



How COVID Made QR Codes Cool

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There is a long list of formerly denigrated technologies that have since become key components of the modern world. The bicycle, the car, answering machines, and laptops were all considered dubious fads when they first emerged. In each case, it took some calamity, innovation, or critical mass of adoption before they wormed their way into the realm of the essential.

Until early 2020, it was unclear whether QR codes would end up in the “formerly denigrated” camp or slide into the heap of forgotten fads alongside Pogs and the jet car. Fortunately for QR codes, a

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Software

- Cloud

- Encoder

- iPhone

App

- Windows

App

Store

- NFC

Tags

- UHF

RFID

Tags

combination of quiet innovation and the calamity of the COVID-19 pandemic have converted them in the public mind from a silly marketing gimmick to a critical component of the public health infrastructure. Suddenly key components of life, QR codes are poised to get taken seriously again as a primary tag technology for Connected Things projects.

Custom

Tags

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Hardwar

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Encodin

Not all fun and games

Until 2020, most western consumers associated QR codes primarily with a complicated and fruitless appendage to advertisements. Encounter a QR code and you'd have to download a third-party app then point your (possibly bad) phone camera at the code, which is simply a two dimensional barcode format often pointing to a URL or identifier, just to be taken to a corporate homepage that may or may not be optimized for mobile.

In spite of the reputation for redundant marketing kitschiness they ended up with, QR codes started as —and remain— a serious efficiency innovation in manufacturing and factory automation. Japanese automakers in the mid 1990s were among the first users of QR codes, deploying them to track and catalogue parts on the assembly line and in the warehouse. From the modern Connected Things perspective, it's clear that they were on to something with their particular QR code use cases.

Fundamentally, the technology is an excellent way to store machine-readable data in a printed format—

and quite a bit of data as well. A standard QR code can hold up to 3 Kb of data, enough to comfortably store all the preceding text in this article in plain text format.

In addition to their machine-readability and remarkable data storage capabilities, QR codes are extremely cheap. Bulk QR codes are the kind simply added to existing artwork (like those on advertisements). Any copies of the material containing the QR code store the same data, and they're totally free. Variable QR codes store different data on each individual printed QR code (like those used to track parts in a factory), and require a special printing process to create, but that only adds between \$0.005 and \$0.01 per QR code to basic printing costs. The cost, even for slightly more complex variable QR codes, is essentially free—which may not have helped their pre-pandemic reputation.

From “may as well” to “MUST”

QR codes may be essentially free, but that doesn't mean they're worthwhile for every use case. Marketers and advertisers were able to make a low-risk bet on including QR codes in just about everything without worrying too much about whether they'd be widely used or what the user experience would be like. Many organizations, from top tier ad agencies to local cafes, took a may-as-well attitude, adding QR codes for the small percentage of

consumers in the west who bought into the QR “cool” that was far more widespread in east Asian countries.

This low-risk, low-investment bet may have played well to a small number of enthusiasts, but left most people ignoring QR codes or rolling their eyes at the poor user experience. That all changed when it suddenly became a health hazard to touch menus, gas pumps, fliers, ticket and beverage machines, and more.

The COVID-19 pandemic quickly converted QR codes from a may-as-well redundant appendage to the only way to safely interact with many public objects. QR codes for interacting with—or replacing—physical objects became a virus mitigation tool as serious as masks, social distancing, and the promise of a vaccine. Consumers who previously saw the technology as a fad soon learned how to use QR codes and found that between the time they had formed their impressions of the technology and the time they were forced to begin using it, the user experience had improved significantly.

Quiet (and not so quiet) innovation _____

While consumers were sorting themselves into QR-fans and QR-skeptics, Apple and Google were adding native QR code and NFC tag support to iOS and Android operating systems. Now, all that was needed was opening a phone’s camera app and

pointing the (much improved) camera at the QR code. This step removed a key barrier that had long hindered QR code adoption by consumers: the need to use a third-party app. Native support made it easy for everyone to start scanning QR codes, but it also signaled to consumers that the technology was now mature and mainstream.

Once nudged into using QR codes by the pandemic, first-time users found it was a lot easier and the experience better than they had imagined. During the pandemic, QR codes became the only way to do things like read a menu or buy a ticket, and the acceptance of “mobile first” web design also meant the experience of using traditional QR codes delivering simple web links was much improved as well.

With the closure of businesses and stay-at-home orders in place, QR codes’ unique ability to connect consumers directly with ecommerce platforms allowed brick-and-mortar businesses to offer customers an easy way to order contactless takeout food and drink and connect with their products and services online. Organizations were forced to quickly rethink their entire business models, and in many cases the contactless digital connection offered by QR codes became an essential rather than peripheral part of their operations.

QR codes are cool again _____

The COVID-19 pandemic has shaken up the way we live our lives and do business. Many of the fruits of this shakeup will outlast the eventual decline of the pandemic itself. Consumers are now used to doing more kinds of business, including business with local stores and restaurants, online. The pandemic has forced QR code technology to return to its roots, connecting physical things to the digital environment in meaningful and uniquely valuable ways.

Now better and much more fundamental to the way we do business, QR codes are quickly becoming as cool in the west as they have been in Asia for years. Riding this recent wave of QR cool, services have arisen that allow users to create “custom” QR codes, taking the cool factor to the next level by creating more visually appealing QR code matrixes. While the basic applications of QR codes are returning to their serious industrial roots, the trend of visually interesting “custom” QR codes is diverging from that tradition, which may cause problems for some QR code use cases.

When form doesn't follow function _____

Custom QR codes by nature diverge from the standards set to ensure QR codes work properly. They include non-standard patterns of dots and eyes and non-rectangular dots and eyes, as well as multiple and variable colors, integration of graphics, and more. For many consumer camera-based QR code use cases, these custom designs work just fine.

Organizations interested in capitalizing on the cool QR trend should be aware that for industrial applications and non-camera barcode readers, these custom codes can cause serious functionality problems (video below). The process of printing custom QR codes also exceeds the standards of traditional barcode printing. As such, creating a series of QR codes with different data on each one becomes much more involved.

There's no doubt that custom QR codes can look very cool, and for the right applications they could be a great way to deploy QR code technology in its most modern visual form factor. Before jumping headfirst into custom QR codes, organizations should understand their limitations (and the limitations of QR codes in general), and how they can be used in conjunction with other tag technologies to connect the digital and physical worlds.

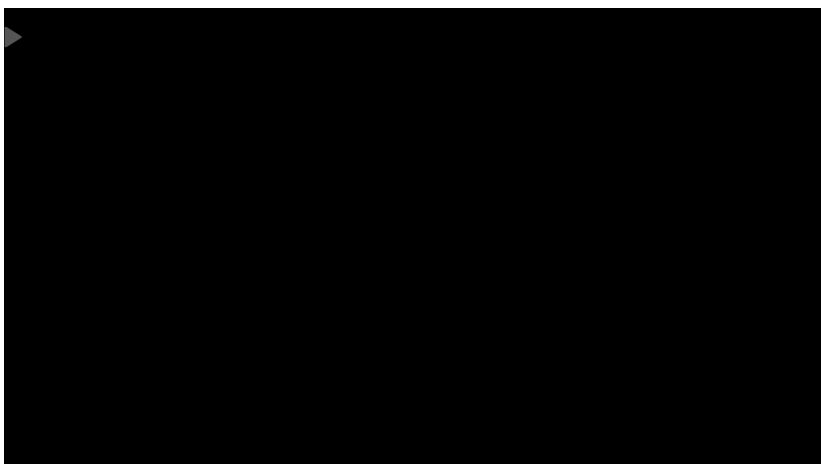
QR Codes + NFC Tags

The quiet innovation Apple and Google did to get native support of QR codes on nearly all smartphones has been mirrored on the hardware side. Most smartphones available today have native hardware and software support for NFC tag technology as well. NFC tags use RFID and an imbedded NFC chip to allow phones to interact with the physical world, rather than QR codes' visual, barcode technology. NFC tags can store more data and offer security advantages over QR codes.

Because of their visual nature, QR codes are very easy to clone—all it takes is a photocopier, scanner, or camera to create an exact copy. NFC tags rely on protocols that have built in security to make cloning much harder, but they're clearly more expensive (it's hard to compete with essentially free).

Companies should also be cautious about the URLs their QR codes point to. In 2015, the food company Heinz made headlines when they allowed a promotional URL linked to a QR code on ketchup bottles to lapse. The URL was later obtained by a website featuring adult content. While these kinds of gaffes are more and more the purview of the old, less popular approach to marketing with QR codes, the incident highlights the need to work with tag technology experts as well as marketing experts to ensure security and intended functionality of QR codes for promotions.

GoToTags routinely works with customers to determine which tag technology (or combination of technologies) is best for their project. Particularly in light of QR codes' recent rise to popularity, a combination of NFC and barcode tag technology is often a solution for serious, durable, and on-product tag applications. QR codes printed on NFC tags allow consumers to interact with the tag in multiple smartphone-native ways, increasing the chance they'll interact with the tag successfully. While NFC technology continues to improve and costs continue to fall in the long run, QR codes will remain an excellent (and suddenly cool) low-cost option for the foreseeable future.



STMicroelectronics – Diversifying the NFC Chip Market



iPhone 14 – Updates to NFC and NFC Tags with iOS 16 in 2022



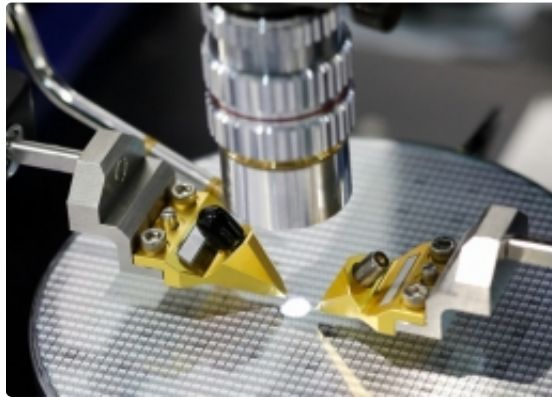
How Changing from Barcodes to NFC Tags Made the Security Services Industry More Trustworthy



iPhone 13 – Using NFC and NFC Tags with iOS 15 in 2021



How COVID Made QR Codes Cool



Beat the NFC Chip Shortage — Start Planning Now



Radar Skis Builds Direct-to-Customer Communication With Embedded NFC Tags



NFC Tag Encoding Table Preview (Video)

