mostly via RFID in Asia, but a few implementations in Europe (see Appendix II for more details)</p>	<p>Payment integrated into both the functionality of the phone and the habits of consumer</p> <p>Full integration with checkout and also other areas of store (such as vending machines)</p>	<p>Will become a reality globally as phones are enabled with RFID technology</p>
Self-scanning & Self-checkout 	<p>Local implementations</p>	<p>Advanced development of in-store information networks to support this and other functionality</p>	<p>Improvement of performance and interoperability with handsets and store systems</p>

Store Location



Available today through certain applications.

Often a quick win for retailers to provide

More integrated approach to store location, product availability and mobile shopping

Store location used as part of other applications

Develop services for consumers that enable stores to be easily located

Explore need for standards in this area

In Store Navigation



Available in a simple way (store plan available on mobile phone)

Integration with in store apps (Mobile Shopping, Self-Checkout, Shopping Lists)

More "intelligent" applications based on planograms and shelf adjacency data

Consumer access to stock information.

Explore basic ways of helping consumers to find what they need in-store

Shopping Lists



Retailers experimenting today

Extending web capabilities like wedding lists

Many firms see these as the glue to integrate many mobile apps around the shopping experience

Further developments such as integration with social networks and better standardised taxonomies for shopping categories

Individual applications must become more robust before they can be linked to shopping lists

Mobile eCommerce



Mostly via online retailers

Limited in-store capabilities

Consumer will be able to locate, order, and buy products using their mobile devices

Needs to be integrated with the ecommerce site and consumer loyalty information/profile

Retailers and product manufacturers to explore evolving business models

5 How to make it happen

Key drivers for technology adoption

We believe the complete technology package to support these applications will be within reach of all consumers in 3 – 5 years, although with certain regional differences. For this to happen, the following drivers are essential.

Mobile Internet

Consumers are in a fundamentally different position thanks to the internet. The internet has given them access to a huge amount of information that was previously either difficult to access or simply didn't exist. Successful e-commerce sites like Amazon have thrived not just by establishing an efficient order fulfilment mechanism online and offline, but also by creating customer-generated content, such as reviews, around the products they sell. Mobile internet gives consumers access to the information they need when they need it, and supports access to data that drives the applications described here. The mobile industry's Long-Term Evolution (LTE) strategy to move to mobile broadband access will support richer services, an even better customer experience and enhanced branded opportunities.

Consumer Experience

Consumer behaviour changes when they have access to technology that is easy and intuitive to use. Despite its low market share, the iPhone has had a huge influence here. By creating a mobile device that is easy for consumers to use where internet usage is central to the experience, Apple has changed how we think about mobile internet. Research shows that iPhone users use their phones to access the internet 5 times more than users of other internet-enabled phones. This means that we appreciate the power of personal applications to be used in everyday life including retail experiences. Placing consumer experience at the centre of any offering is key to success.

Open standards

Open standards provide the foundation for scalable, interoperable services. As Thomas L. Friedman says in *The World is Flat*, "once a standard takes hold, people start to focus on the quality of what they are doing as opposed to how they are doing it". The GSM standard is at the basis of having mobile phones that support roaming and many other services we take for granted. Standards will also be able to support measurement which is essential for marketers. We need to move from a fragmented market to a standards-based market to enable true competition and to benefit from the resulting growth.

GS1 is working with other organisations such as the GSM Association (GSMA) and the Open Mobile Alliance (OMA) to ensure that industry initiatives are aligned.

The GS1 system of standards is widely used to manage the flow of goods and information through the supply chain. The embedded nature of this system ranges from bar codes on product packaging to software on supermarket scanners to integration with Enterprise Resource Planning (ERP) systems. We recommend leveraging the use of open GS1 standards to the maximum to ensure efficiency and cost savings. For the same reasons, we also encourage the industry to promote the use of open standards in supporting technologies such as mobile handsets and networks.

Industry Collaboration

The primary focus of the GS1 MobileCom group is to enable brands, retailers, mobile operators, handset manufacturers, software developers and solution providers to work together. The applications described in this White Paper will only become pervasive when all stakeholders shape the vision of the ecosystem that supports them. To shape this vision and make it reality, businesses must ultimately collaborate and find ways to share information efficiently right down to the consumer.

The main differentiating factor in this ecosystem is the fact that information has value. Whether it be information about products, transactions or consumers, the success of the ecosystem is based on the ease with which this information is allowed to flow through the system. This is one of the primary benefits of using open standards. To do this, businesses need to work on new business models that have the success of the ecosystem as a component. This approach grows the pie for everyone and provides a framework within which healthy competition to take place and where companies differentiate on the basis on the value they add.

Recommendations

The goal of these recommendations is to suggest concrete actions that can help bridge the gap between the situation today and the dream of a mobile-enabled retail store.

General recommendations

- Ensure that consumers receive clear information through clear disclosure practices
- Fully respect consumer rights for privacy, preference and informed consent and enable consumer empowerment
- Adhere to all legal frameworks and best practices appropriate to markets where you operate and participate actively in the development of new best practices and guidelines
- Ensure that intellectual property (IP) is well-researched
- Collaborate with other stakeholders to fully understand business and consumer issues and to create a value chain where all can benefit

Retailers

- When you are considering upgrading scanning equipment, actively consider equipment that can handle mobile technology appropriate to your volume (Appendix IV gives further details)
- Also consider other code integration possibilities such as code entry via keypad (near term) and contactless technologies (longer-term)
- Use the GS1 Global Data Synchronisation Network (GS1 GDSN®) and GS1 Master Data Standards to access trusted product information for mobile applications
- Directly populate, and encourage your suppliers to populate, the GS1 GDSN with product data using GS1 Master Data Standards

Product Manufacturers

- Use GS1 Identification Keys to identify products and services
- Encode GS1 keys using GS1 bar codes according to specifications for application environments
- Use existing bar codes on products as an entry point for product information. If you think other bar codes on products are needed work with GS1 to get advice on standards to follow.
- Populate the GS1 GDSN with product data using GS1 Master Data Standards

Mobile Operators

- Maximise coverage and stability of internet connections to encourage consumer use
- Actively explore business models to support delivery of content using standards-based mobile bar codes
- Adopt open standards to ensure universal access to applications regardless of network
- Explore how personalisation based on knowledge of subscriber attributes or location can add value to content
- Actively support preinstalled software in handsets in market to read and display GS1 standard bar codes

Handset Manufacturers

- Mobile phones should have the relevant combination of optics and processing power to be able to **read and display** GS1 standard 1D and 2D bar codes. This capability should be delivered to consumers **out of the box**
- Explore possibility to **store** GS1 standard 1D and 2D bar codes and related content
- Support web standards to ensure accurate transfer and display of content

Other solution providers

- Ensure that all bar code reading software can read GS1 1D and 2D bar codes
- Use the GS1 GDSN to get product data for mobile applications

Conclusion

There is huge potential to be gained by integrating mobile technologies into retail and specifically into in-store environments. To build on the information in this white paper, we recommend the following next steps:

Research

Find out what your competitors and other industries are doing. Use the GS1 Mobile Commerce White Paper (available from www.gs1.org/mobile/) as a starting point. Good sources of information to understand the current market activities are www.mobilemarketer.com and www.mmaglobal.org.

Coordinate

Identify and empower the people your organisation needs to ensure that the work you are doing is aligned with business objectives and has senior management support

Experiment

Identify which mobile applications will best support your business strategy and get experience with them in the next 12 months by organising pilot activities in appropriate markets. For example, the GS1 Extended Packaging Pilot Handbook can guide you through implementation of Extended Packaging scenarios. It is available from www.gs1.org/mobile/ephb/.

Collaborate

Find the right partners. GS1 encourages joint initiatives involving brands and retailers. Identifying the right technology partners is also important.

Lead

Joining the GS1 MobileCom group is an excellent way to lead industry developments in this area and ensure that the needs of the retail environment are fully understood and supported by the mobile industry. Find out more at www.gs1.org/mobile.

Appendix I Technology Enablers

All of the mobile applications identified in this white paper rely on a number of technology enablers. These are listed and described below:

Identification Keys

Identification keys are unique numeric codes used to identify anything from products to services and locations. For the applications discussed in this document the GS1 Global Trade Identification Number (GTIN) is essential to ensure unique identification of products. More information about GS1 Identification Keys is available at www.gs1.org/idkeys.

Bar codes

Bar codes can be used to store identification keys and other data. Using the camera integrated into most mobile phones, software on the mobile phone can decode the bar code and look up relevant information. Bar codes can be displayed on products, shelves, displays, loyalty cards, or even a mobile phone screen. GS1's EAN/UPC bar code standards are used today for the placement of linear (1D) bar codes on product packaging. Given the level of interest in two-dimensional (2D) bar codes for certain applications, GS1 is assessing the business needs and corresponding standards recommendations for 2D bar codes via its Multiple Bar Codes Work Group. The Position Paper on Mobile Bar Codes gives the initial position of this group, based on limited data (www.gs1.org/mobile/mbpp). More information about GS1 bar codes is available at www.gs1.org/barcodes.

RFID tags

Like bar codes, RFID (Radio Frequency Identification) tags store identification keys and other data. An RFID reader is needed to decode an RFID tag. GS1's Electronic Product Code (EPC) standards define identification of objects using RFID tags. Additionally, there is significant interest amongst retailers in contactless cards and, for the future, in Near Field Communication (NFC) capabilities in mobile phones, especially to enable efficient and secure payment. More information about GS1 EPCglobal is available at www.gs1.org/epcglobal.

GDSN

GS1 GDSN® (Global Data Synchronisation Network) is an automated, standards-based global environment that enables secure and continuous data synchronisation, allowing trading partners in the supply chain to have consistent item data in their systems at the same time. In the future, GS1 GDSN could be a key source for product data delivered to consumers. More information about GS1 GDSN is available at www.gs1.org/gdsn.

GEPIR

The Global Electronic Party Information Register (GEPIR®) is a distributed database that contains basic information on over 1,000,000 companies in over 100 countries that could be extended through cascading to further information providers or to more granular information about products. For more information, visit www.gepir.org.

Internet connection via operator network

Internet connections are available today on most operator networks. Speed varies widely but is currently acceptable to support all of the applications described here. Today, cost is the main barrier to adoption among a wider range of consumers. Markets with high numbers of mobile internet subscribers tend to have moved to a flat-rate deals where subscribers pay a single fee rather than paying for data as they use it.

Internet connection via local Wi-Fi

As Wi-Fi becomes available on wider range of mobile phones, retailers have an opportunity to provide data to consumers using their own Wi-Fi networks. This would avoid the cost of connecting to a mobile operator network and being able to deliver data such as pricing in a more secure way. However, it also has significant infrastructure implications.

Bluetooth

Bluetooth is an established technology enabling devices to communicate together at short range. It can be used by stores to deliver substantial amounts of data (like a music track or a video) to a mobile phone without connecting to a network. Proximity marketing specialises in applications using Bluetooth to reach consumers.

Location Based Services

Location Based Services (LBS) make use of information about the location of consumers to give location relevant services with consumer permissions. Location is either based on actual GPS coordinates or triangulation of a person's position based on location of nearby mobile network base stations.

SMS

SMS (Short Message Service) is the most commonly used protocol for text messaging between mobile phones. Thanks in part to short codes (special telephone numbers that are significantly shorter than full telephone numbers), SMS forms the basis of much widespread mobile marketing today. SMS is also a cost effective way to send messages (e.g. mobile coupons) from a service provider to consumers. Some solutions use SMS to send numeric codes which are then displayed as bar codes.

MMS

MMS (Multimedia Message Service) is a standard way to send messages that include multimedia content to and from mobile phones. Although MMS handset and network support for MMS is not at such a high level as SMS, it can be a viable option. Some solutions use MMS to send bar codes to be displayed on phone screens.

Voice calls

Today's mobile phones remain primarily communication devices for making voice calls. Although the applications described here focus on accessing data via a network, there is potential to use these applications to initiate voice calls where appropriate.

Mobile Phone Applications

Mobile Phone Applications (or Apps) refers to software that runs on the mobile handset to deliver services to consumers.

Augmented Reality

Additional information can be shown as a "layer" on top of the surrounding environment detected by mobile phone camera.

Appendix II Case Studies

We can look to countries like Japan and Korea for inspiration about what can happen when technology is available. In those countries we find applications such as Extended Packaging and Mobile Coupons being used by a wide range of consumers on a daily basis. A value chain has been established that benefits all involved. But other regions are catching up. The following section describes some of these initiatives.

METRO Group: real,- Future Store



The Future Store is a flagship retail store based in T^nisvorst, Germany. A fully integrated mobile application was developed 2008 enabling customers to use a range of mobile shopping services with their phones. For example, customers can use mobile phones during their shopping trip to scan barcodes each time a product is added to the basket. The application keeps a running total of purchases and creates a unique barcode that is scanned at the point-of-sale terminal to enable checkout. Additionally, consumers can use the mobile phone to get additional information on products and promotions as they move through the store as well as pay with their phones using NFC-technology. Since 2009 real,- customers in Germany can use a personal shopping list anywhere they go with the mobile phone. The 'Mobile real,- Einkaufsliste' is available for more than 600 different mobile phones.

Kraft: iFood



Kraft Foods have developed an application for the iPhone that allows consumers to search for recipes and find the ingredients they need. The application has been one of the most downloaded from Apple's App Store. The application does not integrate bar code reading software but shows the potential to provide a useful service to consumers that adds value to the brand and to the product offering as a whole.

Big in Japan: ShopSavvy



Big in Japan is a US-based solution provider. It was one of the winners of the Android Developer Challenge awarded by Google when it launched its Android operating system for mobile phones. ShopSavvy allows consumers to scan product bar codes, find online and offline locations where the product is sold and compare prices. Since its launch in 2008, ShopSavvy has been downloaded by over 4.5 million users with an average of 1 million bar codes scanned daily.

Mobilize: ShopScanSave



Mobilize is a UK-based solution provider which runs a loyalty club. Consumers who join use a unique 1D bar code on their mobile phone screen as a loyalty ID. They obtain mobile discounts when it is scanned at checkout. Offer redemption is secure and validated by checking both the loyalty ID and the bar codes of products purchased. A UK convenience sector implementation has over 22,000 redemption outlets including Coop, Spar and Nisa.

Appendix III State of current services

This section takes a more detailed look at the situation for applications where GS1 standards are most applicable, as of January 2010.



Extended Packaging

How do consumers learn what is possible?

Most consumers are learning about Extended Packaging via applications that are either pre-installed on the phone or downloadable from application market places. Following the publication by GS1 of the Extended Packaging Pilot Handbook (www.gs1.org/mobile/ephb), over 10 local trials are taking place. Some of these are consumer-facing and allowing consumers to discover what is possible.

How can phones engage with products?

The easiest way for consumers to use their phones to engage with products is by reading the 1D EAN/UPC bar code that is already printed on the packaging. This can be done with the application or by typing in the bar code number. Some manufacturers are exploring the value of adding additional 2D bar codes to product packaging. The Position Paper on Mobile Bar Codes, published in 2008, represents the preliminary position of the GS1 MobileCom group in this area (www.gs1.org/mobile/mbpp). The GS1 Multiple Bar Codes Work Group is exploring standardisation in this area via a comprehensive look at multiple bar codes and business requirements.

How can phones engage with shelves?

There are no current GS1 standards specifying how to place bar codes on shelves. When the same 1D bar code used to label the product is found on the shelf, we recommend using this as a starting point for Extended Packaging applications. The Extended Packaging Pilot Handbook gives recommendations for situations where retailers want to communicate about a product category rather than about individual products.

Where does the information come from?

When the consumer has an application provided by the retailer for use in-store, information can come from a local network. In other cases information comes from an external network. In either case there are opportunities to connect to accurate, base data, which has been populated through services like the GS1 Global Data Synchronisation Network (GDSN) and the Global Electronic Party Information Registry (GEPIR). These services make it easier for end services to start with standard formats for information and for brands to have efficient ways to populate multiple services.

What is the quality/performance of information retrieval?

Information retrieval can vary on applications that connect via mobile networks depending on the location of towers and the network speeds. Stores can greatly improve performance by improving the quality of mobile signals in their stores; for example, by installing mobile network signal repeaters or by providing wireless (Wi-Fi) access for WiFi-capable phones. Bar codes should be printed at an appropriate size to ensure decoding on mobile phones is as fast as possible.

What is the impact on store employees?

Giving consumers direct access to the information they need is one way to allow employees to focus on other tasks, so increasing productivity.



Mobile Coupons

How do consumers get mobile coupons?

There are several means to receive coupons that are either live or being trialed: keywords can be sent via SMS messages using a short code, bar codes can be scanned or consumers can subscribe to coupon services using a coupon application, via a mobile website or via SMS. Future retail services are being planned that will connect coupons to shopping lists and loyalty programs.

How do consumers store mobile coupons?

Coupons codes can be stored as SMS or MMS messages for later display or in a coupon application or on the mobile web. They can also be connected via other services such as shopping lists and loyalty schemes.

How do consumers redeem mobile coupons?

Coupons can be redeemed individually or by a connection with a customer identification code. Clearly the latter option is better suited to an environment where many coupons are likely to be redeemed by individual consumers. Three options then exist to interact with checkout:

1. Bar codes can be displayed on the screen of the phone and captured using the checkout scanner. Retailers should consider how to optimise ergonomics of this process. Ideally consumers should not need to hand their mobile phones to cashiers. See Appendix V for a more detailed analysis of scanner technologies.
2. The numeric code can be entered at checkout, either by the cashier or via the numeric keypad used for card payment. To make this possible, it is important that the numeric code be displayed in human readable format as well as in the bar code.
3. Contactless technology can be used to communicate between the mobile phone and a reader at checkout.

Additionally, most retailers need to find a way to distinguish between physical and digital coupons so that the redemption process can function correctly.

How can brands and retailers set up digital coupons?

Both brands and retailers envision significant efficiencies to be gained from using digital coupons based on open standards. To fully realise such efficiencies, much needs to be agreed on, and an evolution of existing processes may be expected. GS1 is organising a coupon work group to evaluate possible needed standards to support such as evolution.

How can you link coupons to Customer Relationship Management (CRM) data?

Coupons can be linked to registered users via loyalty programs and shopping lists.

What other scenarios are linked to mobile coupons?

Mobile could also be considered by retailers as an effective channel to distribute and redeem gift cards. As mentioned above, loyalty schemes could also be closely linked to couponing programmes.



Mobile Self-Scanning

How do retailers prevent theft?

Retailers can prevent theft in a similar manner to what they do today. In-store cameras, random cart checks, and radio frequency security towers (in the case of high-end items) are all effective deterrents. Current self-scanning solutions implemented by retailers (using dedicated self-scanning devices) use a combination of these methods.

How do consumers pay?

Consumers would get a special code or number on their phone upon completion of shopping. This could be used to activate traditional self-checkout payment options, or could be provided to a clerk to access the account at the register.

What other applications are linked to this?

There are a number of supporting applications required to make mobile self-scanning seamless and efficient. These are: Extended Packaging (product scanning and information for shopping decisions), mobile coupons (discounts can be subtracted from the total automatically in this process), loyalty programmes (to connect the consumer shopping behaviour to the CRM system and provide additional services/value), and mobile payment (to offer an additional efficiency to complete the shopping experience).



Mobile eCommerce

Whilst many retailers have embraced mobility through dedicated self-scanning devices, very few retailers currently have eCommerce applications that work on mobile phones. Though many have online shopping websites, these have not yet been integrated with the in-store experience. It is important to distinguish between a number of different mobile eCommerce experiences.

1. Consumers could browse and shop for goods entirely on their mobile phone.
2. Consumers could use physical materials (such as a catalogue or promotional leaflet) containing bar codes as a link to items and where ordering and payment is completed on the mobile phone.
3. Consumers may want to shop in a physical store but have their goods delivered later. In this last scenario, even when goods are not available on the shelf, they may be delivered to the consumer direct from the warehouse.

Whatever form it takes, mobile eCommerce can allow consumers more ease and convenience and can allow retailers to carry less stock.

Other applications

Although the other applications mentioned in this document are not being worked on directly by GS1, we expect standards activities being pursued today will have a positive impact on their development and may trigger further standardisation activity.

Appendix IV Implications of mobile for retailers and retail store infrastructure

The applications explored above all have an impact on retail store infrastructure. Given that any change in infrastructure is costly, this section aims to give guidance so that retailers make the right development choices to support mobile applications in-store to the full.

Impact on products

Given that product packaging already contains bar codes for use at checkout that can be used to connect to relevant information, retailers should experiment with Extended Packaging scenarios to better meet consumer needs for information.

Impact shelves and signage

Mobile phones have the possibility to make shelves and signs into interactive points within the store. Currently, interactivity in-store means heavy investment in kiosks. Focusing on mobile is a sensible route to take to make the most of investment in this area.

Impact at checkout

Given the complexity of current checkout systems, it's no surprise that retailers are reluctant to make fundamental changes. Retailers should explore the business benefits of integrating new technologies at checkout, particularly when they have an impact on consumer experience (such as reduced queue times). If integration is not seamless, retailers clearly risk creating problems for employees and consumers alike. Clearly, demonstrating return on investment is essential.

In the short term, retailers should examine how they are best equipped to read 1D bar codes or enter corresponding numeric codes displayed on mobile phone screens (see Appendix V for more details). In the longer term, they should look at future interactions at checkout involving contactless technologies.

The ultimate goal is an internet-enabled checkout that is able to interact with and contribute relevant data streams for the benefit of the retailer's own business as well as its suppliers and consumers.

Impact on multi-channel strategy

The possibility of mobile shopping poses interesting questions to brick and mortar retailers. Following the experience of e-commerce, we have good reason to believe that consumers will continue to come to retail stores to do their shopping. Mobile shopping is of particular interest in three cases:

1. For repeat purchases where consumers do not want to go through decision-making on each shopping trip
2. For the "long-tail" of products that retailers cannot carry in store but would be willing to deliver
3. For digital goods that can be delivered directly to a mobile device

With this in mind, we recommend that retailers make sure that their mobile offering is fully aligned with their multi-channel strategy so that they can use mobile to grow their core business (of products sold in stores) and complement this with additional services that could be offered via mobile or the internet.

Retailers should begin by making their online presence available to consumers via their mobile phones. Using coupons, promotions and loyalty, mobile can be the glue that brings together the digital side of the business with the physical side. Mobile can also help track the efficiency of all traditional advertising channels.

Impact on business processes

The primary reason for the standards-based approach to mobile commerce advocated here is the ease of integration with existing business processes, so that new capabilities can be enabled in a cost effective way. As with any innovative new technology there is a clear tension between introducing new and different technology with existing infrastructure. We believe the only way to proceed is to recognise that the fundamental infrastructure will not be changed in the short-term, so new technology need to be flexible enough to be integrated with what currently exists.

For most retailers, the biggest challenge is to have an appropriate processes for fulfilment (from processing orders electronically through to delivery) that is integrated with the rest of the businesses.

Consumer adoption

Consumers are individuals and as such have a wide variety of different needs. However, we can give some general advice about how to approach consumer adoption.

Today we can identify two extremes in consumer behaviour. On one hand lies a consumer who prefers to interact with their mobile phone than with the store, and on the other hand a consumer who prefers to interact with the store than with their mobile phone screen. The goal of any mobile strategy should be to target the highest number of consumers between these two extremes by providing relevant applications. During the shopping experience, the goal is to use mobile to help consumers interact better with the store environment, given the rich multi-sensory experience available.

Because of their ability to touch such a large number of consumers and the physical space of the store, we anticipate that retailers will play an important role in educating consumers on how they can use their mobile phone in new ways. Static or interactive in-store displays are an ideal way to do this.

In the next 1 – 3 years, we recommend focusing on the following customer segments:

- Early-adopters of technology. This group is more likely to have the right technology in the phone and the motivation to learn how to use it. Examples: the youth segment and business users.
- Consumer segments that are particularly motivated to receive trusted, and maybe even personalised, information. Example: special interest groups (environmentally conscious, alternate language, allergic, religious, diet specific, etc.).
- Product categories where decision-making is not straightforward and would benefit from access to additional information. Example: wine, health and beauty products or consumer electronics.

Shopper insights

Having consumers equipped with mobile phones before, during and after their shopping trip is clearly an opportunity to gather data about consumer behaviour.

Retailers must ensure that this is done non-intrusively and, if the data is not collected anonymously, that consumers give their permission respecting industry best practices such as opt-in. Additionally, consumers should be easily able to know what data is being collected and opt out at any stage.

As the GCI Report on Information Sharing states, “the industry must more readily and freely share information, embracing the concept that the best way to manage increasing complexity is through transparency.”

The impact of sharing consumer-level information can impact not only product development and marketing, but also operational aspects such as manufacturing, logistics and store management. Retailers should not underestimate the value of sharing basic information such as purchase history with consumers themselves. For manufacturers, having an additional data stream to point-of-sale data can have great value.

Appendix V Scanning bar codes from mobile phone screens at retail checkout

This section aims to give a deeper understanding of scanning bar codes displayed on mobile phone screens at retail checkout.

Technology capabilities

- Both linear and 2D barcodes can be displayed on mobile phone screens
- Laser scanners can only read linear bar codes. However, they cannot reliably read linear bar codes displayed on mobile phone screens.
- CCD scanners and imaging scanners (also called camera-based scanners) can read both linear and 2D barcodes. Market implementation shows that some CCD scanners and many imaging scanners can read bar codes from mobile phone screens in the field.

Retailer implementation

- Based on today's standards and implementation, the use of scanners at checkout in general retail will continue to support the scanning of linear bar codes such as EAN/UPC or GS1 DataBar that appear on products.
- Although a few retailers are already equipped to support mobile phone scanning, mass implementation of mobile phone scanning at point of sale would require either upgrade of existing scanner systems or purchase of complimentary scanners for most retailers. Given the impact of any mass implementation on the broad range of retailers globally and GS1 member companies, targets for adoption dates would be considered by the GS1 Board and General Assembly based on the business case.

Conclusion

- Scanning bar codes from mobile phone screens is technically feasible today. Further research is necessary to determine:
 - The exact specifications of CCD and imaging scanners that can scan bar codes displayed on mobile phone screens reliably.
 - Current market penetration in terms of the number of units in the field deployed in general retail per region or nation.
- As high-value applications for scanning bar codes from mobile phones are identified, an impact analysis should be conducted to determine:
 - the technology (bar code, NFC) or process (manual entry) choice
 - the amount of time and money needed to upgrade or replace the existing technology infrastructure.
 - the positive and negative impacts on consumer satisfaction and employee productivity at checkout
- This can then be weighed against the benefits in order to determine the business case and timeline for adoption.
- Retailers who wish to support interaction between mobile phones and point of sale today should:
 - experiment to better understand consumer needs and the business case for adoption:
 - consider piloting by equipping a small number of checkout lanes with complimentary scanners
 - consider alternative methods of interaction (such as manual data entry)
 - continue to monitor the market for adoption of new interaction technologies such as NFC
 - have realistic expectations about the timeline for standardisation and eventual mass implementation with respect to any new interaction technologies (probably several years)

Appendix VI References

For a better understanding of any technical terms or acronyms mentioned in this White Paper, visit www.gs1.org/glossary.

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Useful Websites

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