

THE AMAZON GO CONCEPT: IMPLICATIONS, APPLICATIONS, AND SUSTAINABILITY

Alex Polacco, Herberger Business School, St. Cloud State University, 720 4th Ave S, St. Cloud, MN 56301, 320-308-3935, apolacco@stcloudstate.edu

Kayla Backes, MBA graduate, St. Cloud State University, 720 4th Ave S, St. Cloud, MN 56301, 320-308-3935, baka0707@stcloudstate.edu

ABSTRACT

Amazon plans to introduce a *sans*-checkout grocery store in 2017. The experience is designed for those who do not like to stand in a checkout line. Amazon benefits by eliminating the cost of checkout personnel. Customers will use an Amazon Go app and scan their I-phones on entering the store. Sophisticated technology will track their purchases, allow them to exit the store without a physical checkout, and automatically charge their account. This paper explores implications, applications, and sustainability within the industry, and in other industries. Included are also the results of a survey conducted with management of a Walmart grocery store.

Keywords: IT (information technology, Amazon Go, machine vision, artificial intelligence, EPOS (electronic point-of-sale).

INTRODUCTION

In early 2017, Amazon plans on making their *sans*-checkout grocery store, Amazon Go, available to the public. The experience is designed for those who don't like to stand in a checkout line. Sophisticated technology will track their purchases, allow them to exit the store without a physical checkout, and automatically charge their account.

In order to fully understand the implications of this new technological and operational model, we must first look at how the shopping process will shift with Amazon Go. We will examine the type of technology being used such as computer vision and weight sensors. Then will we explore the industries that are currently exploiting these innovations.

Once we have reviewed how the *sans*-checkout grocery store concept works, we will look closely at the impacts on the retail operational model. We will dive into the evolution of self-checkout processes over time. Then, we will investigate the potential for sustainability within Amazon Go's supply chain.

We will delve into the effects on the community at large. Focus will be on the current employment landscape and how it may be impacted by this new technology. We will also touch on any sociocultural implications that may exist.

After we have discussed Amazon Go's potential impacts on the community, we will switch gears and consider the possibility of using this concept in other industries. We will take care to examine how similar technology is currently being used, and what industries most likely will be affected by these recent developments. For example, how this payment method could possibly impact banks and financial institutions.

Upon reviewing how this technology may influence the retail operational model, the community, and other industries, we will look at the specific threats and opportunities that may arise. Focus will be given to the work force, new industry standards, and concepts of trust. Once all of these topics have been covered, managers may better prepare themselves for the potential threats and opportunities that could lie ahead. We will also include the results of an interview conducted with a manager of a Walmart grocery store.

METHODOLOGY and RESEARCH QUESTIONS

This study was conducted on current literature in the library and from online resources. The assistant manager of a major retail and grocery chain was also interviewed and asked the following questions:

The manager was given the following information: *In early 2017, Amazon plans on making their sans-checkout grocery store, Amazon Go, available to the public. The experience is designed for those who don't like to stand in a checkout line. Sophisticated technology will track their purchases, allow them to exit the store without a physical checkout, and automatically charge their account.*

Survey Questions:

1. What would some of the pros and cons be in the adoption of this technology?
2. Do you think it could benefit your chain of stores and your particular store?
3. Do you believe that Amazon Go's new technology will be adopted by other food chains?
4. Do you believe that this new technology is sustainable?
5. What are the greater effects that you think this technology will have on their respective communities if implemented into food chains?
6. Could this new concept make Amazon Go a major player in the grocery business in the future?

The respondent's answers are incorporated into the rest of this paper.

AMAZON GO REVIEW

Shopping Process

In order for consumers to shop at an Amazon Go store, the consumer must first create an Amazon account, have a smart phone, and download the Amazon Go app. Once these items are in place, the customer scans their Amazon Go app, located on their smartphone, upon entering the retail store. At this point, the customer is free to walk around the store, shop, and add and replace items to or from their virtual cart [1].

In order for Amazon Go to accomplish this paradigmatic shift in the operational model of retail shopping, it relies heavily on technological innovation. The technology Amazon Go uses automatically senses when an item is picked up, put back on the shelf, and who committed the action. Once the customer is satisfied with the items they've chosen, they simply walk out the door - no lines, no checkouts, and no waiting. The purchased items are charged to the customer's Amazon account and a receipt is sent to the Amazon Go app [1].

Technology Used

Amazon Go uses what they call, "*Just Walk Out Technology*". This technology is responsible for keeping track of items taken from, and in some cases, returned to, the store's shelves. It also keeps track of the individual's virtual cart [1].

For this to be possible, Amazon uses technology similar to that of self-driving cars. The system relies heavily on sensor fusion, computer vision, and deep learning algorithms [1]. While they haven't revealed too much about their technological advancement, it appears that Amazon plans on making cameras central to their operational strategy. These cameras will track not only the products and their placement, but also the individuals who do the shopping [17].

Industries with Similar Technologies

Amazon states that the technology behind their cashier-less operating model is the same technology prevalent in driverless cars [1]. However, the automotive industry isn't the only place that this type of technology is being used. Vision technology is also extensively used in manufacturing industries to assure quality, and to inspect, test, and sort parts [8].

Computer vision and machine learning have become so prevalent across industries that it can even be seen in the scientific study of animal behavior. 3D Computer vision software has already been developed that scans the subject animal's behavior in order to try and measure the quality of life of the animal. It is capable of learning and differentiating normal behavior from abnormal behavior. This allows for an objective analysis of how the animal is coping in its captive environment [4].

In addition to the automotive, manufacturing, and scientific industries, the hospitality industry is no stranger to the type of sensor technology potentially used by Amazon Go. A similar concept is used at some hotels that have condiments and drinks on the counter or in the refrigerator, known as a mini bar. These snack trays have motion sensors and electronic scales built in, that at times, may automatically charge the consumer if something is moved [10].

OPERATIONAL EVOLUTIONS

Movement towards Self-Checkout

The Amazon Go concept is an evolution from the self-checkout operational model that is used at Walmart and other grocery stores. However, self-service in the retail arena has been evolving for over a hundred years. In 1916, Piggly Wiggly made the innovative decision to allow customers to explore the aisles of products without the assistance of an employee. Then, in 1992, some of the first self-checkouts debuted [13].

Since then, the self-checkout model has been widely accepted and immensely popular. According to a study conducted by computer and point-of-sale terminal company, NCR, those who use the self-checkout indicated that they appreciate the convenience and ease of use that it provides. One interesting note of those surveyed, was that they indicated that they still liked knowing an attendant was nearby to provide help if needed [13].

While interviewing Paul Forsell, an Assistant Manager with a major retail and grocery store, he estimated that roughly 20 to 30 percent of customers prefer the self-checkout. Meanwhile, the rest give preference to the traditional cashier check-out method. He indicated that while self-checkouts are popular, some people prefer to not have to deal with the technology themselves [9].

Sustainability of Supply Chain

With all of this next generation innovation associated with Amazon Go, we must also look at any potential strides in supply chain sustainability that may also be occurring. It's no surprise that Amazon does have sustainability initiatives that span many of its different services and products. From Amazon Wind Farms in Texas, to its innovative approach to recycling energy of nearby data centers, it's clear to

see that Amazon has been making great progress in its efforts to build upon the best energy and environmental practices. However, one initiative of particular relevance is the work being done with AmazonFresh, Amazon's grocery delivery service for Prime Members [2].

AmazonFresh's initiative with Feed America, a nonprofit organization tasked with feeding America's hungry through extensive national cooperation of food banks, has led AmazonFresh to donate food to these food banks from its distribution centers. While it is unclear if Amazon Go will incorporate a similar model as Amazon Fresh, the partnership with food banks appears to already exist and could potentially be duplicated [9]. In addition, Amazon has stated that the efforts it makes towards energy and environmental practices are intended to be implemented throughout Amazon [2].

COMMUNITY IMPACT

Impact on Workforce

According to the Bureau of Labor Statistics, in 2016, there were 2.7 million people identified as being employed by retail grocery stores, 856,850 of whom are employed as cashiers [5]. This number doesn't even reflect the 3.5 million cashiers that are employed across all industries, not just the retail grocery industry [6]. With so many people being employed in this industry, and in jobs that this disruptive technology may make obsolete, it follows that one may be curious how these individuals will be affected by Amazon Go and its cashier-less operational model.

While there could be an obvious adverse impact on cashiers, there could also be an increased demand for technical people to design, implement, and maintain this new technology. Supervisors and customer service personnel would be needed to answer questions, handle returns, and handle quality related issues. Security and anti-theft employees would also be needed to prevent shop-lifters [15]. It appears that people will still be needed in retail, perhaps just in different capacities.

Forsell's take on this new technology appears to reinforce earlier theories. He indicated that if technology was implemented, it would free up the cashiers to perform other duties. He also alluded to the probable increase in demand for individuals with computer maintenance skills, and individuals to help in the validation of purchases prior to leaving the store [9].

Sociocultural Implications

With all of this fear that Amazon Go's new "Just Walk Out Technology" will eliminate the jobs in retail stores, it should remain top of mind that humans are still emotional creatures. We are hard-wired to crave human interactions. An example of this can be seen in the increase in popularity of farmers' markets that provide a more personal experience [12].

In addition, an Accenture study found that 77 percent of U.S. consumers would rather interact with a human than with a digital channel to solve service related issues [7]. The desire towards personalization in retail shopping would almost inherently require a unique experience that, at this point, may only be possible through dynamic human interaction. At the end of the day, the consumer will decide what type of shopping experience will win out in the retail industry, not technology.

IMPACT ON OTHER INDUSTRIES

Impact on Other Industries

There are many industries that are likely to be impacted by the technology and operational model of Amazon Go. For starters, it is believed by some that Amazon intends to increase the amount of Amazon Accounts. This could have many benefits besides data-collection, it could also increase the adoption rate

of its Amazon Payments platform. If this is the case, it could greatly increase competition for payment platforms such as PayPal, Square, and Visa [11].

This sans-checkout model could be easily implemented across various retailers. While retailers and grocers more than likely don't have the funds available for research and development like Amazon does, if Amazon Go's technology were to be offered to the masses this could cause widespread change [14]. As previously discussed, this could potentially cause increased profits, faster shopping experiences, and job role changes. This could mean instead of cashiers, we will have concierges, greeters, and sampler staff [16]. With a little creativity, one could also imagine similar models in non-retail settings such as libraries, check-ins at doctors' offices, and restaurants.

MANAGERIAL IMPLICATIONS

The potential threats for retailers, grocers, and their employees, in the event of a widespread implementation of a technology similar to that of Amazon Go, are numerous. This technology threatens those working in cashier positions gives rise to theft and fraudulent activity concerns among retailers, and could potentially widen the competitive gap between small and large retailers with the potentially large investment [9]. If Amazon were to expand their payment platform, this could create increased competition for companies like PayPal, Square, and Visa [11]. In addition, if Amazon chooses to implement sustainability efforts into Amazon Go, like it has with its other business units, it could increase the sustainability standard among retailers [2].

With potential threats, come potential opportunities. The advent of Amazon Go and the evolution of the self-checkout bring many benefits for both the consumers and retailers alike. For consumers, the decrease in waiting time, and the ease of use are very attractive benefits. For retailers, the ability to reduce lines, relocate personnel resources, and gain the customers trust to provide quick service could prove to be profitable [9].

CONCLUSION

Amazon Go plans to introduce its checkout-free grocery shopping concept in early 2017. The strategy is an evolution from the self-checkout version that is used in many grocery chains today. Advanced technology and computer integrated inventory management systems enable the customer to take products off the shelves, put them in their carts, and leave the store without going through a checkout line. Besides the convenience to the customer, Amazon evidently plans to benefit through a reduction of checkout clerks. The cost of implementing, maintaining, and sustaining the system may offset or exceed cost-savings through reduction of checkout clerks. It is unclear as to whether the new concept will be embraced fully or partially by other grocery chains and similar industry applications.

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