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How Vending Machines can Conquer Access to Better Quality Convenience Food

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Chapter 1: Introduction

The Western world is facing a nutrition crisis. The modern food system relies on the consumption of low quality food. One of the things credited as contributing to the influence of poor food choices for youths and adults are vending machines (VM)(Carrad et al., 2015; Viana et al., 2017; Hua et al., 2016; Matthews et al., 2016; Bell et al., 2013; Rosi et al., 2017; Bos et al., 2018; Carillo-Alvarez et al., 2019). VMs are often the only place to buy food, and generally have unhealthy snacks that incentivize a consumer to buy from them (Matthews et al, 2015; Bell et al, 2013). As such, VMs are adding to the overall problem of low nutrition that is plaguing America, and the rest of the Western world. Children are particularly susceptible to making unhealthy food choices. According to the Center for Disease Control, as of June 2019 obesity affects 13.7million children and adolescents between the ages of 2-19 years old (CDC, n.d.). Matthews et al. (20150 states that obesity amongst children is not only dangerous to their current health, but it puts them at greater risk of getting chronic diseases in the future. These diseases include type 2 diabetes hypertension and cardiovascular disease in adulthood. VM have come under criticism for adding to an increasing obesogenic food environment and have gotten a bad reputation as such. .

Vending machines are machines that dispense packaged, usually highly processed food, and are found in many different types of locations, generally making them the most convenient option for a snack or quick meal. Since VM became popular through dispensing cigarettes, and then moved to highly processed convenience foods and beverages, VM have a bad reputation (O'Brien 1999. It is so widely recognized that VM are adding to an overwhelming amount of obesity in the Western world, they have come under the scrutiny of parents, consumers and

politicians. While the general public can see the problem that VMs add to, the convenience aspect often forces people to use them as a food source.

The reason VMs remain so popular, even though they are a recognized problem, is because today people rely on convenience to get their food. Technology and lifestyle changes have brought the food system to a point where a majority of the work that goes into preparing food is put on the manufacture. Convenience foods have taken over the market and therefore taken over VMs. The convergence of food and convenience makes VMs the perfect vehicle for selling food to many different typed of consumers, in many different locations. We are not transitioning into a time where consumers are hyper-aware about health and sustainability. There is now demand that convince products include these aspects, and VMs can follow this trend as well.

The concept of having food conveniently available for consumption is something every civilization has used a form of. "Fast food has been a mainstay of every society" claims Rachel Laudan in her essay called *A Plea for Culinary Modernism* (Laudan, 2001). The introduction of the automat in the early 20th century was a the first modern concept of food dispensing, and it lead to development of fast food, which is one of the most popular forms of convenience food. In the 20th century convenience food was revolutionized. "Researchers have recognized that convenience involves more than just saving time and includes minimizing physical and mental effort associated with planning and preparing meals" (Brunner et al, 2010; Stranieri et al, 2016; Warde, 1999; Capps et al 1985). Industrialism made it possible for companies like General Mills (Moss, 2013) to emerge as revolutionaries for the modern housewife because they began creating ways to supposedly make homemaking easier. Freezing and canning vegetables, making things like mayonnaise, and adding chemicals to food gave it a longer shelf life. Increasing the shelf

life helped household managers begin to reorganize their time, and consequently their priorities. Now we have transitioned into a time period where convenience food is ubiquitous. Although convenience foods have come to dominate the food system, the modern day consumer is beginning to demand a healthier or more sustainable convenience food product, and perhaps VM could become one of the ways they get it.

Studies in the last ten years have shown researchers that consumers are demanding healthier, or more eco-friendly convenience food products (Rosi et al., 2017; Ricci et al., 2018; Brunner et al., 2010; Jackson et al., 2016; Stranieri et al., 2017; Bell et al 2013). This paper will explore the convergence of this newly desired convenient food option with VMs, and to understand if VMs can improve access to healthy food for a diverse set of populations. These populations are commonly found at schools, hospitals, office buildings and universities (Carrad et al, 2015; Rosi et al, 2017; Stranieri et al, 2016; Bell et al, 2016; Matthews et al, 2015; Viana et al; 2017). Changing the contents of VM would offer better food choices for people with no other option but to purchase a snack or a meal from a VM (Matthews et al. 2015). In particular, in interviews with two unique organizations using vending machines as the venue for selling healthy, environmentally-oriented fresh foods, I sought to understand the motivations, advantages and challenges of this business model.

This paper is organized as follows. Chapter two will introduce what convenience foods are, and how they have existed and manifested throughout history. By following how VM became a part of the convenience food trend, I track how demand for healthier and more eco-friendly convenience foods are increasing. Chapter three presents the approach used to develop and conduct the interviews with two organizations that represent contrasting uses of VMs: a for-profit company using vending machines to sell sustainable fresh meat, and a not-for-profit

organization using vending machines to get fresh food into low-income neighborhoods. Chapter four is the results chapter. This chapter uses data from interviews with organizations that are using VMs to try and make healthier food more accessible. The final chapter will conclude the paper and explore further research that this could be applicable to, including the impending crisis and selling food contact free.

Chapter 2: Convenience

What drives the mass consumption of unhealthy food? There are many parts that drive the delicate systems that we rely on to eat. This chapter aims to explore how convenience has entered the food system and has manifested itself around food overtime. In exploring convenience over time in relation to food we come to the era of fast food and convenience food. While fast food has remained a convenient option, it has manifested into only one form of convenience food. This chapter uses literature that attempts to define what CF food is in order to understand the complexities that make it suitable for the use of vending machines (VMs). Continuing with the theme of convenience there will be further investigation more specifically into how VMs have converged with convenience foods and a modern trend for health and sustainability.

Origins of Convenience Food

Forms of convenience in the food system through history

Fast food's history began in the distant past in Ancient Rome. City dwellers at that time, living in wooden homes, could not have fireplaces (Laudan, 2001). Without fire there was no cooking, and the urban population therefore relied on the Forum (an open market with different food stands), as well as small pubs that had many hot dishes to choose from, in order to pick up food to bring home (Laudan, 2001). Most food consumed at home was already made and brought home, eaten cold, or eaten warm. During work hours men got their food fresh somewhere like the local pub (Laudan, 2001). Dining out does not always imply luxury; it came as a matter of

necessity first. Even now, we all know the stereotype that the French go out every morning to pick up a baguette. Bread is difficult and time consuming to make, yet it is a staple food and has been for centuries. People rely on their local bakers for a freshly made loaf in the morning to grab quickly and bring home for breakfast and use for the rest of the day. This stereotype may have emerged out of the French culture's specific affinity for baguettes, but surely this reliance on local businesses exists in several urban cultures worldwide. This we can think of as an example of fast food. Fast food is not always the McDonalds that we think of, but food that is made already and can be picked up quickly, cheaply, whenever you need it; in this case in the morning for breakfast and for the rest of the day's meals.

The roots of what we call fast food today catered to the middle and working classes and in fact has been one of their primary food source for a long time (Laudan, 2001). However the days of burgers and shakes did not come from France or Ancient Rome. It began in America, with The Automat, where two friends intended to provide the perfect restaurant for people of every class to come together for affordable and convenient food.

Early Twentieth Century America

Joseph Horn and Frank Hardart opened their first Automat restaurant in Philadelphia in 1912, introducing the world to automated dining (Bromwell, 2000; Hughes Crowley, 2001). The Automat was a combination of fast-food, vending and cafeteria-style eating (Hughes Crowley, 2001). The assembly line had not yet been adapted to the food industry, and this was the first attempt to recreate it in the restaurant business. Customers built their own meals in a cafeteria style assembly-line, where they would move in a line to select what they wanted. The Automat itself was a giant machine that covered two walls with several doors on one side and open

compartments on the other. A dish sat behind each door, and the customer would walk up to the door with the desired food behind it. They would insert one of their coins, turn a knob and the door would open to reveal the food. The business only served cold food from behind the doors, but they served warm options in a buffet line, where patrons could take as much as they would like for one price (Bromwell, 2000).

There were certain aspects of the Automat that made it attractive to customers. It was high tech for its time, and this made it a spectacle in its newness. The compartment looked sanitary, as they were chrome plated and white. There were no servers, so customers did not have to tip, and they could pay one price up front at the door. "The Automats provided insight on how to serve middle-class tastes without excluding the working with high prices" (Bromwell, 2000). Patrons sat at long tables, at their choice, because when they walked in there was no host waiting on them (Hughes Crowley, 2001). The customer could see what they were getting before they chose each item which was also a unique advantage. This added a level of comfort to the meal that the company was trying to achieve. If the meal tasted the same every time it would allow patrons to have a reliable place where they could dine knowing they would get the food they liked (Bromwell, 2000). This standardization of recipes and food is exactly replicated by fast food companies today, which is one of the reasons the Automat is credited with beginning America's consumption and demand for fast food (Bromwell, 2000).

A report about the Automat restaurants states that a businessman, a carpenter, a banker, and a tailor could be sitting together making merry (Bromwell, 2000). While the Automat was made for customers of varying incomes, it primarily attracted the middle and working class. These were people who could not normally eat out, because of both the prices of restaurant dishes and the price of service. Fast food restaurants offer the same benefits today that the

Automat did in its day. Food that is affordable, that tastes the same every time and that doesn't require servers or hosts and the extra cost of service (Bromell, 2000).

One of the key parts of running the Automat restaurants was the standardization of dishes and food. The rules and regulations for employees were strict, and managers enforced the rules, using a manual written by the owners (Hughes Crowley, 2001). This manual included the names of the 400 food items sold across the different locations, insuring standardization. It also contained details such as the number of times an employee must clean the tables or exactly how much pepper could go into the macaroni and cheese. There was no culinary experimentation, but rather the goal was to ensure consistency (Hughes Crowley, 2001). Horn and Hardart Automats also adapted to the busy lifestyle of the laborer, introducing booths where patrons would pay, get a ready-made meal and stand at a counter to eat their food. Hughes cites these as adopting the name "perpendicular meals" (Hughes Crowley, 2001).

The Automat ironically fell victim to its own business model, and coincided with mass exits to the suburbs. Cafeteria-style eating became a place for schools, and the cost of food increased. The Automats' success had a lot to do with the densely packed urban areas existing in America in the early-mid 20th century. Densely packed, poor populations gave the Automat the perfect market for their product and restaurant design (Bromwell, 2000). McDonald's and Burger King were creating a name for themselves in the late fifties when this happened, and The Automat was no longer convenient to working-class families moving to the suburbs (Schlosser, 2001). The Automat, with its more fresh, high-quality meals, could not compete with the prices of fast-food either. The last Automat closed in 1991, in New York City (Bromwell, 2000; Hughes Crowley, 2001). Once Horn and Hardart failed with their Automats they purchased a

Burger King franchise which they placed in their old Manhattan location, literally bringing fast food to the city (Bromwell, 2000).

Convenience in the Modern Era: Fast Food

The birth and growth of fast food

The design of the Horn & Hardart Automat is not dissimilar to the practices fast-food companies use in order to produce their product cheaply and fast. These practices were first adopted by the Automat to create a space where any class could enjoy the luxuries of eating outside of their home. In the post-war period, with the rise of the automobile and suburban living, a new model was emerging to fulfill a similar need. Companies like McDonalds helped lend to practices that would make food more processed, standardized, and convenient.

Fast food was born in Southern California, where the sun is shining and capitalism is booming. The men who pioneered fast food were Carl Karcher, of Carl Jr's, and the McDonald's brothers (Schlosser, 2001). Automobiles and the suburbs spurred the growth of the fast food industry in the mid twentieth century. Unlike the Automat, fast food restaurants offered drive-in services. Cars would pull up either get their food through a window, or park and have servers come to their car, take their order and deliver their food (Schlosser, 2001). Both the McDonald brothers and Karcher recognized how popular restaurants with a drive-in service were becoming and both started drive-in BBQ restaurant, in Southern California, making their start the same way in the fast food industry. But BBQ was not very popular, and it was expensive. The McDonald brothers wanted to increase their profits and lower their costs, and so they invented the first "self-service" model restaurant (Schlosser, 2001). This new design is what allowed the fast food

industry to grow so quickly, and still make a huge profit but maintain its affordability for the consumer (Schlosser, 2001).

Fast food, as the name implies, is food that comes fast and cheap. This is due to a system revolutionized by the McDonald's brothers at their first burger restaurant in Anaheim CA (Schlosser, 2001). The brothers wanted to cut out all extra expenses, which included staff. So unlike the servers taking orders in their carhop, they started a self-service model restaurant. (Schlosser, 2001). In this new service model, which Carl Kercher soon adopted to open Carl Jr's, customers would come in and order from someone behind a counter, or through a window to the same employee behind a counter. After ordering they would wait for their food and find themselves a seat and get themselves a drink. The brothers replaced their reusable dishes and cutlery with disposable ones (Schlosser, 2001).

The new self-service model that the McDonald's brothers had come up with included changing the way employees worked in the restaurant. Everything was to be made as affordable and efficient as possible, which meant as small a staff as possible. Each employee was trained to do one job, which they did every shift. As technology developed machines began replacing more complex kitchen skills, like cooking and mixing things. As Schlosser describes "cooking was designed into the machine" (Schlosser, 2001). This way the brothers minimized the risk of losing profit on labor or supplies, and they could standardize their food because the same people were making it every day (Schlosser, 2001). New fast food restaurants copying McDonalds began to open up across America. The fast food industry experienced its greatest growth between the 1960's and 1990's, after processed food became extremely easy to produce. Everything in the fast food industry became frozen, and cooked by machines (Schlosser, 2001).

American's really came to rely on fast food when companies began franchising their businesses, and the expansion along highways. Franchising enabled fast food restaurants to expand rapidly, and in a variety of locations (Schlosser, 2001). While McDonald's also pioneered the idea of franchising his restaurant, every other fast food company followed their example. (Schlosser, 2001). Highways were long and flat, and provided fast food restaurants with the perfect market: people going places in cars. Fast food restaurant began to line the streets, and in order to compete created the giant, colorful signs that we still see today. Now companies like McDonalds have locations all over the world (Schlosser, 2001). However, fast food has become associated with more negative things than positive today.

While fast food became popular for its affordability and convenience, the long term impact on the food environment, especially in America, has been negative. The convenience of it has made it a replacement for meals. Now after many years of fast food being readily available it is impacting the health of many Americans (Jaworowska et al., 2013). High in salt, trans fats and carbohydrates, many of the convenient foods of today are just as unhealthy as fast food. McDonald's and Burger King only offer the world one type of convenience food, but there are others that are having negative impacts on America's foodscape as well.

Fast food and associations with poor quality

In the era of industry America's food system has evolved to include mass production in a way that has made a lot of food unhealthy. According to Michael Pollan's book *Cooked,*(2013) industrial food across the board is made with higher amounts of fat, salt and sugar. It is also imbued with manmade chemicals to enhance flavor or shelf life. Industrializing the processing of food makes it cheaper, and as the cost of food goes down the consumption goes up relative to

other foods (Pollan, 2013; Moss 2013). Because of its cost, fast food has social implications as well has health implications. It is often the only accessible calories for low income families, who don't have another choice, and therefore are forced into consuming unhealthy food (Biltekoff, 2013). As the fast food industry has increased its presence, research is showing that it is linked to health problems like obesity (Schlosser, 2001; Pollan, 2013; Biltekoff, 2013; Moss 2013).

Convenience foods have emerged into the modern food system, parallel to fast foods, but their flexibility to exist inside or outside the home have made them indispensable to people, and their ability to eat. Convenience foods have become as perverse as fast foods, and are having just as negative an impact on public health as fast food is. They are also much more readily available to people than fast food is. Different convenient technologies, like vending machines, only help enforce societies reliance on convenience.

Convenience in Food

Today convenience in the food system comes in many forms. It spans from boxes filled ingredients delivered to your doorstep to personal sized portions of snacks and candy. It began when large companies started redesigning food to make it easier and faster for people to make and eat (Moss, 2013). Inventions such as the microwave and the freezer and fridge made these goods easy to store and cook up quickly, without any effort. TV dinners became very popular as soon as they were invented (Scholliers, 2016; Warde 1999). Grocery stores today stack freezers with TV dinners for purchase. As soon as we, as a society, gained the ability to standardize and produce food cheaply using machines, convenience food became very popular, with fast food following along a similar timeline.

As mentioned, convenience food has taken many different shapes and forms. We think of convenience food now as these frozen dinners and individually packaged Oreos, but it still seems rather undefined in a broad, academic sense. People look at and define convenience foods in many ways. Jackson et al (2016) argues that this confusion is due to convenience being a chaotic term. The article applies Andrew Sayer's (1992) term 'chaotic conception,' which attempts to "arbitrarily divide the indivisible and/or lump together the unrelated," to the existing understanding of convenience food. The term convenience can refer to saving time and energy, via location and context. The ambivalence and lack of a solid definition of it gives scholars the ability to assign definitions that are based on their research. Some of these explanations will help to synthesize a working definition of convenience food for this paper.

Every definition of convenience food includes one key concept, which is that it saves time. Brunner et al (2010) defines convenience foods as food products that save both time, and mental and physical energy. Warde (1999) explains that the definition of convenience food has included an aspect of time saving throughout history. He explores this idea partially through the role of the housemaker. A quote from *The Guardian 1968* highlights the time-saving aspect of convenience food: "No one would deny the drudgery, the time-wasting, the monotony, that has been removed by convenience foods." Before, the time spent preparing food in traditional family contexts may have indicated how much the mother cares for the family, but that image has been shifted to time wasted (Warde, 1999**)** convenience food emerged and focused on helping the homemaker save time, because, as Warde (1999) argues, the reordering of time during the day deprioritized meal preparations in the modern day. Based work done by Robinson and Godbey, Warde uses data which shows, "paradoxically, that Americans felt more rushed in 1985 than in 1965, despite, according to their time budgets, having substantially more free time" (Warde,

1999). Despite that, many studies argue that women's increased entrance into the workforce has been the main driver for the use of convenience foods. Warde argues that convenience is not about time saving but in fact is a response to a "de-routinised" life, which has reordered time rather than lost it. Driving forces behind the popularization of convenience foods include that meals are a social experience, and scheduling a meal with many people is much harder in the modern day because work hours are more flexible and time is organized in a way that may not prioritize social connections around food.

In order to define convenience food we need to apply its current and historical context. In Scholliers (2015) paper defining convenience foods he looks at different perspectives and definitions throughout time in order to find commonalities between what the term "convenience food" has been applied to throughout history. He includes an example from the 1959 definition of convenience food from the British ministry of Agriculture, Fisheries and Food saying "product of the food industry in which the degree of culinary preparation has been carried out to an advance stage and which are purchased as labor-saving versions of less highly processed products" (Scholliers 2015). In 1959 when this was written convenience food was linked to "home cooking." Adopting the idea that the definition is fluid, in a modern context convenience food has shifted to be less oriented with the family meal and home cooking, and more orientated toward lunch or breakfast "on-the-go."

In today's context it becomes even more difficult to define convenience food because it seems to have adopted so many different aspects of the food industry. Fast food, meal boxes, grocery store delivery services, ready-meals, frozen food, canned food, snacks, individually packaged products, sauces and jams and juices already pressed and bottled all seem to fulfill the basic requirements of convenience in food form. But to define it as a concept, and apply it to

today, convenience food is a product that saves the consumer time and energy in the preparation or cooking (Warde, 1999; Brunner et al., 2010; Scholliers et al., 2015; Jackson et al., 2015; Stranieri et al., 2017; Leroy et al., 2015).

Another trend we have to recognize in consumers is their interest in healthier or more eco-friendly food. Studies have shown that as convenience foods become more pervasive so has the desire to make them healthier or more sustainable (Rosi et al., 2017; Ricci et al., 2018; Brunner et al., 2010; Jackson et al., 2016; Stranieri et al., 2017; Bell et al 2013). In a study done by Ricci et al. (2018) they tested consumer trust and intention when purchasing integrated pest management vegetables, which are things like baby carrots or pre-cut and washed lettuce. The study established that consumer trust in a brand name plays a large role in their purchasing habits. It suggested then that manufacturers and producers selling eco-friendly products should try and win the trust of consumers and they will begin purchasing healthier convenience foods.

Lifestyles have rapidly changed in the 21st century. The increased convenience of consumption food is often credited toward these lifestyle changes. People moving towards the cities are found to have faster paced lifestyles. This is one of the key drivers for the consumption or convenience food (Ricci et al., 2018; Capps et al., 2019; Stranieri et al., 2017). This type of food was created so that people could spend less time on food and more time on other activities, like work. It has made learning how to cook unnecessary for the next generation, which is one of the other drivers. One of the biggest reasons more convenience food is being consumed today is that the younger generation is losing their ability to cook (Capps et al., 2019; Warde et al., 1999; Brunner et al., 2010; Jackson et al., 2016; Leroy et al., 2015; Pollan, 2013). Women entering the workforce more is another reason some scholars have used to explain societies use of convenience food more and more. However, Jackson et al., (2015) suggests that the energy spent

to make a meal that convenience food replaces is pushed to the laborers producing that product. Convenience foods are becoming part of the foodscape due to other pressure. However, these pressure create perfect opportunities for other convenient technologies to manifest into the food system. One of the most proliferate dispensers of convenience foods are vending machines.

It is not just food products that have conformed to the need for quick food, it is technology as well. Beginning with the Automat, the food industry has continually experienced food vending. Cigarette vending was very common, before smoking became ban inside (O'Brien, 1962). Today vending machines can be seen in a number of different settings, but mostly dispensing food instead. Convenience food is the perfect product for food vending, and since it is so popular to consumers, it is what most vending machines contain. So vending machines are beginning to be recognized as one of the mechanisms adding to the obesity crisis in America (Carrad et al., 2015; Viana et al., 2017; Hua et al., 2016; Matthews et al., 2016; Bell et al., 2013; Rosi et al., 2017; Bos et al., 2018; Carillo-Alvarez et al., 2019). However, vending machines are machines that can be filled with any type of product, and could be a positive addition to America's foodscape, and remain successful, if they were being stocked with healthy options.

Vending Machines as the Epitome of Fast, Convenient Food

Vending History

Vending machines (VMs) are one of the tangible manifestations of food convenience in the modern world today. Taking convenience in the sense of saving time and energy VMs are one of the only ways to sell lots of products without a brick and mortar store or restaurant, or employees to run the store front. They save the owner time because the owner can decide how frequently to

restock. Even if they run out of a product the VM remains in the same location until there is time to fill it up again (Kasavana, 2013).

The VM industry has continued to grow and increase its sales revenue since its beginnings. VMs became very popular after WWII and continued to get more popular. James O'Brien (1962) writes that by the late 1950's the vending machine industry grossed over $2 billion. It was recognized early on that running a VM company had low labor costs and low startup costs but continued to gross income as time passed. He reports that trends over the previous 10 years predict a 5% annual increase in sales from owning VM. However, the products that VM began selling have not changed much. O'Brien reports that, although cigarettes were the highest grossing product sold in VM in1961, making over a million dollars, the second highest sales were from bottled sodas and packaged candy, with sodas making $328,215 in 1961 and candy making $321,557 (O'Brien, 1962). Thus, the type of food commonly found in vending machines has not changed over the past 60 years.

The convenience aspect of VM lends helps them smoothly incorporate themselves into an changing food environment. As the demand for convenience food has increased, so has the amount people snack. Today children get 25% of caloric intake from snacks, and schools are one of the most common places to find a VM (Hua et al., 2016). Since so many people in different locations rely on VM to feed themselves it suggests that many are also relying on snacks to feed themselves, which are more convenient then a meal (Carillo-Alvarez et al., 2019; Grzybowska et al., 2019; Bos et al., 2018; Warde, 1999; Matthews et al., 2015; Hua et al., 2016).

Vending today

Today VMs have a bad reputation for a legacy of adding to an overall bad food environment. VMs typically carry unhealthy food and beverage options which some have linked to contributing to the obesity crisis in America, and other Western countries (Carrad et al., 2015; Viana et al., 2017; Hua et al., 2016; Matthews et al., 2016; Bell et al., 2013; Rosi et al., 2017; Bos et al., 2018; Carillo-Alvarez et al., 2019). It is the location of VMs that is one of the most problematic things about them in combination with their contents. VMs are typically found in a multitude of spaces that don't offer other food choices. According to the *2011 State of the Vending Industry Report* 28.5% of all VMs were located in offices, 26.8% in manufacturing buildings, 2.1% in retail sites, 8.8% in hospitals and nursing homes, 7% in restaurants, bars and clubs, 6.8% in schools and 5.9% in universities (Matthews et al, 2015). In many of these locations VM are the only source of food. If the food is unhealthy you are forced, sometimes repeatedly, to pick something that can negatively impact your health (Carrad et al., 2015; Viana et al., 2017; Hua et al., 2016; Matthews et al., 2016; Bell et al., 2013; Rosi et al., 2017; Bos et al., 2018; Carillo-Alvarez et al., 2019).

Most of the research done around VMs has been focused on the ways in which they have negatively contributed to the large amount of accessible unhealthy food. Rosi et al. (2017) explain that there are low amounts of healthy foods found in VMs at all. The most concern about low quality food regards VMs in schools, where children are in the process of learning how to make the right food choices. In Matthews et al. (2015) vending machines in schools, and other locations, have an effect on food choices outside of vending machines, because they give people so much access to unhealthy snack options. If VM are teaching unhealthy food choices then this could carry with the next generation continuing on the path of high-calorie, energy dense foods.

This research shows, however, that selling healthier choices from VMs is a possibility. Because of the recent consumer demand for healthier convenience foods, there is a market to start selling more energy rich snacks from them. There are different "interventions" studies have done to test this idea, to see what the barriers are for this idea to work, as well as if selling healthier foods from vending machines works. Since there is such a globally recognized problem with VMs impacting public health, more and more literature is being published to study how VMs can contribute positively to the foodscape and increase access to healthier food that is also convenient for people to buy.

Demand For Healthier Food and the Potential Role of Vending Machines in Providing It

Vending machines are beginning to be recognized as a piece of technology that has been misused but could have a positive impact on the food system. In 2015 Mathews et al. (2015) assessed the methodologies of literature on VMs. In review of 24 different studies, in varying locations, results showed that when certain environmental interventions were enacted the sales of healthy food options increased. However, when vending machines are found in schools students are found to eat more sweets (Matthew et al., 2015). This opens up a discussion about how VMs can be used as a way to increase accessibility to healthier food if products could be swapped for healthier options.

There are a growing number of studies that are showing that consumers want healthier options in VMs (Rosi et al., 2017; Ricci et al., 2018; Brunner et al., 2010; Jackson et al., 2016; Stranieri et al., 2017; Bell et al 2013). Rosi et al. (2017) explains how certain interventions to improve the nutritional quality of VM food have been attempted in the past. These strategies

include things like changing the price point of healthy foods, offering better labeling for further understanding of nutritional quality as well as behavioral and educational interventions. This study shows that the way we purchase food through VMs is influenced by replacing unhealthy options with healthy options, as well as the promotion of healthier food options through nutritional information about the products inside. Using the sales data from three VMs at the university of Parma in Italy the authors showed that when the sales of healthier food items from the VMs increased the sales for unhealthy products decreased (Rosi et al, 2017).

Consumers are already aware that the choices in VMs are too unhealthy. In a study by Carrad et al. (2015) they took a survey of students and hospital employees about their opinions on VM food options. According to the survey 92.% of university students reported that VM food was unhealthy, and 82.% of hospital employees agreed. When asked the same question about beverages, 58% of hospital employees thought that they were too unhealthy, while only 55% of students agreed . In both groups of participants, around 40% also said that they were willing to pay higher prices for healthier options in VMs (Carrad et al, 2015). Price is one of the main concerns of vendors when they consider supplying healthier food, because processed, nutrient-poor food is both affordable and convenient.

The main barrier for consumers and producers in stocking and selling healthier food options in VMs is the price (Viana et al., 2017; Ricci et al., 2018; Hua et al., 2016; Rosi et al., 2017; Carrad et al., 2015; Bell et al., 2013; Matthews et al., 2015; Bos et al., 2018). A study done by Viana et al. (2017) showed that there was no loss to the vendor financially if they were to switch to vending healthier items from their machines. The study attached either a green, yellow or red sticker to different vending machine items. Each color represented a different level of healthfulness. Green was the most healthy and red the least. These stickers were placed on

items in some machines, on a university campus, and called “intervention” machines. Others did not get the stickers and were considered “comparison” machines. This study collected quantitative data, using price as a point of comparisons between products. A survey was conducted to see how undecided constituents chose their food from the machine. in this study, it’s other motive was to see if undecided consumers would choose healthier items more than conventional items when eating from a vending machine.

The results of the study done by Viana et al. (2017) showed that undecided constituents were 50% more likely to choose healthier snacks from the “intervention” VMs. Whereas only 10% of undecided customers chose healthier items from the comparison machines. (Viana et al, 2017). These finding suggest that the barrier is not price or how healthy the items in the VMs are, but whether or not the consumer is aware they have a choice. Since this study also found that 50% of consumers, who were aware which of their choice were healthy, picked a healthier snack from a vending machine. This implies that price does not seem to be a deterrent for healthier items in VMs. However, in Ricci et al. (2018) they argue that price point is something that deters low income people from purchasing healthy food from places like vending machines. They also state that price is one of the main barriers to providing healthier products like minimally-processed fruits and vegetables (Viana et al., 2017; Ricci et al., 2018).

Different types of products are continually being put into vending machines, and some are trying to cater to the recent increase in demand for healthier convenience food by putting minimally-processed fruits and vegetables in them. These give consumers the option to choose and apple slices or carrots sticks as a snack, instead of something processed. Like Viana et al. (2017), this study says that one of the main reasons that there aren’t more minimally-processed produce, like other healthier options, in vending machines is because they are too expensive.

This study done by Ricci et al. is focused on finding out the "determinants of purchasing intention" for minimally processed vegetables, integrated pest management program products, ready to eat fresh produce associated with reduced use of chemicals and processing. According to the results the demand for fresh fruits and veggies is growing. but high prices and low availability are two problems facing vending machine companies from stocking more produce and organic options. Prices are too high, and this drives away customers who can't or don't want to pay a lot of money (Ricci et al, 2018). However, some see these types of products as the answer to helping improve the obesity rate, and making convenience food more sustainable.

It is not just healthier options, but more eco-friendly options, that consumers want in their convenience food today (Brunner et al, 2010; Stranieri et al, 2016: Ricci et al, 2018; Viana et al 2018). Along with Ricci et al. (2018)Stranieri et al (2017) describes minimally-processed fruits and vegetables as a solution to the demand for healthier convenient options, as well as more environmentally conscious options. Produce individual portioned out, to be sold from a machine, but not made in a factory. This option is one that this study considers good because it is more environmentally -friendly then more conventional convenience foods, and it answers to health concerns. (Stranieri et al. 2017).

Vending machines have emerged in the 21st century as one of the most convenient ways to sell food (Carillo-Alvarez et al., 2019; Grzybowska et al., 2019; Bos et al., 2018; Matthews et al., 2015; Hua et al., 2016). They have become a booming industry that consumers are beginning to recognize as a source for unhealthy snack. Unfortunately many people still rely on VMs as a way to eat. Recent trends for the awareness of nutrition and sustainability could come as a benefit to the VM industry. They are the perfect piece of technology to combine the need for convenience and the requirement of health in a food product that consumers desire. Some

companies are already attempting to do this. They are attempting to meet a consumer need for convenient food that is also healthy or sustainable.

Chapter 3: Methods

Interviews

Recruitment

Before finding companies to interview research was done to identify the companies that could be interviewed. Using Google, key words such as "eco-friendly," "healthy," "sustainable," "fresh food" were used in conjunction with "vending machine." Newspaper pieces and magazine articles were used to identify four companies based in the United States that were considered to be health or sustainability oriented and used VMs. Other countries also had vending companies that followed the same criteria. There was a company in Ireland that sold milk from a vending machine. Japan also is a country known for using vending machines to sell many different things out of. For the purposes of this study the analysis remained in the USA.

Four VM companies were emailed to ask if an interview could be conducted about their vending business. Using their websites four companies were identified to interview: Farmer's Fridge, Byte, Applestone Meat Co., and Smart Vending by Capital Roots. The first three are for-profit companies and the last one is a program run through a non-for-profit organization. All four companies were asked for an interview by email (Appendix A1/A2). The emails were slightly different due to the different motivations behind the different organizations.

Interviews and data processing

A different set of interview question was written to address the for-profit companies and the non-for profit company. The questions were organized in a way that helped frame the motivation behind them. The first motivation was to understand how the company uses vending machines to characterize themselves. Trying to understand their motives behind using a VMs to understand if their aim in using vending machines, and why the business model works. Next it tries to understand how health and sustainability are considered. Is it more one than the other and are they selling these foods from VMs for any particular reason? Last us to understand the challenges of using VMs. It specifically tried to examine if labor costs are an incentive for using the machines, or if there is an advantage to the labor cost at all.

The first company to be interviewed was Applestone Meat Company. Applestone Meat Co. is considered a 24/7 butchers shop because it sells fresh, raw cuts of meat, sausages and meatballs from vending machines. Two interviews were conducted for Applestone Meat Co. The first was with the General Manager and the second interview was with the owner of the business. Both interviews were conducted over the phone, one the same day but the interviews were done separately.

The second company interviewed is called Capitol Roots. Capitol Roots is a non-for-profit organization that supplies fresh or healthy food alternatives to under resourced or food scarce neighborhoods. A branch program they fund is called Smart Vending, which puts healthier snacks in a variety of locations. It pairs with local, family owned vending machine companies to support local business as well.

I attempted to interview two additional companies utilizing vending machines: Farmer's Fridge and Byte. Farmer's Fridge sells fresh salads and sandwiches at affordable prices from

vending machines in Chicago and Milwaukee. Byte uses the concept of vending to sell convenience food products from a refrigerator model, typically placed in an office environment. In order to get the food, one has to swipe their card through a reader for the fridge to open, so you can take the food you select. Byte is placed in many different locations, and pairs with local companies to stock their machines in all the variety of locations. Although interviews were not completed with these two companies, information is utilized from their websites.

Interviews were recorded and then data for each question was entered into a sheet. Supplemental information on the two organizations interviewed was found on their websites and in local news publications.

Chapter 4: Results

Interviews with two organizations were conducted in late January and early February of 2020. I was able to speak with two people affiliated with Applestone Meat Company: The owner Joshua Applestone and the CCO and Creative Director Samantha Gloffke. At Capital Roots, a not-for-profit organization aimed at supporting food access in the Albany, NY, region, I spoke with the Toni Nastasi, Online Produce Market Coordinator and Director of Smart Vending. After providing details regarding the history and basic organizational model used by each organization, I present the perspectives regarding the emphasis each of the interview participants placed on healthy food, environmental values, and how reductions in labor factor into their respective business models.

Characterization of the two Organizations using Vending Machines

The Private Sector: Applestone Meat Company

The first company interviewed is called Applestone Meat Company. This company is a butcher shop that first opened in Stoneridge, NY by Joshua Applestone and his wife Jessica. Applestone does not follow a classic glass case business model. Joshua's goal was to make good quality meat as accessible to as many people as possible. In order to do this Joshua began using vending machines, and created a 24/7 butcher shop.

When the business began, Applestone was cutting meat from their production site, and people were simply coming to the door to ask what they had and if they could cut up ribeye's and strip steaks. After becoming frustrated with the onslaught of requests, especially orders

coming in after hours over email or the phone, Josh decided to create a butcher shop that gave everybody equal opportunity to access good quality meat. Inspired by the Automat, Josh decided vending machines would be the best option, so the company began experimenting with VMs to see if they would work as a replacement for the glass case.

There are two store fronts that Applestone Meat Co. runs VM out of. One is in Stone Ridge, NY and includes the store front and processing facility. The second location was recently opened in Hudson, NY and holds just vending machines. Each location holds five to six vending machines. Each one represents a different animal product. The meats that Applestone sells are beef, pork, lamb and chicken, and they make raw sausage and meatballs. During normal business hours, there is a retail window in both locations. Sales representatives are there to restock the machines and sell freezer inventory, which is 20% off. The company also takes special orders from customers. Special orders consist of cuts that are not stocked in the machine, as well as reserving cuts that are found in the machine (https://applestonemeat.com.).

Figure 1
Taken by Charles Greenhalgh

The butcher shop sells a majority of their products through the vending machines. The doors are open 24/7, and the machines are stocked the day before. Butchers work Monday-Friday in order to keep up with the demand for meat. The uniqueness of the business model is the use of vending machines to sell a raw food product. This allows the company to butcher more of the

same cuts than a normal shop because they are able to sell their products all day every day, while only paying their workers during normal business hours (https://applestonemeat.com.). Most VMs are standalone operations that are restocked with products every few days. This operation shows a successful business model that sells fresh food from VMs, stocked regularly, that make a profit.

Not-for-Profit Sector: Capital Roots

Capital Roots is a non-for profit organization that started by building community gardens in NY's capital region in 1975. According to their website their mission is to serve the population of the capitol region of NY with accessible healthy food. (https://www.capitalroots.org/programs/smart-vending/). This is a response to poor public health as a result of healthy food being expensive or non-accessible to everyone. Capital Roots fulfills their mission by sponsoring and running many different programs that fall under their mission statement. They provide educational opportunities, sponsor community gardens and help bring fresh produce to under-resourced neighborhoods or locations. The program that is applicable to this paper is their Smart Vending program.

Figure 2
http://alloveralbany.com/archive/2017/08/29/capital-roots-healthy-vending-machines

The Smart Vending program is making healthier food more accessible by providing support and funding to help stock VMs with healthier snack options and drinks. The machines that the program serves are in a number of locations including schools, office buildings and public places like parks. This allows the program to reach a number of different people, so that they can help educate consumers to understand their food choices.

The Smart Vending program works by teaming with small, local vending machine companies so that they can help benefit the local economy. The way Capital Roots gets involved with organizations to help initiate the Smart Vending Program is done through what they call "interventions." There are two different types of interventions: the first helps organizations to swap their products out of a pre-existing machine, and the second intervention is working with an organization that wants a vending machine on site, with healthy options. Capital Roots, with this approach, will work to install a machine with a local VM company and help write up a contract between the two. They also cover the costs of the installation and educational materials so that the people eating from the machine can learn what they are eating and begin to make informed decisions about their food

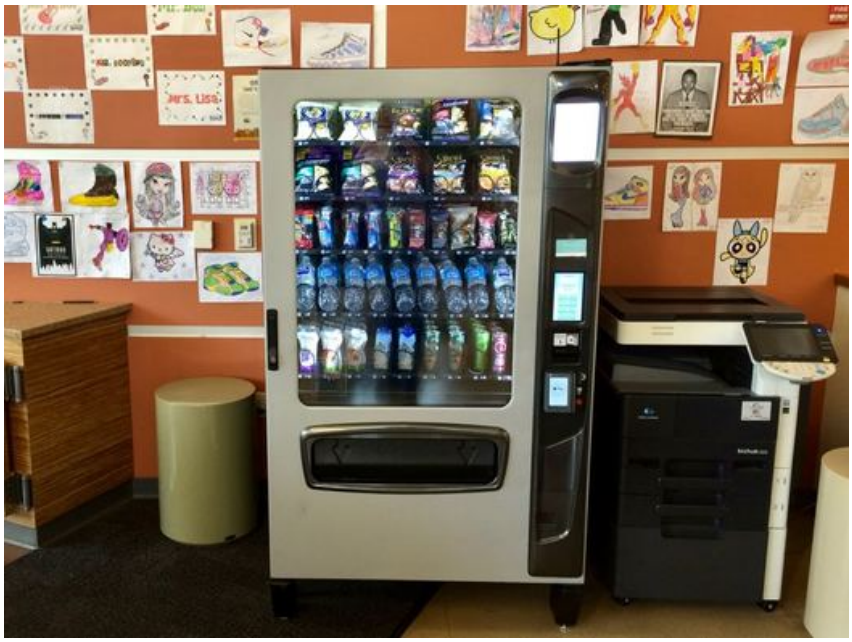

Figure 3
http://alloveralbany.com/archive/2017/08/29/capital-roots-healthy-vending-machines

choices. The VM company will take the profits from the machine and be responsible for restocking the machine.

There are only a small number of family owned or local VM companies Capital Roots works with. Capital Roots works as the liaison between the organization desiring a vending machine on site and the vending companies. They don't control the prices of the product inside the machines. The funding for the Smart Vending company comes from NY State's Creating Healthy Schools and Community's (CHSC) program.

The Rationale for Vending Machines

The first question posed to both organizations was what inspired them to use vending machines as their outlet for selling food? The response from Joshua at Applestone was "I had an idea of a meat machine forever, which kind of came from Horn and Hardart, which was the Automat. So that basically was the basis of it, but it wasn't just about the machines but about people using them". He then responded that the idea of a 24/7 butchers shop, using vending machines, was an attempt at social justice and community building. Joshua stated that he wants the machines to become a normal part of daily life. He wants people to get use to shopping out of machines for unusual items, and to really engage the community in a conversation about making healthier food accessible through the use of vending machines.

Similarly when asked about their mission statement, regarding the vending machines, both participants from Applestone Meat Co. described it as getting the best quality food into the highest number of hands possible. They emphasized the idea that quality food is not readily available, but as Gloffke puts it: "The mission is always really just to get as much high quality food specifically meat into as many people's hands as possible at the lowest price possible and

we aim to do so by making it as accessible as possible." Vending machines were the easiest way to sell products and fulfill their mission of increasing accessibility. VMs represent how technology has imbedded itself in the foodscape and how convenience has become something people rely on.

Another reason to use vending machines, given by the representative at Applestone, was because of demand. When they opened Applestone, both interviewees were answering to the high number of customers who were in demand for their meat. This forced Josh to innovate and test the Horn and Hardart idea.

To test whether customers would use the machines, or if they would be a deterrent to the business, Mr. Applestone set the machines on a free setting. The idea was to see if this was enough to get customers to come see the machines and tolerate learning to use them. Gloffke said that the customer response to the machines was positive. The amount of people who had come in to use the machines in order to get meat showed that customers were willing to use them. After a few trials, as repeat customers came back to use the machines, Gloffke said that they felt like vending machines would be successful in part because customers were willing to try new technology to get their food from. Vending machines, in this case, are being used to try and make better quality food available to as many people as possible, while being able to support a business on vending machine sales.

When asked about why Capital Roots had chosen vending machines as the basis of one of their programs they also responded that it was an outlet of the food industry they hadn't yet explored. "So it's very much a newer program but still falls under that food access goal." This response recognizes that vending machines are a part of the food environment that could have a positive impact but don't currently. However, food justice advocates are beginning to recognize

their potential to change the foodscape. The Smart Vending program are seeing vending machines as a tool to help food become more accessible, like Applestone Meat Co., and they are aware that the current food being dispensed from them needs to be changed.

Both organizations recognize that vending machines are part of the changing food scape and expressed the idea that technology can be used for accessibility. However, philosophies regarding healthy food and environmental values differ between the two organizations.

Healthy Food and Environmental Considerations

Healthy Food

Both organizations were asked to describe the types of products in terms of health, convenience, environmentally friendly and good quality. One of the representatives of Applestone responded "All of the above." While the idea of high quality meat is a primary focus for them, so is promoting the idea that healthy means eating a smaller quantity of good quality meat. Applestone abides by the basic principles of organic meat, while not officially having the label. They describe their product as meat that is humanely raised and of very good quality. It is hormone and antibiotic free and not raised and slaughtered in a factory. The meat that they are selling is pasture raised, and grain finished, and the company is beginning to explore grass-fed options as well.

The products are mostly sourced from local farms. The beef and lamb come from Mylan Farms, in Red Hook, NY. The pork comes from Pennsylvania, as well as the chicken which comes from Bell and Evans Farms. Thus, "local" is one of the values promoted. Animals, except for the chicken, come in whole animal form and are broken down by the butchers and trimmers in the work room, emphasizing artisanal craft of butchery. Joshua is continually working with all

of these farmers, as well as others, to develop different raising and slaughtering practices, which also conveys a sense of a community food system. Over the course of the last few years grass-fed has also been sold on a trial and error basis in order to test the customer reaction to it, which is yet another aspect implying healthy food, environmental benefits, and animal welfare.

While they don't consider environmental implications in their efforts, Smart Vending provides the consumer with a more diverse range of snacks that are healthier than conventional VM food. Capital Roots' Smart Vending program is focused on educating the public on healthy food choices, and then giving people those options using VMs. Smart Vending follows the National Alliance for Nutrition and Activity (NANA). These guidelines were built by a team of scientists and nutritionists to create a set of recommended nutritional guidelines for healthy snacks and beverages (http://www.nslai.org/partnerships/nana-coalition-2/). "So normally they are under 200 calories, they are less than 35% calories of fats and sugar, they usually have zero trans-fat, and they are less than 385mg of sodium." So instead of supplying a product that is more a need at home, Smart Vending is giving people who rely on food from vending machines the opportunity to choose something more nutritional.

In order to gain more insight into health they were asked if the lack of healthy convenient food was motivation for using vending machines for either of these organizations. In the Smart Vending response they said that yes, this was one of the primary reasons the program was started. "I think that that model has been around for a long time and this time and opportunity to change that is very much present. Health awareness is just a more accessible concept now." Consumers are recognizing vending machines as a problem, and Smart Vending is trying to change the idea, and giving vending machine constituents the opportunity to put something healthy in their body, or making the choice not to.

Capital Roots is also focused on making food accessible through vending machines by "empowering" people to make a choice. When a new vending machine is installed, part of the intervention Smart Vending performs is education. They provide brochures and other materials to try and educate people on why conventional VM products are bad. Then the consumer can make a choice as to whether to choose the healthier option or not.

Comparing the idea of "healthy food" between the two organizations, although both do promote the idea that their products provide a healthy choice, there is definitely a distinction. Snacks are normally found in VMs and so Capital Roots' Smart Vending program is meeting the needs of people who have no other choice but to get food from the vending machine by improving the quality of that food and giving consumers a healthy choice. Applestone is taking part in another aspect of health. Their focus is on "quality" and trying to make a better quality product available to more people, while simultaneously trying to normalize the idea of buying raw food from a vending machine.

Environmental values

Both organizations were asked if they consider the environment in any way when they are selecting the products they sell. In both Applestone interviews, they answered that they think about their footprint in every aspect of the business.

> You always have to consider the environment. So we are constantly looking at packaging of the different farms we use. Just the practices we do we are always trying to use less plastics and figure out a better way of doing things. It's not about the money, you know, it's about the efficiency and the sustainability of people. How can we keep longer, healthier, whether it's going to be farmers, our own people or the customer. All of these things play a factor. [Joshua Applestone: 03-09-2020]

Applestone also recognizes that sourcing good quality meat can be really difficult. Josh stated that when he originally planned on opening Applestone he wanted it to be a resource for farmers to make a profit as well. “When I started Applestone I really wanted to concentrate on farmers and their production because their options were very limited for advanced production. They didn't have the accessibility to make higher priced items.” By allowing the farmers to price their meat accordingly, and by working with them, Applestone believes they are giving the farmers enough money to support a switch to more sustainable farming. As explained by Gloffke:

> Someone who is going to buy all their product so they can make money. So he is basically working with us on like the best feed practices and he's trying to do things Josh has recommended from his history working with other farmers. But you know at the end of the day no hormones, no antibiotics, humane raising practices, humane slaughter practices - these are all things we are looking for. and we just work with people from different programs. [Samantha Gloffke: 03-09-20]

Giving farmers an “outlet” and maintaining quality standards shows that Applestone is aware of the line of production. They also want to be transparent about where the line of production, so the customer can see that they aren’t lying, that there is transparency within the meat industry.

Because they are a for-profit company Applestone was asked if they use their environmental awareness in their marketing strategies. The response was that they try not to use it as part of their marketing strategy. However, both recognized that the media has often used it to promote the company. Josh stated that he tries to stay out of the media, and not take all the credit, because he is just a player in the industry. His response elicited the same feeling as the

other response from Sam. “That's a good point. We don't really lean into that right now, I think probably because we feel like we don't do enough.”

Applestone’s website includes some of the words they spoke about in the interview. Affordability is emphasized, as well as accessibility to good quality food. They also talk about transparency in the supply chain. This seems in part how they connect to sustainability, which is also emphasized. On the *About Us* page equity for farmers is something that the company and the owner focus on in their attempt to be sustainable. This allows farmers to fund their efforts to act more environmentally conscious in their practices. Treatment of the animals is something that is important to the company, and this ties into their connection to farmers as well. Sustainability is also a focus when it comes to the quality of their product. The website uses the ideas of sustainability to be focused in consumer trust in quality. This gives the company’s website the feeling that the company is very invested in their consumers wellbeing by trying to source the best quality meat and make it available to the most amount of people possible through price and convenience (https://applestonemeat.com/about-us/).

They recognize that there are a lot of things about the company that have a negative impact on the environment. Sanitary regulations force the use of plastic gloves, and the company goes through hundreds a day. They also recognize packaging is always a part of the conversation. Even though they are aware that plastic is not sustainable but it’s the only viable product to sell the meat out of a vending machine affordably. And butchering as an industry is wasteful. It is almost impossible to have a zero waste butchering facility, especially at the production level Applestone is running at.

Clearly, although it is not foremost in their business model, Applestone places much more emphasis on environmental values than Capital Roots’ Smart Vending Program which is

almost solely focused on improving access to healthy food. The representative from the Smart Vending Program stated that they were not currently thinking about sustainability. “I think the goal is swapping those snacks. I don’t know if packaging is considered, things still come in bottles and cans.” However, they interestingly they also said that with the rise of healthy food, sustainably produced food would be supported as well.

Is There an Advantage to Vending Machines? Labor and Prices

Labor

Labor is an important part of running a company. Since they are for profit Applestone was asked if vending machines were an advantage in terms of labor. It seemed as if they were an advantage because they allowed the store to stay open all night without having to pay any employees. However, since there is a retail window during the day staff is employed anyway. So the advantage is in terms of time here, not really labor. They would staff a butchers shop anyway, but having the vending machines gave them the advantage to have longer hours than anyone else.

Smart Vending does not directly work for the companies, or provide a salary opportunity for laborer’s. They are the liaison for smaller VM companies and organizations to create a business relationship. However, they are giving other companies the opportunity to make money, which is one of the programs specific goals. Capitol Roots is there to serve the community as a whole, and creating business for the local economy is serving that mission.

Prices

When asked about the prices of their products it was stated that Appletone’s were competitive with the grocery store nearby, as well as other small butcher shops. They compared the grass fed

ground beef at the grocery store with their ground beef, which is pasture raised, both priced at $6.99/lb. They stated that at Applestone they are focused on quality, not quantity. While their prices are the same as other places, they claim that their meat is higher quality, so the customer is paying the same for a healthier product. Some of their cuts might more expensive per pound because they are hormone-free, but they promote the idea that the customer should spend the same amount of money on meat, and eat less.

Applestone considers itself a whole animal butcher shop. By using the whole animal the butcher shop can sell expensive and inexpensive cuts. When asked about the prices of their meat, Joshua said that he is trying to construct a diverse menu that includes many different cuts, many of which are at prices competitive with fast food and convenient food items. If he wasn't making most of his meat affordable, Joshua states that he is not fulfilling the mission he set out to by using the vending machines, and building his business on the idea that his meat should be accessible. "More than half, probably 2/3 of my beef section is under $9.99/lb." He states his frustrations that people are uneducated about food. This idea reinforces the suggestions that the lack of cooking skills in the younger generation is a key driver to the consumption of convenience food. When asked about the how their prices compare to convenience and fast food prices Josh said that while he does have an affordable menu, he has to make his price high enough to provide for his employees. Applestone pays more than minimum wage and they offer benefits to employees. While maintaining their goal of accessible pricing, the company still has to have expensive ribeye's and strip steaks, and this caters to a certain customer, and is not available to everyone.

The Smart Vending Program, under Capital Roots direction, operates in a very different way. Toni Nastasi, the director of Smart Vending, explained that they don't control the prices in

the vending machines. They team up with small, local or family run vending companies who are then in control of setting the prices for the snacks. This is due to the fact that Capital Roots makes no profit from this, all of the money goes to the vending company. There is not as much of a focus on making food accessible through cost. Smart Vending is focused on giving their consumers healthy options to choose from so they can make an informed decision about what they are consuming.

The biggest difference between Smart Vending and Applestone Meat Co. is that one is for profit and one is not for profit. While this forces them to focus on different profit goals, they still are both using vending machines to increase accessibility to higher quality or healthier food. Applestone has to set prices that they think are affordable but are high enough to meet profit margins, and run the business. However, they have increased the access to higher quality food in terms of time, making their products available twenty-four hours a day, seven days a week. Smart Vending has focused their vending efforts towards making healthier snacks more available in terms of locations and time of day, but not in terms of price. So while Capital Roots is giving consumers more options, those options might not be affordable for the target consumer they intend.

Discussion

What both of these companies have in common is their use of vending machines to make healthy food more accessible. Applestone has made this clear through their 24/7 butchers shop aimed at making good quality meat affordable and available even after the grocery store has closed.

Smart Vending is trying to reconceptualize what vending machine snacks are. Traditionally we see candy, chips and soda as the only options. The programs recognizes that a

large population, across all demographics, relies on vending machines to eat. They are the most convenient options, and office buildings and schools are beginning to recognize their negative impact on people's health. So Smart Vending is providing the financial and business resources to swap unhealthy snacks with healthier ones, and educate people on why they should chose the healthier option.

Both of these organizations are examples of how food and technology are changing to include the idea of health or sustainability. There are barriers to selling healthy or fresh food out of vending machines but other companies have been successful as well. Other organizations are attempting to use similar models with a focus on healthy food relying on vending machines. For example, Farmer's Fridge is a vending company out of Chicago and Milwaukee whose goals with vending are to provide a healthier product (put url of their website). Farmer's Fridge sells fresh salads, and sandwiches out of a vending machines. Their goal is to give people a fast food option that is healthy. The company has been successful in their mission and have multiple vending machines in both cities.

Each of these companies is very different but they highlight two important ways vending machines can contribute to the food scape. The first is access. Both companies are aiming to make healthy food more accessible. They use VMs as their tool to making access to healthier food more convenient. While Applestone recognizes environmental degradation as a problem in their industry, suitability is not the main focus of both organizations. Applestone makes a connection between how suitability increases the quality of their product. The profit comes from the VMs, therefore their business seems more focused on ways to make access to healthy food more convenient.

Vending machines being used in these different ways is also showing that technology is continually becoming part of the foodscape. In both interviews the organizations recognized vending machines as an opportunity to use technology to change the conversations around food. They are trying to use technology as a benefit to the food system, and they are not trying to bolster the idea of industrialism or mass production. While they also both recognized that vending machines still pose environmental problems, using them in the conversation around eating healthy is something that is possible.

Chapter 5: Conclusion

This research is focused on how vending machines could be a tool to increasing access to healthy food. There are links between increased risk to obesity, and related diseases, to those who eat from VMs regularly (Carrad et al., 2015; Viana et al., 2017; Hua et al., 2016; Matthews et al., 2016; Bell et al., 2013; Rosi et al., 2017; Bos et al., 2018; Carillo-Alvarez et al., 2019). This is something that consumers and health professionals are beginning to worry about. But VMs are beginning to be seen as a solution to their own problem. Healthy food could be sold out of VMs just as easily as unhealthy food. This paper outlines consumers' demand for healthier and eco-friendly food in VMs as well as the role convenience plays in the transition to healthier and more sustainable food.

The impact on public health that food has had comes from the industrialization process the food system has gone through (Moss, 2013; Pollan, 2013). The result has been low-quality food that has had a serious impact on both health and learning habits (Ricci et al., 2018; Hua et al., 2016; Matthews et al., 2015; Bell et al., 2013). Convenience has become something humans expect in their lives. Therefore food meets the needs of the consumer and has transformed to become convenient while giving up the health benefits that food usually has.

There are a few things help push the consumption of convenience foods forward. They are made with lower quality ingredients and cheaper replacements, and so they are mass produced and inexpensive ((Moss, 2013; Pollan, 2013). Convenience foods save time and energy but the tradeoff is that they are low in nutrition. People are losing the ability to cook, since it has become so easy to use machines instead (Warde, 1999). Microwave meals that come frozen or

French fries and fish sticks that only need a toaster oven to crisp up. The dependability on convenience has also shaped the technology we use to get our food

Consumers are beginning to recognize that many food items we have relied on in the past are bad for us. Health awareness is coming into focus, and there is incentive to provide healthier convenience food (Hua et al., 2016; Matthews et al., 2015; Carrad et al., 2015; Brunner et al., 2010; Stranieri et al., 2017; Bos et al., 2018). VMs are an adaptable piece of food dispensing technology. They conventionally hold convenience food items, because of how efficient they are at selling food. This would make it very easy to begin to use VMs to meet consumer demand for healthier convenience items. Along with healthier food, there is a demand for more sustainable convenience food as well. Products that meet the criteria for nutrition or sustainability could both be supplied to the public using VMs and still make a profit (Rosi et al., 2017; Ricci et al., 2018; Brunner et al., 2010; Jackson et al., 2016; Stranieri et al., 2017; Bell et al 2013). .

A company that recognizes the role VMs play in improving the foodscape is Applestone Meat Co. Their mission is to use VMs to make better quality food more accessible, by making it convenient. By using VMs the company avoids having to follow normal business hours, and run a twenty four seven butchers shop. The ideas of accessibility and convenience are linked by the VMs for this company. And rather than use the machines for more conventional food products, this company has shown that VMs are adaptable to different typed of products. Where a brick and mortar store might not fit or profit, a VM in the same space could, and could be selling fresh food.

The focus on the quality of their product ties into how eco-friendly the company sees itself as. The criteria set forth for the meat implicit follow guidelines that have a lower environmental footprint than industrialized produced meat. There are nothing injected into the

animals and they are slaughtered humanely. The company is also trying to recognize the farmer's role in the food chain, and how important equity is for the farmer. Farms are a feedback loop, so if the farmer is paid well the profits can go into improving the sustainability of the farm, which ensures high quality meat. The focus on quality is important for the company to try and fulfill their mission of getting good quality food into the most amount of hands possible.

Companies such as Applestone capture one of the contexts that VMs become very useful for. Changing lifestyles of the modern day dictate a certain amount of efficiency when purchasing food (Ricci et al., 2018; Capps et al., 2019; Stranieri et al., 2017; Warde, 1999). However, the importance of accessibility isn't understated by Applestone either. While they recognize convenience as a function of accessibility, it is used as a way to really provide a better option for more people of different income-levels. Using VMs is a way, in this case, to make healthier food more convenient to purchase, but also more abundant in a more accessible way.

The program run by Capital Roots, Smart Vending, is also recognizing the potential VMs have in turning the tide of unhealthy convenience food. Their mission is to use VMs in the same way they are used today, but to make them healthier so that the consumer has a choice. Instead of transforming the use of the VM, this program swapping snacks, is trying to educate the public on choices.

Choosing to incorporate education and the idea of choice is something Matthews et al. (2015) speaks to. By using VMs to constantly get unhealthy food from you are reinforcing habits to continue to buy unhealthy food. Both children and adults are susceptible to this and Smart Vending is using their resources to help with this problem. They provide materials on why having the option to choose something healthier at a VM can teach better food purchasing habits.

It also gives the consumer the power to decide what is going to be in their body, and they emphasize in the interview that having the option to eat healthy can be empowering.

Since VMs are so common to find they feed many different types of people. Since children are so susceptible to marketing schemes and tasty food there is a focus on the implication they have in school environments. As Rosi et al. (2017) recognizes in their paper VMs are technology that people have to rely on to get food from and normally everything there is to choose from us unhealthy. People also use VMs as a dependable food source. Sometimes, in hospitals or office buildings, they are the only source of food, so any choice you make can be unhealthy. These are the machines that Smart Vending are trying to change because they see that VM accessibility reaches different demographics.

Smart Vending is making VMs in this context healthier, and therefore making healthier food more accessible. In the interview about Smart Vending, the overall mission of Capital Roots to increase overall accessibility of healthy food, especially to low-income populations, is being fulfilled. This organization sees VMs as an outlet for healthier foods, and they are trying to use them to begin to replace unhealthy foods, rather than increase the amount of good quality food, like Applestone. However, these two companies both highlight how important VMs could be in transforming the current food system.

Vending machines have the ability to make better quality food more available. The ways that they have been used in the past shows that people rely on VMs for food in many different contexts. However, the use of VMs by both organizations shows that people are recognizing that the foodscape needs to change, and technology is a part of that. VMs represent how technology has been misused but also how adaptable it is to change. This adaptability could play an important role during the current crisis. COVID-19 is a crisis the world is beginning to adapt to.

It has impacted how we buy and eat our food. Since it is spread through the air we are all experiencing a need to try and stay away from people. VMs are perhaps an answer to something that gives us all anxiety: buying food. They are the perfect tool for consumers to use to get their fresh food, as well as their convenience food items. Not only would they be a contactless form of purchasing food, they are available to anyone at any time. Everyone is at home, and lifestyle are changing, but the need for convenience is still there. VMs are a convenient way to improve access to food by extending hours which could give more economic opportunity for vendors, as well better access to food for emergency workers.

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Appendix

Capital Roots Interview Questions:

1. What was the inspired you to start the Smart Vending program.
2. What products do you stock in your VMs?
    a. Do you sell fresh produce?
    b. Do you sell beverages?
3. Why did you choose vending machines as the outlet for healthier food? How are VMs helping you achieve this goal?
4. Your website states you work with family owned vending businesses .
    a. How do you select these businesses?
    b. Describe the relationship you have with them
    c. Does it help you reach your objectives?
5. How do you decide where to put your Smart Vending VMs?
6. What is the criteria for choosing the products you choose to stock Smart Vending VMs with.
7. Do you consider sustainability or how eco-friendly your products are? If not why?
8. How is "convenience food" considered by Smart Vending?
9. What are the greatest advantages you've seen from the Smart Vending program?
10. How do the prices of your selected products compare to conventional, processed, vending machine food?
    a. How do you price different products
11. Do you think that the Smart Vending Program has been successful?
12. Where are your VMs located and how to you decide where to put them?
13. Do you follow the Federal Healthy Food Guidelines

Capitol Roots Email

Dear Capitol Roots,

My name is Tessa Greenhalgh, I am a senior at Bard College and I study Environmental and Urban Studies with a concentration in Food System and Agriculture Studies. In order to earn a Bachelor's degree at Bard each student must complete what we call Senior Project. My senior project explores the use of vending machines in today's society, and asks if vending machines are a way in which to make healthier food more convenient for different populations.

I am writing to you today to inquire about conducting an interview for my Senior Project. The interview will last 30-40 minutes and in that time I will be asking about the vending machines your organization uses to deliver fresh produce to disadvantaged, urban populations. This aspect of your organization will help to identify and show how vending machines can manifest positively and deliver a resource the community is lacking in a successful way. Some of the questions I will be asking will address the vending machines that you use specifically and how they have successfully, or not, been used as a way to provide fresh food to the populations you serve.

If this interview would be something that you are willing to do please email me back at tg6118@bard.edu. We can set up phone a phone, skype or in person interview depending on what is the most comfortable to you. I am free on Fridays and Mondays all day as well as

Wednesday afternoons to conduct interviews. Please let me know a time that would work for you!

Thank you for your time.

Sincerely,
Tessa Greenhalgh
Bard College
Class of 2020

Applestone Interview Questions:

1. What inspired you to open a business using a vending machine?
2. Can you describe your mission statement regarding your food vending business?
3. What products do you stock in your vending machines?
4. Which of the following words would you be characterize your food products?*
    a. Healthy
    b. Convenient
    c. Eco-Friendly
    d. Good value for the price
5. Why did you choose to sell the products you do instead of more conventional vending machine food like candy, chips and soda?*
6. Do you consider the impact to the environment when you choose the products you are selling?
    a. If yes what aspects of the environment do you consider?
7. Is the eco-friendliness of your product a marketing strategy for you?
8. Was the lack of convenient healthy food one of the reasons you began your business?
9. What have been your greatest __ challenges in selling healthier food items in a vending* machine?
    a. Economic challenges
    b. Environmental challenges
    c. Political challenges
    d. Marketing challenges
    e. Pricing challenges
10. Do vending machines provide advantages to your business in terms of labor costs*
11. Are they easier to manage then a store front or restaurant or other food service business?
12. Are there philanthropic motives behind your business?
13. How do your prices compare cheaper items that are also convenient such as fast food or ready-made meals?*
    a. If yes, is it hard to compete with these businesses?
    b. If higher, how do you justify your higher prices based? quality? Healthier?
14. Where are your VMs located and how to you decide where to put them?

Applestone Interview Email:
To whom it may concern,

My name is Tessa Greenhalgh, I am a senior at Bard College and I study Environmental and Urban Studies with a concentration in Food System and Agriculture Studies. In order to earn a Bachelor's degree at Bard each student must complete what we call Senior Project. This is an independent project, which the student completes throughout the whole senior year, as well as a four credit class each semester. In my area of study the students senior project attempts to answer a research question through various methodologies.

My senior project explores the use of vending machines in today's society, and how the development of convenience foods has contributed to many of the food related health problems many people in the Western World face today. I then will attempt to argue that vending machines are a way in which to make healthier food more convenient for different populations.

I am writing to you today because I would like to interview you about your company/organization in order to collect data for my senior project. The business you have created is a perfect example of how vending machines can be used to contribute to society in a positive and healthier way. Some of the questions I will be asking will have to do with the idea to own a vending machine business that sells healthier option then conventional vending machines, some of the advantages of owning this type of business model and barrier that you have faced.

If this interview would be something that you are willing to do please email me back at tg6118@bard.edu. We can set up phone a phone, skype or in person interview depending on what is the most comfortable to you.

Thank you for your time

Sincerely,
Tessa Greenhalgh
Bard College
Class of 2020