Overcoming Instant Payment QR Code Impediments to Adoption: Usability

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Introduction

A quick response code, or QR code, is a type of barcode that can store a large amount of information per unit area. It is a two-dimensional code that is capable of 360-degree (omni-directional) high-speed reading. Quick response codes can be scanned by a consumer via a merchant/biller hand-held or mobile device or static printed version of the code. The quick response code can then be used to initiate payment to the merchant/biller.[1]

The integration of QR code payments at the point-of-sale (POS) has become increasingly more popular due to its convenience, speed, and touchless nature. Yet the adoption of QR code payments has materialized more rapidly across the globe compared to the United States where consistent technological, operational, and consumer-related obstacles to implementation remain more challenging.

The U.S. Faster Payments Council QR Code Interface Work Group's document titled *How QR Codes Address 'the Last Mile' Adoption of Faster Payments at the Point-of-Sale*[2] identified five market-drivers for implementation: Oversight, Payment Schemes Supported, Functionality, Security and Usability. In this document, the FPC QR Code Interface Work Group aims to identify the most pressing impediments to instant payment adoption through QR codes from a usability perspective. The document provides insights into ways to overcome the barriers that slow the implementation process.

Usability refers to the extent to which a product, system or interface can be used to achieve specific goals effectively, efficiently and with satisfaction in the use of QR codes. QR codes should be easy to use for both consumers and merchants. This includes factors such as size and placement of the QR codes, the ease of scanning, terminal accessibility, and the simplicity of the payment process. The idea is to enhance the systems and technology that are already in place and/or evaluate the implementation of innovative technologies.

The scope of this analysis is bound by these parameters:

- Focused only on in-store payment acceptance at POS.
- Examines the usability issues across three retail vertical markets - restaurants, small businesses, and supermarkets - to represent a wide range of terminal configuration options at the POS.
- Limits the discussion of usability to merchant presented QR code payment acceptance (because it is more globally implemented than the consumer presented alternative).[3]

1.1 Legacy POS System Limitations

A significant hurdle in adopting QR code payments across industries is the overall expense to upgrade and support the required changes to the software at POS for enabling QR codes.[4] Many POS systems are configured for card payments and are not compatible with the technology required for QR code-based faster payments.

POS Software Updates: Most POS systems currently manage transactions through their acquirer processor or gateway service providers for debit/credit card rails or electronic checks. QR code technology could potentially initiate any payment rail in the United States including faster payment rails (e.g., RTP® network or FedNow® Service). However, existing systems would require adaptations to accommodate such technology. For a merchant presented QR codes, the POS would also need to be configured to support the generation of a QR code to present at a terminal or the printing of the QR code on a receipt for scanning.

Software Point-of-Sale, also known as SoftPOS, is a new technology that enables merchants to accept payments via their smartphones, tablets, or other devices.[5] This technology is revolutionary because it eliminates the need for additional hardware such as card machines or physical POS devices.[6] Retailers, e.g., small businesses and restaurant dining, using standalone payment terminals, are currently evaluating the replacement of their outdated terminals with SoftPOS terminals configured with QR code capabilities at the POS. According to a recent PYMNTS Intelligence Report - How SoftPOS is Poised to Revolutionize Payments - 71% of merchants believe SoftPOS will replace traditional terminals. The report also noted a 475% increase in the projected global SoftPOS user base by 2027.[7] This deployment will help to mitigate many of the impediments to adoption of faster payments at the POS.

The trend to replace standalone terminals with SoftPOS technology at the POS is more problematic at the supermarket checkout lane where dedicated terminals are configured as stand-beside or integrated to the register and/or host system. POS applications for supermarkets are unique, specialized, and sophisticated, supporting functions such as inventory and price look-up. This layer of complexity is not supported by SoftPos technology which is designed much more like a commercial-off-the-shelf (COTS) package with standard functionality. For this reason, SoftPOS technology is not typically used directly at traditional grocery checkout lanes, although it is well suited for use in specialty departments or periphery service areas in the grocery store.

Keep in mind the average household goes to the grocery store 1.6 times per week[8] making the grocery store environment the highest transaction volume by merchant type. Making any changes to traditional POS to accommodate a new payment mechanism incorporating QR code and faster payments is a long, developmental process and moreover must be cost justified. Furthermore, grocery retailers rely on their acquirer processors to support new payment configurations, and those acquirers may not have a market-ready solution.

Scanning Device Compatibility: For a merchant presented QR codes, the consumer could scan through: (1) their phone camera app, which could increase security exposure; or (2) through specific apps, e.g., mobile banking apps, requiring adaptations to support QR code functionality.

Using QR codes as an initiation method for payment requires payment service providers and/or payment rails to offer this service via software at the POS. Even though it is challenging, these adaptations are possible.

1.2 Integration Complexity

The technical integration required to support QR code payments remains a challenge across sectors. QR code payments often involve coordination between payment processors, acquiring banks, and faster payment networks, adding layers of complexity for businesses.

Multiple QR Code Presentation Formats: In the United States, there are multiple QR code presentation formats (e.g., PayPal, Venmo, CashApp.), and many of these are not interoperable. This inconsistency across formats can result in poor user experience and complicated integration efforts for businesses. Therefore, the existence of QR code specifications, including standards, may streamline QR code implementation efforts. There are already initiatives in place in the United States to establish a QR code standard, such as the X9A4 QR Code Payment Work Group set by Accredited Standards Committee X9.[9]

System Compatibility: Integrating QR codes for faster payments with existing POS systems can require significant effort. Additionally, merchants need to evaluate the potential impact to enterprise systems, including inventory management and loyalty programs.

1.3 Physical Design and Technical Specifications

Data Density: One of the biggest advantages of the QR code is that it provides a fast and effortless way to transmit massive quantities of data in the small space represented by the code. QR codes can be read in two directions, top to bottom and right to left. Effectively the QR code has URL information embedded in the code, eliminating the hassle of typing long addresses on a tiny phone keyboard.

As defined in the ISO/IEC 18004 Standard, QR Code Technical Specifications outlines the data elements in the design of the QR code, specifically symbol size, data capacity (measured in characters and bytes), error correction levels, and different data encoding modes (numeric, alphanumeric, binary, Kanji) depending on the information being stored. This industry standard enables support for both rich data and streamlined data processing – factors that are important to merchant and acquirer processors in the adoption of any new payment technology.

Merchants want to pack as much information as possible into the transaction message. The code can provide product information, contact information, or other text. Further customization expands the functionality of the code to be used for a multiplicity of purposes – linking the customer to coupons, discounts, product reviews and descriptions, contests, surveys, and loyalty programs. This rich data in the transaction message is a huge benefit for merchants in support of back-office functions. Additionally, QR codes have an error correction function which enables data to be restored if the code is damaged or missing.

Data density supported in the QR code enhances its usability by merchants and acquiring processors and overcomes some of the impediments to adoption for faster payments.

Physical Design: The physical design of the QR code encompasses aspects such as size, placement, visibility, and distance to ensure the creation of a QR code that can be efficiently read. The use of static codes at the POS has been much more prevalent than dynamic codes because they are easier to generate and implement. A sticker with the QR code is attached to or posted near the merchant's register so it is visible and readily accessible for the consumer to make purchases at the POS.

1.4 Connectivity and Network Dependency

Across industries, QR code payments are heavily dependent on stable internet connections, which can pose a major barrier in regions with poor connectivity. Grocery stores and other high-volume businesses require robust internet connections to manage numerous simultaneous transactions. Even with wide internet coverage across the United States, spot outages of power and internet plus high volume of transactions at peak can impact in performance, speed, and perception of reliability of faster payments.

Wi-Fi and Cellular Data Failures: The merchant needs Wi-Fi or cellular data for the generation of a QR code. QR code payments can be disrupted by unstable or inadequate Wi-Fi or cellular data connections.[10] Offline functionality or a reliable backup (e.g., cellular data) is necessary to ensure that businesses continue to operate smoothly even in connectivity-challenged environments.

Scalability in High-Traffic Areas: For those merchants that process large numbers of in-person checkout transactions daily, ensuring the scalability and reliability of QR code systems during peak hours is critical. Any breakdown in connectivity could lead to revenue loss and long lines, frustrating customers.

Summary

Technology is not the only restraint in accelerating the adoption of QR codes with embedded faster payment capabilities at the POS. System upgrades, platform modifications, and terminal replacements are infrastructure components merchants need to evaluate as part of their payments modernization initiatives. Additionally, the cost justification for these changes is dependent upon business decisions about the tangible benefits of implementing QR codes for payment, not technology limitations or shortcomings.

Customers will adopt and adapt to innovative technology and payment methods if the proper value proposition is extended, as evidenced by their growing use of mobile phones and digital wallets to make purchases. Ease of use is built inherently into innovative technology, as consumers (particularly millennials) expect the operation of any technology device to be intuitive. Adoption of QR codes for payment initiation was prominent within the restaurant industry during the COVID pandemic. From a consumer perspective, the fear of fraud is a deterrent to adoption, which is a broader topic to be addressed in a future QR Code Interface Work Group report on Security.

Interoperability remains a long-term goal for the adoption of faster payments. While a few high-volume retailers have implemented QR codes supporting faster payments, these programs are proprietary in nature, supporting only their own customers' access to their bank accounts. So, while they meet the usability criteria, they fall short of completing the last mile of an interoperable system supporting an open pay-by-bank model.

The continued development of industry standards in the form of message specifications will positively impact the wide-spread adoption of QR code technology as a 'last mile' connector to faster payment capabilities. Consistency in the application of industry standards will help to bridge the gap that remains in achieving an end state of interoperability.

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QRCIWG Leadership

Payfinia	Keith Riddle (Work Group Chair)
JJ4Tech	Caroline Serejo Cypriano (Work Group Vice Chair)
Avenue B Consulting, Inc	Maria Arminio (Work Group Facilitator)

Work Group Members & Contributors

FPC Member Organization	Representative
Accredited Standards Committee X9	Mark Tiggas
BetterBuyDesign	Steve Mott
Catalyst Corporate Federal Credit Union	Mark Keeling
JJ4Tech	Guilhermina Martins Kuster
Matera Inc.	Sarah Hoisington
Photon Commerce	Steve Wasserman
SHAZAM	Scott Green
Sionic Mobile Corporation	Charles Jackson
Sphere Laboratories	Anthony Serio (Editorial Review)
Strategic Resource Management Inc. (SRM)	Larry Pruss
Zumigo Inc	Satya Parimi

About the Faster Payments Council and the QR Code Interface Work Group

The Faster Payments Council (FPC) is an industry-led membership organization whose vision is a world-class payment system where Americans can safely and securely pay anyone, anywhere, at any time and with near-immediate funds availability. To further this vision, the FPC established the QR Code Interface Work Group with the mission to describe how payment QR codes can facilitate adoption and usage of faster payments and provide considerations and recommend best practices for end users and financial institutions.

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[3] To understand adaptations required, it is important to highlight that QR Codes may have two forms of presentment: consumer presented, or merchant presented QR codes. For merchant presented QR codes, the QR code is presented by the merchant for the consumer to scan. For consumer presented QR codes, the QR code is presented by the consumer for the merchant to scan.

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