Market Insight
Amazon Go and the Future of Brick-and-Mortar Retail

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What do you feel is the reason for Amazon Go?
The Amazon Go store is a response to the limitations of on-line Grocery shopping and less a new battle line for a full out assault on the brick and mortar Grocery industry. As John Blackledge, an analyst with Cowen & Co. wrote in a research note; "Although an increasing number of people are buying and willing to buy groceries online in the future, we acknowledge some people may never be comfortable with the idea, hence Amazon introducing physical locations makes a lot of sense as it removes a friction point."

Is the Amazon Go concept new?
No, but then Yes. Amazon has done an admirable job with a practical application from their own experiments and IP, as quoted in their announcement. However, the store concept itself is not new. In fact, MetroAG was one of the first retailers to conceptualize an array of technologies (2003) that enabled consumers to shop in a store almost completely unassisted, as well as exit the store without any checkout queue or process (Watch here: https://www.youtube.com/watch?v=bV-4phC2rvU). An even more recent rendition of a similar concept was debuted by Tesco in 2011 called Homeplus (Learn more here: https://www.youtube.com/watch?v=nJVoYsBym88).

Specific to Grocery, Food Lion tested a small group of stores branded 'Bloom' between 2004 and 2012, which employed a range of similar technologies including mobile shopping (albeit with a laser scanning device provided to a registers shopper at the store entry), the ability to self-serve and package produce, match foods and wines with a kiosk application and self-checkout including handing over the mobile cart contents to the store POS system (via self-checkout) or simply by turning in the scanner to an attendant (and completing the transaction) and exiting the store. Even today, mobile grocery shopping via mobile phone apps, or store provided scanners, are available in a wide range of retail chains today. So, while the concept itself is not new (e.g. mobile check-in, mobile shop, mobile checkout), the degree of seamlessness that appears is.

Is the Amazon Go technology new?
Within the Amazon announcement and video, the in-store technology they describe at a conceptual level is well known, and for the most part (and in different technology renditions) are available across the Retail IT industry. Store check-in, mobile shopping, self-checkout, smart shelves, etc. have all been around for quite a while, However, there have been three primary challenges that have limited or scuttled their success.

First, implementation – the sheer cost to deploy and sustain these technologies have been a challenge for the past decade. In short, the benefit to the consumer has not been matched with a digestible benefit to the retailer in terms of shopping frequency or basket size.

Second, adoption – when in-store mobile applications have been made available, they have been optional to consumers, and the adoption rates have been low. In most cases, in-store mobile shopping application use has been in the single or low double digits, making the ROI to sustain these technologies too low to support broad rollout or complete dependency. In the case of Amazon Go, it appears that there is no option to shop or transact other than using the mobile app and going "all in" on the shopping experience. Therefore, the complete orchestration of resources, both physical and virtual, will be critical to the success of the Amazon Go model.

Third (and most critically,) friction – using a mobile phone camera to scan item barcodes, QR codes or UPC text has been a major issue, slowing down the shopping process, frustrating consumers and clogging aisles in some cases. In addition, basket audits (or the possibility of being audited) has prompted some consumers to avoid the process all together and wait in a traditional queue or self-checkout. Adding in any transactional anomalies such as age restricted items (age verification required), issues with tendering instruments (payments), etc. and more are reasons why the adoption rate has been so low. While at the retail industry level, computer vision, sensor fusion and deep learning technologies are still generally in various stages of testing and evaluation. The arrival of Amazon Go may drive the acceleration of these and other similar technologies. which has so far not gotten the focus, or attention, those technologies can provide and consumers deserve. Computer vision applied to the itemization at checkout has been attempted repeatedly by retailers and technology companies alike. In most cases, the cost and accuracy took years to develop and perfect, and in the end, adaptation of the technology within the store operations and customer acceptance (again when traditional checkout options were still made available) resulted in lower consumer adoption rates and questionable ROI.

What are the real differences in the Amazon Go shopping experience?

Check-in
The Amazon video appears to show a mobile phone placed by a consumer near an antenna or "reader" of some type, whether NFC or BLE. This provides multiple forms of authentication via association of the physical device and activation of a "transacting session". What is different, is the seamlessness of the initiation of the session. No opening of an App, or logging in or entry of a security code (e.g. SMS/MMS message with a unique identification code or physical registration) is shown in the video.

Mobile Shopping
Guessing at how Amazon Go overcomes one of the biggest issues with mobile shopping (scanning), it appears from the video that by use of an array of cameras, when a customer removes and item from a shelf, the item is added to their order. This could in fact be a combination of camera, beacon and microphone sensing technologies to precisely identify the item type and quantity of items selected by the consumer, the consumer movement, hand position, etc. Regardless, overcoming the requirement to scan a barcode on an item or using the camera of a mobile phone, and to do so quickly and accurately, is a major advantage for Amazon Go.

Checkout
No lines, of course, are the headline for some of the media responses to the Amazon Go announcement, and rightfully so. But, it's clear from the video that Amazon Go will not accept cash or anything else in the form of paper tendering. Even paper receipts are non-existent in the announcement description, but that will be a challenge in a few markets that require consumers to be provided at least the option to receive a printed receipt at checkout. The announcement also does not address what happens when an account over-limit or a consumer decides to return an item - all very real challenges Amazon Go will face if the store concept expands.

Foreseen Challenges
Items sold by unit of measure or weight
Amazon Go appears to be mostly packaged goods products, which is fine if they can consistently maintain fresh product assortment and availability neatly packaged, as REMs (ready to eat meals) or RTPM (ready to prepare meals). But, should the product model venture into unpackaged products (such as produce) or items that are sold by unit of weight (requires a scale), then additional technologies will be required (and are readily available today).

ID Verification
When checked-in the consumer should be "known" by the possession of a mobile phone, the Amazon app and registered (associated account), but ID verification is routine in Grocery retail. Unless Amazon Go never plans to sell OTC pharmaceuticals, Alcohol, or even nail polish remover (abuse-able inhalants), physical presentation of an ID, such as a Drivers Licenses, State or Military ID cards will be required and automation of ID verification so far has failed to pass muster with most state laws. This issue gained industry and national attention when California banned the sale of Alcoholic beverages at self-checkout, which had signification ramifications on self-checkout use throughout the state and in one instance where Tesco Fresh and Easy had only self-service automation as the checkout option created significant operational challenges for the store and disappointment for a significant portion of the consumers.

Security tags
Likewise, if even Amazon intends to sell items that are tagged with traditional electronic article surveillance devices (removable), a process to physically remove those tags and/or deactivate soft tags will need to be addressed. It is possible that computer vision can solve this issue completely, and if Amazon can do that, they'll have a solution the greater retailer industry has been trying to accomplish for decades.

Privacy Rights
Whether it's RFID tags or computer vision that's employed, any implication of monitoring customer habits and behaviors in the store that's not "anonymous" or "anonymized" can draw the attention of a range of privacy rights advocate groups. Because Amazon Go customers most likely "opt-in" to what Amazon can do with the data, customer profile information, shopping behaviors and item purchase history, personal information may be assumed to be secure, handling and use process will be followed and privacy right may safely be waived. However, this may not be the case. In 2015, Nomi (Brick stream), a consumer tracking solution provider, settled FTC charges alleging that it misled consumers about in-store opt "out" choices specific to Wi-Fi tracking of Mobile phone used in the store. This is a current topic being discussed industry-wide as Retailers begin to exploit big data and in-store shopping behavior analytics in efforts to get closer to their customers, shopping preferences and buying behaviors.

Infrastructure
As might be imagined, the infrastructure required to facilitate machine vision technology is significant. The processing technology, whether it's in-store, cloud based, or some combination of fog/edge computing, is vastly different than what a traditional Grocery store has available today. Location of stores, such as Amazon Go in urban markets where the consumer base in more apt to adopt their new shopping experience, also lends itself have available higher speed network access and bandwidth whether it's fiber, wired or wireless broadband. So, as this concept potentially branches out into other markets, not only might the customer demographics be a deciding factor on location, but also the networking performance.

Summary
As a Retail IT solution provider, Fujitsu America is excited to see Amazon Go debut for probably a different reason than might be expected. Grocers have historically been very pragmatic, waiting for new technologies and their application in the store to be trialed and their value well proven elsewhere. Many of the physical technologies used as described by Amazon are well known and available today, but behind the scenes, the analytics, big data, cloud services and platforms, machine learning and computer vision wrapped in Amazon's extensive experience and significant investment are what are the probable differentiators and potential grocery industry disruptors. For Grocery Retail in general it's been the lack of vision, investment and critical focus on the customer store experience side of the equation that's been the biggest obstacle to achieving what Amazon Go appears to have just done. And kudos to Amazon for firing a warning shot across everyone's bow right after announcing they grabbed almost 40% of all holiday weekend on-line transactions Thanksgiving through Cyber Monday. It's possible more physical store centric announcements are on the way from Amazon and it will be interesting and exciting to see how the Grocery industry responds.

New technology adoption in Grocery Retail
Look at self-checkout as an example. First rolled out by a large U.S. grocery chain and DIY chain in the early 2000's, there are still very large Tier 1 retailers that have not adopted the technology, or have only applied self-checkout where unique business conditions exist (e.g. tight labor markets, high demand for self-service, etc.). Additionally, RFID has not progressed past the receiving area doors to the sales floor due to infrastructure and tag costs, as well as accuracy concerns. But, just like self-checkout, the grocery industry does respond differently to competitive pressures. We are witnessing that today with online grocery shopping (ordering and fulfillment) be it curbside pick-up or home delivery. This tool has been achievable for several years, and it was not the ability for grocery retailers to execute these programs, but rather the fulfillment cost that made them untenable. However, those competitors have made the move to provide online shopping to attract and retain customers especially in urban markets, the Grocery industry is now moving in mass to combat customer and revenue loss.

Retail innovation labs (store incubator, store of the future, tech hub labs) have transitioned from novelty to competitive necessity. Tech vendors and retailers are now collaborating and innovate together, to bring new solutions to market sharing in the investment, learning and successes for mutual and individual benefit.