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Book Industry Study Group

## DISCUSSION PAPER



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### *Innovation and Change*

## Consumer Empowerment through Smart Phones

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*An online version of this Discussion Paper, with a place for industry comments, is available at <http://www.bisg.org/contentweb/papers/consumer-empowerment/>*

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## Introduction

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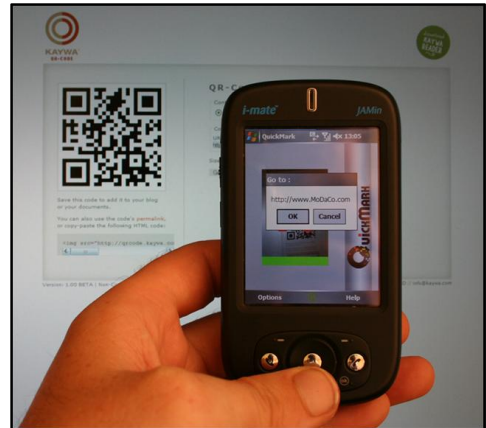
The advent of “smart phone” applications that initiate action based on information encoded in bar code symbols has provided a wide array of new opportunities to inform and empower consumers. For purposes of this presentation, a “smart phone” is a cell or mobile phone that includes a built-in camera and has the ability to run application programs.

The opportunity for consumer empowerment occurs when a provider places a symbol containing data:

- In a magazine advertisement
- On a promotional poster
- On a book (or other product)

The opportunity comes to fruition when:

- A consumer captures an image of the symbol using the camera in a smart phone
- The application decodes the stored information
- An action is taken depending on the information decoded and the instructions in the application



Prominent among the applications is the access of a website when the encoded information is a URL. Once the website is reached, the actions that may be taken are virtually unlimited.

Consumer empowerment through smart phones is widespread in Japan and in many European countries; applications are beginning to appear in North America.

## Applications for the General Public

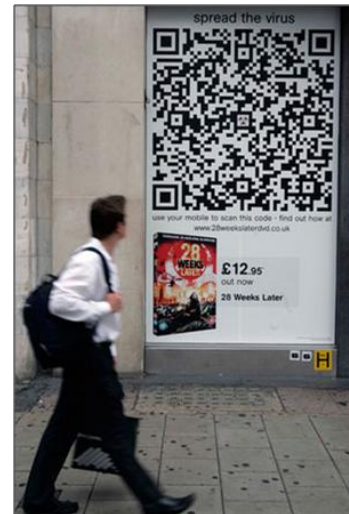
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Recent news reports have described a number of applications intended for the general public that provide information or other action opportunities for consumers equipped with smart phones.

- Posting, along with other real estate signs, a sign displaying a consumer readable symbol leading to a website with additional information on the property offered for sale
- Linking from a symbol on a visitor information sign to elaborate on the significance of a historical or natural interest site



- Displaying symbols leading consumers to promotional or sales information on advertising posters in trains, subways and transit stations
- Including symbols in magazine advertisements
- Enabling credit or debit purchases from web-enabled vending machines



## An Example of Application in the Book Industry

HOW SWEET IT IS?  
Jane Roberts was the average girl next door until she and her best friend, Scarlet Harp, landed their own hit reality show, L.A. Candy. But life on camera is getting complicated....

When sexy photos of Jane are leaked to the press, she becomes the center of a tabloid scandal. She turns to former modeling partner for help, but does Madison really have Jane's back?

Scarlett got a scandal of her own. She's fallen for a guy who's insistently off-limits—which means Scarlett has a big secret to keep. But nothing stays secret for long in Hollywood.

In television star Lauren Conrad's witty, entertaining novel about young Hollywood, the two are only as sweet as the people biting them.

READ HOW IT ALL BEGAN!

http://laconradymobi

Work these augmented text CONRAD to READY 752M. U.S. residents only. Message and data rates may apply.

\*1 NEW YORK TIMES BESTSELLING AUTHOR  
**LAUREN CONRAD**  
*Sweet Little Lies*  
AN L.A. CANDY NOVEL

LAUREN CONRAD  
**LAUREN CONRAD**  
The Books  
All About Lauren  
Film Reel  
Read Chapter 1  
Get Lauren's Look mark.  
Spread The Word  
Buy The Books  
HARPER  
An imprint of HarperCollins Publishers

Scanning this symbol with a camera-equipped smart phone using the appropriate application leads to this webpage displayed on the phone

Illustrations courtesy of and © HarperCollins

### Options Offered on the Lauren Conrad Smart Phone Page Shown On Page 4

The following options are available on the smart phone screen shown on page 4:

- A list of all the author's titles
- Biographical notes on the author
- A video of comments by the author
- The opportunity to read Chapter 1 of this title
- Personal makeup directions (with products identified) to achieve the author's "look"
- The ability to participate in promoting the title and other titles by the author
- A list of booksellers at which a consumer can buy the title

Other options could have been presented by the designer. In general, options or actions are virtually unlimited, depending only on screen space and the designer's objectives and available information.

### Implementation Guidance

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It is extremely important whenever any new feature is introduced to the public that the experience of the user is as positive as possible. If the initial experience is tainted by confusion or erratic results, the willingness of a consumer to embrace it will be compromised.

The Machine Readable Coding Committee is currently reviewing the factors that affect the user experience so that appropriate technical and implementation guidance can be developed for the book industry. These factors will include:

- Placement considerations
- Readability considerations
- Symbology selection

#### Placement Considerations

Placement of consumer readable symbols is not as critical as placement for the Bookland EAN on a book, because in some cases the Bookland EAN will be read by stationary scanners that have little tolerance for improper placement. Consumers have much more control over positioning the smart phone to read a symbol. However, the symbols must be:

- Easy to find
- Separated from the Bookland EAN on books, to eliminate confusion and misreads

#### Readability Considerations

Factors critical to dependable readability include:

- Quality of the original image
- Size of the reproduced image

- Material upon which the symbol is printed
- Color contrast between the symbol and the background

### Symbology Selection

The selection of symbology is also a key factor in producing a positive consumer experience.

- Although a number of symbologies may be capable of linking consumers to information, the Machine Readable Coding Committee will develop guidance focusing on symbols complying with established open standards
- Non-standard or proprietary symbols could contribute to a negative consumer experience; the consumer may not realize that failure to read a symbol is due to the absence of a proprietary application in the smart phone

## Bar Code Symbologies

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### One-Dimensional (1D) Bar Code Symbologies

- Conventional bar code symbols present encoded information in a linear or one-dimensional direction
- The use of these symbologies (e.g., EAN/UPC, GS1 DataBar™) has produced significant improvements in the supply chain, from manufacturer through distributor and retail to the consumer, by enabling the identification of products and packages of products
- Because one-dimensional bar code symbologies are typically more limited in the amount of information that can be encoded, the applications using them are likely to be of product identification in nature (or similar)

### Two-Dimensional (2D) Bar Code Symbologies

- Two-dimensional bar code symbologies encode information in both horizontal and vertical directions, hence the name “two-dimensional”
- In general, these symbologies can encode much more information in a smaller space than one-dimensional bar code symbologies
- There are two types of two-dimensional bar code symbologies, stacked-linear and matrix, with variations in each type
- Stacked-linear symbologies consist of rows of not-very-tall one-dimensional linear symbols stacked one above the other (e.g., GS1 DataBar Stacked)
- Stacked linear symbols can be read by most linear scanners and by almost all scanners employing camera-like technology
- Matrix symbologies resemble a chessboard, and the location and color of the “squares” or cells encodes data (e.g., Data Matrix, QR Code, Aztec Code)
- Matrix symbols require a two-dimensional imager (camera) for decoding; thus they can be “read” by smart phones that include a camera and appropriate software

## Frequently Encountered Symbologies

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Several bar code symbologies have been used in the initial array of consumer readable applications. In some cases, the symbols were already in place for pre-existing applications; in other cases, symbols especially suited for the application have been selected.

Brief descriptions of the more frequently encountered symbologies and typical applications in which they are found are presented on the following pages.

### EAN/UPC



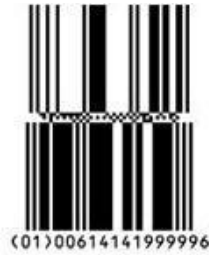
#### *Properties*

- EAN/UPC is the familiar one-dimensional bar code symbology used throughout the supply chain worldwide for identification of product units
- This symbology was developed in the early 1970s to improve inventory control and speed checkout in grocery stores
- The EAN/UPC is capable of encoding 13 numeric characters in the main body of the symbol and either 2 or 5 numeric characters in the add on
- This capacity precludes encoding larger amounts of information
- This symbology is published as ISO/IEC 15420:2009

#### *Applications*

- Since the presence of these bar codes is so widespread, there is a significant potential for consumer smart phone applications using them
- On the other hand, the amount and nature of the information that can be encoded will limit the span of applications (e.g., direct URL lookups are not possible; the smart phone application may perform a programmed lookup upon recognizing an EAN)
- The symbol is solely the data carrier for a product item identifier. The identifier is provided by industry related organizations (GS1 or national ISBN agencies), which do not exercise control over actions taken by smart phone applications based on the identifier
- To build consumer confidence, developers using the identifier in an application other than product item identification (e.g., price comparison lookups, product details) are cautioned to ensure that information provided is obtained from trusted data sources
- These bar codes may be printed on product labels and packaging at a size that is difficult for many smart phone cameras to resolve and decode
- As indicated, price comparison lookups based on product or shelf label bar codes are an application using this symbology

## GS1 DataBar Stacked



### Properties

- GS1 DataBar Stacked is a variation of the GS1 DataBar Symbology that is stacked in two rows and is used when the normal linear symbol would be too wide for the application. GS1 DataBar Stacked was formerly referred to as Reduced Space Symbology (RSS)
- The symbol is employed in two versions: a truncated version used for small item marking applications and a taller omnidirectional version designed to be read by omnidirectional scanners; the taller omnidirectional version is depicted above
- It is used to encode the product GTIN (Global Trade Item Number)
- This symbology specification is part of ISO/IEC 24724-2006 (Reduced Space Symbology)

### Applications

- GS1 DataBar Stacked is appearing as the product identification for loose produce and random weight products (such as meat and cheese) in grocery stores
- The advantage of this symbol, small size, may challenge its being read by consumers because the size may be too small for a smart phone camera to resolve and decode
- The symbol is solely the data carrier for a product item identifier. The identifier is provided by industry-related organizations (GS1 or national ISBN agencies), which do not exercise control over actions taken by smart phone applications based on the identifier
- To build consumer confidence, developers using the identifier in an application other than product item identification (e.g., price comparison lookups, product details) are cautioned to ensure that any information provided is obtained from trusted data sources

## QR Code



### Properties

- QR Code is a two-dimensional bar code symbology created in Japan in 1994; “QR” stands for “Quick Response”

- Although the QR Code symbol was developed for tracking parts in manufacturing, the symbols are now used widely in applications targeted for consumers
- This symbology specification is published as ISO/IEC 18004:2006

### *Applications*

- QR Code symbols supporting consumer applications are quite common in Japan and are appearing in increasing numbers in other parts of the world
- Typically they appear in magazines and newspapers, on advertising signs, on bus and subway posters, and even on business cards
- When a URL is encoded, the application accesses the corresponding website and directs activity by the phone's browser as indicated
- The activity may be to provide consumer information of a promotional or informative nature; it may enable consumers to take action, such as purchasing a product or tickets for transportation or events
- Applications supporting such activities are beginning to appear in the U. S.
- QR Code is approved to encode passenger and flight details on airline Bar Coded Boarding Passes (BCBP) read at airport gates and security checkpoints

### **AZTEC Code**



### *Properties*

- Aztec Code is a two-dimensional bar code symbology invented in 1995
- This symbology specification is published as ISO/IEC 24778:2008

### *Applications*

- It is one of the symbologies approved to encode passenger data and flight details on airline Bar Coded Boarding Passes (BCBP) read at airport gates and security checkpoints
- It is used by several national railroads in Europe on self-printed tickets and on smart phones
- It is used on some identification cards to encode biometric information
- Aztec Code is ideally suited for use on hospital patient wrist bands

## Data Matrix



### *Properties*

- Data Matrix ECC200, the version of Data Matrix in widespread use today, is a two-dimensional bar code symbology
- This symbology specification is published as ISO/IEC 16022:2006

### *Applications*

- A major use of Data Matrix is in Direct Part Marking (DPM) of small items with data unique identifier
- In pharmaceuticals this would include name, dosage, batch number and expiration date
- In parts, it would encode manufacturer ID, part number and a unique serial number
- Data Matrix codes are part of a new traceability drive in many industries (e.g., aerospace, pharmaceuticals, medical/surgical instruments) where quality control is tight and a black market exists for counterfeit parts
- It is one of the symbologies used to represent postage that is accepted by the United States Postal Service and other national postal services
- Data Matrix is also approved to encode passenger data and flight details on airline Bar Coded Boarding Passes (BCBP) read at airport gates and security checkpoints
- A variation known as GS1 Data Matrix is approved for limited use in encoding product identification in GTIN (Global Trade Item Number) format along with a wide range of secondary attributes, such as expiration date, lot/batch number and unique item serial number