**RFID**

Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. Active tags have a local power source (such as a battery) and may operate hundreds of meters from the RFID reader. Unlike a barcode, the tag need not be within the line of sight of the reader, so it may be embedded in the tracked object.

More Info: <https://en.wikipedia.org/wiki/Radio-frequency_identification>

**QR code**

QR code (abbreviated from Quick Response Code) is the trademark for a type of matrix barcode (or two-dimensional barcode).

The QR code system became popular outside the automotive industry due to its fast readability and greater storage capacity compared to standard UPC barcodes. Applications include product tracking, item identification, time tracking, document management, and general marketing.

A QR code consists of black squares arranged in a square grid on a white background, which can be read by an imaging device such as a camera, and processed using Reed–Solomon error correction until the image can be appropriately interpreted. The required data is then extracted from patterns that are present in both horizontal and vertical components of the image.[2]

More information: <https://en.wikipedia.org/wiki/QR_code>

**Barcode**

A barcode (also bar code) is an optical, machine-readable, representation of data; the data usually describes something about the object that carries the barcode. Traditional barcodes systematically represent data by varying the widths and spacing of parallel lines, and may be referred to as linear or one-dimensional (1D). Later, two-dimensional (2D) variants were developed, using rectangles, dots, hexagons and other geometric patterns, called matrix codes or 2D barcodes, although they do not use bars as such. Initially, barcodes were only scanned by special optical scanners called barcode readers. Later application software became available for devices that could read images, such as smartphones with cameras.

Read more: <https://en.wikipedia.org/wiki/Barcode>

**Benefits of RFID**

They can hold a substantial reasonable amount of data and can display the data when read by a compatible device.

Reading the The tag does not require a direct line of sight, and data can be transmitted when the tag passes a fixed reader.

**Drawbacks of RFID:**

RFID systems are can be very expensive- they require special mobile or fixed computer readers to transmit or receive data

The RFID tags chips can be sensitive to certain materials and liquids, which may limit where the tag can be placed on an item, as readability may be affected.

In order to implement a RFID system, the entire local environment must be analyzed, including anything from the types of metals, lighting, and sources of radio interference, since the data is transmitted via radio frequency. A site survey is necessary to identify all sources of potential interference or weakening of the signal and can cause major disruptions.

**Benefits of QR or DM tags:**

2D codes can hold a significant amount of information, and can be printed in any in any size, on virtually any material, making them useful to manage many different types of assets or items.

They can be scanned using most smartphones, allowing data can to be stored and received from almost anywhere.

No additional devices required for data collection, since the device is already in your pocket.

QR 2D tags are very inexpensive. Asset management using smartphones and printed tags can be set up for significantly less than a RFID system, providing users of any type a simple solution where a requirement for data collection exists.

**Drawbacks of QR tags:**

QR codes lack the automation ability for proximity scanning like RFID- human input is necessary.

A line of sight to the tag is necessary to scan the tag and input or extract data.

<https://nektardata.com/a-brief-guide-to-understand-the-difference-between-qr-and-rfid-tags/>

**How are QR codes better than barcodes?**

The QR code, similar to a barcode, is an example of an information matrix. However a significant difference in the two is that while a barcode only holds information nicely in the horizontal direction, a QR can do so vertically as well. This is why QR codes are referred to as two-dimensional, because they carry information both vertically and horizontally. Another direct result to this is greater potential to carry information in a smaller space. Compared to a barcode, it’s no competition at all.

**What are some of the advantages?**

A QR code can carry up to some hundred times the amount of information a conventional barcode is capable of. When comparing the display of both: a conventional barcode can take up to ten times the amount of printing space as a QR code carrying the same amount of information. A QR code is capable of being read in 360 degrees, from any direction, thus eliminating any interference and negative effects from backgrounds.

<http://www.mobile-qr-codes.org/qr-codes-vs-barcodes.html>