

# Vertical Social Network for Retail Business Eco-system, A Proof of Concept

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## ABSTRACT

A proof of concept based on cloud and mobile technologies was developed to provide a social platform for retailers, their in-store customers and suppliers. The solution tried to reduce retail friction and improve consumer demand clarity and at the same time, serve as a basis to study how exactly social content will make an impact to the actual sales of products.

## KEYWORDS

Vertical social network, Supply chain, Retail friction

## 1 BACKGROUND

Demand sensing is one of the key challenges for retail suppliers. AMR research [1] has stated that the average time to sense demand is usually three times the time to process an order. Hence companies that focus on reacting to demand are always on their back feet struggling. Consumer facing retail businesses and their upstream suppliers are always in need of data to affirm their product design, procurement, sales, and logistics related decision makings. But the right kind of data is not easy to come by. There are two common issues associated with demand sensing data that are currently available: forecast accuracy and timeliness.

For the accuracy part, POS data that are usually used can be misleading, what consumers bought today does not necessarily lead to more future sales. There could be untold dissatisfactions regarding the purchased goods on many levels. There could also be unfulfilled demands that retailers are not aware of.

For the timeliness part, market research reports primarily drawn on professional surveys and interviews provide valuable insight, but it is not realistic for routine operations such as procurement planning to incorporate such research results as real world is much more dynamic.

One known approach to shorten order to fulfillment process and bring up the level of consumer demand sensing is to practice e-commerce, which will skip intermediate players such as distributors and retailers. As an alternative and also counterpart approach for those still practices in-store retail, we have found pervasive social network a good answer to shorten the order to fulfillment process, bring up the agility level of supply chain and at the same time reduce frictions for in-store retail transactions [2].

## 2 SYSTEM ARCHITECTURE

A proof of concept (POC) was developed by our team, with the overall architecture illustrated below:

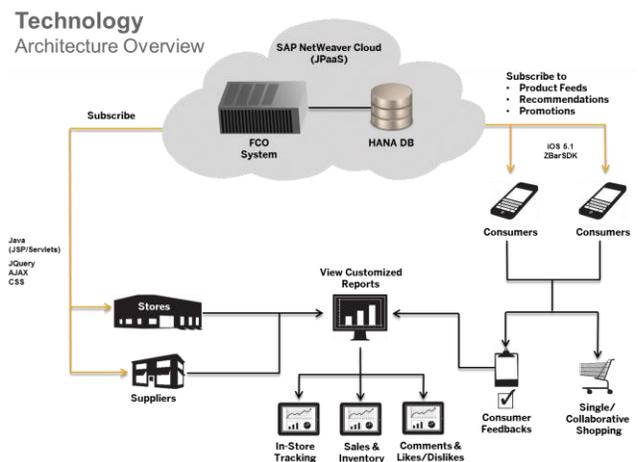


Figure 1 - System architecture

The POC first assumes a cloud server owned by the retailer has been setup in the cloud with master data including product catalogs, source of supplies and store layout.

All suppliers can subscribe to this cloud service as long as they are the verified source of supplies by the retailer. A generic user interface is provided for the following real time information: (1) product sales and inventory, (2) consumer in-store locations, and (3) consumer generated social content. Access to above content for each user in all above 3 categories is role based, depending on individual role's product ownership. For example, supplier A of product X shall not be able to view any data of product Y which is supplied by supplier B.

Consumers can subscribe to product feeds from the cloud service via their mobile phones, including product catalog, personalized product suggestions, and promotions. They can collaborate with each other using a shared shopping list. They can add product based comments, likes and dislikes which will be available for retailer and relevant suppliers to view and respond to. Their purchasing behavior data including picking sequence and choices of products will be recorded back as individual profile and contribute to the generation of product suggestions.

### 3 SOLUTION BUILDING BLOCKS

This proposed solution is consisted of 2 building blocks:

- (1) Mobile application to allow:
  - I. Indoor location based product suggestion
  - II. Mobile collaborative shopping
  - III. Product based social network
- (2) Role based cloud access of consumer demand

#### 3.1 Mobile application - Indoor location based product suggestion

“Indoor location based product suggestion” is to allow consumer to access relevant product data

such as description, image, price, barcode, shelf location, previous shoppers' comments etc. via smartphone, according to the person's actual indoor location. Suppose a shopper is standing in between aisle 1 and aisle 2 searching for yogurt, the embedded indoor LBS module shall suggest a list of products on the nearest shelves, filtered further by the shopper's profile if past activities have been captured in the system.

Various technologies [3] and [4] can be implemented to find the shopper's indoor location including the GPS, signal strength triangulation via Cell Tower locating, Wi-Fi network, BLE (Bluetooth low energy), scanning of RFID (radio frequency identification), UWB (ultra wideband, [4]), mapping of Magnetic Field, and processing of video content. We have adopted a simpler method which is based on the store layout and item shelf locations sit already in the retailer's store information management system. Whenever shopper scans the bar code of a product using his mobile phone, the item location shall be read and our solution shall be able to propose other items nearby according to this shopper's profile. The more items the shopper picks up, the more accurate the position projection shall become. Our solution shall have the obvious advantage of low hardware investment as compared to other technology based positioning systems, and can be built easily on top of existing store information management systems.

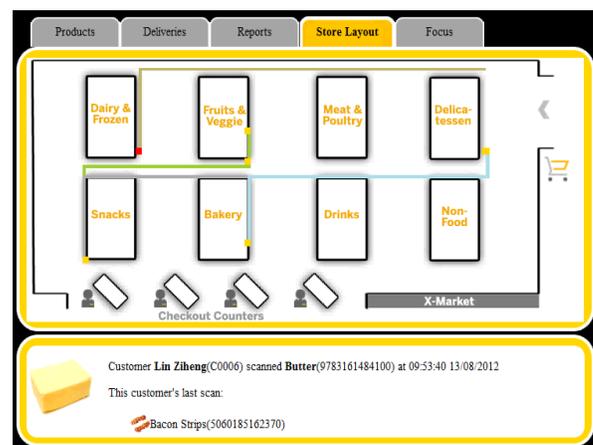


Figure 2 – In-store consumer location tracking and product suggestion

Copied above is the POC screen for in-store consumer location tracking and product suggestion on the mobile app.

### 3.2 Mobile application - Product based shoppers' social network

“Product based shoppers’ social network” is to allow shoppers give feedback to a selected product either carted or purchased in a physical store environment via their smartphones. Such comments together with likes and dislikes are attached to individual product SKU, and broadcasted through cloud service. The published comments will reach to other shoppers, the retailer and the relevant product suppliers, forming essentially a social network.

Such product based social network shall enable communication among shoppers, or any combination in between the shoppers, the retail store, and the product suppliers. As illustrated below, shopper’s likes and comments will be summarized together with POS data to make the demand sensing both accountable and in real time, and pass to all upstream suppliers based on product source of supply, thus to bring up the level of supply chain transparency and agility. Additionally, researchers can use this as a basis to study how exactly the social behavior including agreeing/disagreeing, and sentiments in detailed comments, will make an impact to the actual sales of products, as described in [6].



Figure 3 – Subscriber’s view of shopper generated social content (Retailer)

### 3.3 Mobile application - Mobile collaborative shopping

“Mobile collaborative shopping” helps when there are a group of people shopping together, for example: husband and wife for family groceries, good friends for weekend parties, or a team of administrative staffs for office events. A mobile-cart can be created and shared among the group of shoppers via their smart phones, and each individual’s choice of item is made visible to the rest of the group.

Extension can be made here to include mobile payment. The topic has seen many discussions [7] and applications as well.

### 3.4 Role based cloud access of consumer demand

Last but not least, consumer-level demand data including: actual sales, shoppers’ comments, ratings and in-store locations, filtered by product, will be broadcasted to the cloud service for each role in the supply chain to access in real time. The supplier of a particular brand of canned soft drinks, for instance, will be seeing real time sales figure, customer in-store picking up rate, and comments made to this soft drink product, from all the retailer stores it does business with. The suppliers shall then have the exact and real time market demand data to feed into their planning process, the one thing that is most needed for supply chain efficiency and agility.

As described, access rights will be given based on the verification of product source of supply. Upstream distributors, wholesalers and suppliers once receive the invitation from the retailer, can (1) access consumer demand data for their own products, and (2) create own source of supplies and submit to the retailer to review. Role based access shall make sure all parties have access only to products which they have been verified as source of supply. This is to assure business owners that non-relevant parties shall not be able to access their sensitive data.



**Figure 4** – Subscriber’s view of shopper generated social content (Supplier)

#### 4 SUMMARY

To summarize, this proposed solution will equip the onsite shoppers with mobile shopping interface with a C2B social channel to interact with stores and verified suppliers. The retailers and upstream suppliers shall be able to serve the in store customers better and reduce frictions in retail transactions. From the B2B side, consumer level information gathered will become transparent to all the stakeholders in the supply chain, so that they can better plan their design, production, promotion, procurement, minimize inventory, and achieve faster time to market.

The solution is best applicable for retail business selling fast consumables with large variety of products and requires in-store experience. Drugstores, supermarkets and franchises for designer items, are some of the targeted user groups. The solution will further enable the traceability of serialized product to establish required corporate social responsibility and help create a more sustainable business eco-system. As Mikolaj Jan Piskorski from Harvard Business School stated according to [8] that, online social networks are most useful when they address real failures in the operation of offline networks.

This proof of concept is an attempt to address the demand sensing problem in a better way with the help of vertical social network platform, which helps with the extensive and complex information change along the supply chain as explained in [9].

Unlike many existing literatures in the field of vertical marketing and demand predictions where inter-organizational relations and exchange based paradigms are the focus of study, we seek to cloud based on demand data sharing and reporting to build up and strengthen the relationship ties, involving end to end relevant parties in the supply chain. We believe the proposed POC is a practical and proactive approach for retail business owners to remove information exchange frictions.

#### REFERENCES

- [1.] Lora Cecere (2009), A Four-Step Program for Supply Chain Agility, AMR Research, June 2009
- [2.] Curtis Franklin JR. (2012), Low-Friction Retail Transactions, Enterprise efficiency forum, February 2012
- [3.] M. Vossiek, L. Wiebking, P. Gulden., J. Weighardt., C. Hoffmann (2003), “Wireless local positioning — Concepts, solutions, applications,” in Proc. IEEE Wireless Communications Network Conference, Aug. 2003, pp. 219–224.
- [4.] Gyeyoung Lee and Jaegeol Yim, A Review of the Techniques for Indoor Location based Service, International Journal of Grid and Distributed Computing, Vol. 5, No. 1, March, 2012
- [5.] Institute of Infocomm Research (2011), High Precision Indoor Positioning, white paper, 2011
- [6.] Christy Pettey (2010), Gartner Says Majority of Consumers Rely on Social Networks to Guide Purchase Decisions, Gartner.com, 2010
- [7.] David Pogue (2012), Pay by Voice? So Long, Wallet, New York Times, July 18, 2012
- [8.] Sean Silverthorne (2009), Understanding Users of Social Networks, Harvard Business School Weekly, September 14, 2009
- [9.] Stefan Wuyts, Stefan Stremersch, Christophe Van Den Bulte, and Philip Hans Franses, Vertical Marketing Systems for Complex Products: A Triadic Perspective, Journal of Marketing Research 479 Vol. XLI (November 2004), 479–487