Benefits of IoT Vending Machines for Retail

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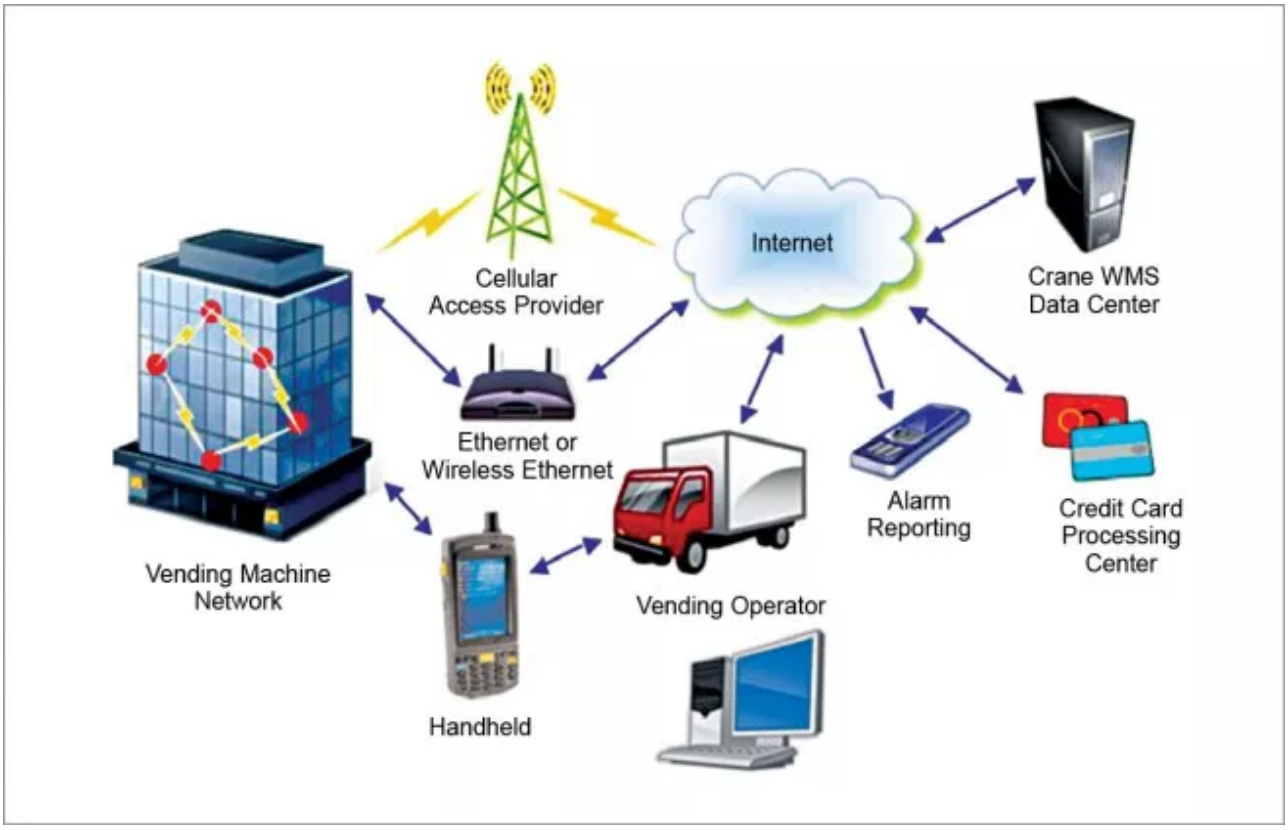
Machine-to-machine (M2M) learning and the Internet of Things (IoT) technologies present a lot of opportunities to increase business efficiency. One such opportunity exists in the retail vending machines segment.

A medium to large retail facility in India, with an average weekly footfall of about 2000, requires four to six vending machines for basic products. The entire setup including software, hardware and related services costs INR 1.5 to INR 3 million.

So far, the Indian retail segment has been highly labour-dependent, requiring a lot of manual procedures. Accountability and inventory management are areas of high concern for the industry. Smart vending machines address all such problems, while promising high returns on investment.

The global intelligent vending machines market is expected to grow at 38 per cent annually up to 2021, reaching 13.34 billion US dollars by 2021—according to international research organisation Technavio.



Case study: Q3 Technologies

A company wanted to introduce new cutting-edge products and technologies that allow people to communicate with systems and hardware in the retail space.

The company wanted to develop a system that could communicate with machines, devices and systems. The company envisioned to tap the fast-growing vending machine market by providing remote tracking for a network of vending machines so that distribution companies could effectively plan trips for refilling the entire supply chain.

Q3 Technologies office in Gurgaon was engaged to customise, design and develop the vending machine remote management application on top of the client's core machine-to-machine (M2M) protocol. This wireless technology would allow users to monitor vending machines from a single control centre.

The technical systems and application requirements of the company were analysed and an application was designed to ensure all the needs and objectives were covered. For M2M communication, it used the BitXml M2M protocol, which was specifically designed to provide a strong syntactical and semantic foundation to M2M communication. It was an XML-based language, thus providing easy readability. As the protocol was Meta-

coded in XML, Q3 designed a parser to parse the XML schema language, get details about vending machine, and upload the data to the database server.

Features of the mobile application include:
1. *Wallet/card top up.* Home page of the mobile app contains two sections: wallet/card and top up. Whenever a user scans or manually puts a vending machine code, the code gets validated through an API. The user is able to connect with the machine only if a valid vending machine code is entered.

2. *View the latest transaction.* The mobile app allows users to see the latest transaction (executed in the vending machine) and wallet balance. It also provides the feature to recharge the wallet and top up. Transactions could be wallet payments, credit card payments or top up payments.

3. *Insert/edit/remove vending machine.* The mobile app allows users to insert, edit or remove vending machine devices. While creating the vending machine device entity, they can map the Box ID with the particular vending machine. The Box ID is the gateway manager's unique ID, which is installed on the actual vending machine.

4. *Register/edit/remove vending machine operators.* The mobile app allows users to register/edit/remove vending machine operators. After registering the operators, it allows them to map the vending machine operators to their respective locations (POS) and clients.
In web application too, the GUI interface allows users to register/edit/remove vending machine operators and insert/edit/remove vending machines. In addition, the control panel interface allows users to add, remove and organise the gateway, modify parameters, and manage notifications and events. Users can see real-time data like alerts, warning and sales on their dashboard along with the available latest firmware, which is installed on gateway manager.

Users are also able to set product prices, where applicable, and out of stock alerts for each vending machine in the field. They can send some commands to the connected vending machine device using the web services and EVADTS protocols and receive sales data, alarm and warning data through web services and EVADTS protocols. The

middleware system parses the received raw data into meaningful data and inserts it into the main database.

Specific benefits of the Q3 solution include:
1. Real-time usage reporting via smartphone or personal computer, as every transaction is automatically tracked and recorded at the user level.

2. Many of the company's operations run 24×7. As the vending machine gets a secured source product, required items are available at any time without exposure to misuse.

3. Improved assortment segmentation eases profiling of single machine consumption, which increases the profitability and service level.

To conclude
The retail industry is slowly but steadily opening up to the use of smart vending solutions. This opens doors for IoT hardware, software and related service solution providers to offer customised solutions for enterprises.