

# The Obvious Winner: NFC vs. QR Codes

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**Abstract:** In today's world with ever changing technology, innovations are seen everywhere to keep up with the competition globally. Below, we will read what exactly are the NFC and QR codes, and how do they help us in managing the inventory. Advantages and benefits of both the codes are also mentioned along with their respective disadvantages. Various similarities between the two can be seen as well, along with the relative differences. The study ends on the conclusion that the latest model of the code, NFC, would be a better choice due to its innovative and technological advantages though it might take a few more years for it to do so.

**Keywords:** NFC, QR code, innovation, globalization.

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## 1. INTRODUCTION

The world is changing drastically, and with the change comes the advancement of the technology to keep up with the new trends globally. Various tools are developed to reduce the work speed and increase the effectiveness of day to day processes. Some of the technologies consist of a form of communication known as the QR code and the NFC.

QR codes were developed from the invention of barcodes to perk up the management of the stock and inventory. It was launched worldwide in 1994 and it is now also used in marketing, business, online transactions, and much more. It is easy to work with as it can be scanned by anyone using a smartphone.

NFC (Near Field Communication) is another form of wireless communication that is quite recent and stands in competition with the QR code. Radiofrequency technology is used in the process of NFC. It works with the help of a chip that interacts with a smartphone if it contains the NFC function in it. The device needs to be within the 4cm radius of the phone to activate the chip ("What are the differences between NFC tags and QR codes? / Learning Center", 2020).

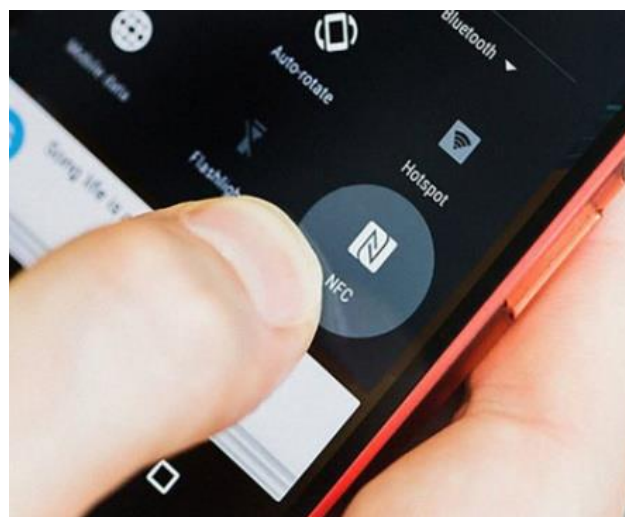


Figure 1: NFC function in a smartphone

## 2. USES OF QR CODE

QR codes are used widely all over the world. It can be used in the online phone billing as well as in the payment of bitcoins. Users can be provided with information regarding various products upon scanning the code. Sharing of various links is also done through this like the links of the app store, media files, images, videos, or PDFs. It is also used in the

formation of a range of coupons and allowing the users to gain it by scanning the code. The sharing of the location with Google maps is also done via these codes. Some form of communication like emails, messages, and business cards also use this system to their benefit by making the customers gain easy access to their websites.

### 3. USES OF NFC

This form of communication was launched in 2008 and has been in use since then. It is mostly in use with the credit and debit card payments which involves no contact. It has become more popular with an increase in online shopping and transactions. Another feature of NFC includes transferring documents, numbers, pictures, or using it for Google maps location trait ("NFC vs QR Code: Why QR Codes Are the Clear Winner - QR Code Generator", 2020).

### 4. ADVANTAGES OF QR CODE

The main benefit of the QR code is the small amount of cost essential to apply it. It is also a simple system and can be used by anyone with a smartphone, whether it is an iPhone, Android, or any other system. It also does not require any physical contact to be made which is beneficial in the current COVID pandemic. The size of the code is linked with the distance required to use it. The bigger the code is, the more the distance increase to scan the code for activation. This is useful to keep the social distancing practice in mind (patrol, 2015).

### 5. ADVANTAGES OF NFC

There are many benefits to the NFC system. It is simple to use and understand. The tags or chips required for the function is embedded in the system and is not visible easily. Light does not affect the execution of the process. It is more flexible as the change in the tag can be overwritten easily. User-friendliness is another benefit of NFC as the phone owner only needs to tap the device against the NFC tag and do not require opening any app for it to function. The system works two ways since it can be used for online payments as well as to save loyalty points ("The Death of QR Codes & The Rise of New Technology | Digital Operative", 2017).

### 6. DISADVANTAGES OF QR CODE

The main disadvantage of the QR code is the inflexibility in the alteration of the code. Any change in the code will require the remaking of the new one which will lead to mass printing of it for further use. It will also make the previous code null. Light also plays an important role in the proper functioning of the QR code scan. It should be properly visible in clear light and the print should be dark enough for the scanning to take place. The stability of the camera is also another factor that often leads to failure of the scan if not paid proper attention. Security issues also take place in this system since the hackers might also use this for phishing and lead the users to websites with various deadly viruses ("QR Codes versus Near Field Communication – NearFieldCommunication.org", 2020).

### 7. DISADVANTAGES OF NFC

The current main disadvantage of NFC is the cost required for the production of the NFC tag or chips. Since the chip is encoded, only specialized organizations can produce them thus leading to high cost. The phone should also be within a close range of 4 cm for the NFC tag to work, occasionally requiring a tap from the device. Due to its wireless feature, the activation might get disruptions from the surrounding environment. NFC chip is also not available in all the smartphones, thus restricting the users to use the system. Apple is the major problem since none of its products comes with an NFC chip. It could be because of the cost which comes with installing the chip, or the security issues which could arise due to the new technology. Apple also has a history of wait and watch before adopting any new system. QR system is already included in the Apple products so possibly it does not see any need for the new system. According to a survey in 2015 by Statistica, about 43.5% of Americans use the iPhone instead of androids, which will pose the problem above mentioned ("Comparing QR Codes vs NFC in the Battle for Your Mobile Wallet | Visual.ly", 2020).

### 8. THE SIMILARITY BETWEEN NFC AND QR CODE

NFC and QR codes are used to give the users more information about the products. For example, a QR code on a newspaper upon scanning will allow the reader to check out a video regarding the article from their phone. The NFC system similarly will provide information to the users about an object by just tapping on it.

The QR code made for a specific purpose like a sale product will send the user to that particular product only when scanning the code. NFC uses this method too by tapping the other tagged device like a phone of the customer.

With the coming of globalization, online shopping has taken a great place in the world. The best online customer decides on buying a product only after looking at the review regarding it. Both the NFC and QR code system allow quick review of products just by a simple scan which takes no time and is hassle-free.

By adding a QR code or an NFC chip to a business card allows the users to visit your website easily for future purchasing of products. The user-friendliness of it might lead to more sales through the retained customers.

## 9. COMPARISON OF NFC AND QR CODE

QR codes can be produced by anyone. There are various websites available on the internet which provide such services at no cost. Production of the code in bulk leads to minimal cost. On the other hand, NFC requires a specialized organization to produce a chip that needs to be embedded in the product. The cost of the tag is comparatively more due to its specialization.

QR codes require an appropriate light system for the scanner to work. The camera of the phone also needs to be in a proper working condition to avoid any failure. Whereas NFC does not have to meet such sort of condition. It only needs to tap itself against the device with the embedded chip for it to work.

QR code is used worldwide and everyone is comfortable in using the system. It is also available in all the smartphones with or without a third-party app. Due to its modern technology, many users do not feel comfortable using it or are just not aware of the technology just yet. It has also lagged due to its limited devices. Apple products, for example, do not contain an NFC chip to make it work.

Visibility of the QR code is necessary to scan the product. This might cause a problem if the print is not dark or readable enough. Printing of the code also makes some products lose their appeal since it needs to be able to be seen. NFC does not require the visibility of the chip to make it work. You can hide your tag and use the space saved to promote your work.

No change can be made to the QR code once it is printed. Any error in it will lead to completely changing the code which will result in making a new one. The owner of the NFC chip, on the other hand, can reprogram the system anytime leading to more flexibility. It also helps in saving time, money, and effort.

QR codes can be used by hackers to mislead the users, resulting in coming in contact with a virus. The radiofrequency technology of NFC puts off most of the hackers since the communication is done within a small radius only (Aditya, 2020).

## 10. EVALUATION

Both the QR codes and NFC had faced a disadvantage because the devices were not prepared properly for everyone to use. But with the coming of time, these problems are decreasing and the notion of using these systems is gaining an upper hand. QR code is an old method but still has been increasingly progressing to keep up with the developing world. But it has some limitations which can be overcome by the NFC system. Though not up to the par, the NFC system has been making quite a progress by being user friendly. It also has an enhanced plan and any changes that need to be made can be done quickly just by reformatting the chip. Another reason why NFC is the winner is the security system is provided. More and more phones are created with the NFC chip now to keep up with the changing environment. With the coming of the years, it is seen that the NFC system will take over the QR code.

## REFERENCES

- [1] Aditya, R. (2020). QR Codes vs NFC: What is best for your business?. Retrieved 16 September 2020, from <https://blog.beaconstac.com/2019/09/qr-codes-vs-nfc-what-is-best-for-your-business/>
- [2] Comparing QR Codes vs NFC in the Battle for Your Mobile Wallet | Visual.ly. (2020). Retrieved 16 September 2020, from <https://visual.ly/community/Infographics/technology/comparing-qr-codes-vs-nfc-battle-your-mobile-wallet>
- [3] NFC vs QR Code: Why QR Codes Are the Clear Winner - QR Code Generator. (2020). Retrieved 16 September 2020, from <https://www.qr-code-generator.com/blog/nfc-vs-qr-code/#:~:text=While%20NFC%20technology%20can%20be,very%20short%20radius%20for%20use.&text=QR%20Codes%20are%20more%20secure,with%20absolutely%20no%20physical%20contact.>

- [4] patrol, q. (2015). NFC or QR-codes? What are the advantages of each one? | QR-Patrol | Real-Time and Online Guard Tour Patrol System. Retrieved 16 September 2020, from <https://www.qrpatrol.com/blog/nfc-or-qr-codes-what-are-advantages-each-one>
- [5] QR Codes versus Near Field Communication – NearFieldCommunication.org. (2020). Retrieved 16 September 2020, from <http://nearfieldcommunication.org/qr-codes.html>
- [6] The Death of QR Codes & The Rise of New Technology | Digital Operative. (2017). Retrieved 16 September 2020, from <https://www.digitaloperative.com/blog/2017/the-death-of-qr-codes-and-the-rise-of-new-technology/>
- [7] What are the differences between NFC tags and QR codes? / Learning Center. (2020). Retrieved 16 September 2020, from <https://www.idsuperstore.com/learning-center/what-are-the-differences-between-nfc-tags-and-qr-codes/>