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Piloting a Healthy Street Food Venture in Kenya: Lessons Learned

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Abstract

Approximately 2.5 billion people, majority of them in developing countries, consume street foods on a daily basis. High malnourishment rates in these low-resource settings create a need for healthy street food. The successful introduction of healthy street food could ultimately improve communities' overall health and wellness without constraining people's budgets and eating habits. Packaging locally available ingredients into aspirational foods like pizza improves consumers' access to micronutrients without disrupting their consumption of indigenous foods. The Zima Pizza venture was piloted in the town of Nyeri, Kenya to pilot this implementation process. This venture introduced a westernized food option into a local restaurant, and the lessons learned from this venture can inform the introduction of healthier street foods. This article outlines the basis for designing healthier meals for a simple street food business, the challenges that arose in the implementation process, and the lessons learned from this social venture.

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1. Introduction

The 2014 Food and Agriculture Organization (FAO) report indicates that a quarter of the population of Sub-Saharan Africa, approximately 204 million people, remain chronically malnourished. In order to achieve the United Nations' first Millennium Development Goal (MDG) of eradicating extreme poverty and hunger, Sub-Saharan Africa needs to overcome three major challenges. The first challenge is improving access to a variety of healthy foods both economically and geographically. The second challenge is increasing the nutrient content of people's diets. The third challenge is to improve food handling and unhygienic preparation methods [1].

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Street food is defined as "ready-to-eat" meals, snacks, and beverages sold by vendors or hawkers in streets and other public places [2]. Popular street foods in Sub-Saharan Africa provide many meals for individuals who are busy with work, school, and/or caring for family. Approximately 2.5 billion people consume street foods on a daily basis, and the majority of them live in developing countries. Most of them rely primarily on street food for their daily intake of micronutrients and protein [2]. However, research has shown that the most prevalent street foods in Kenya are high in calories, but low in nutrient diversity [3]. Local markets have a need for more nutritious food products as alternatives to these current options. An integration of healthy and tasty street foods can improve overall wellness and potentially help control chronic diseases, such as obesity, diabetes, and heart disease.

Pizza was used for this case study because it can potentially meet the nutrition, processing, packaging, and storage constraints of street vending. It has also become an aspirational food for many potential consumers due to urbanization and globalization. This is because food repertoires are becoming more westernized in rapidly urbanizing areas of Africa [3]. Zima Pizza was formed as a social entrepreneurial venture in order to create and introduce an innovative street food that combines aspiration with health. In May 2014, the founders of Zima Pizza traveled to Nyeri, Kenya to pilot their enterprise and conduct research to improve the venture. This pilot program was conducted from a local restaurant, and research areas included consumer-vendor relationships and consumer preferences. In particular, interviews and sensory evaluations were conducted in order to better understand consumers' and vendors' interests. Partnerships were established with local entities, and indigenous knowledge was integrated throughout business strategy and recipe development.

Section 2 presents background on this venture, including its concept development and a nutrition comparison between the proposed foodstuffs and current options. Section 3 focuses on the implementation of the venture and lessons learned through daily operations, partnership establishment, and sensory evaluation sessions. These lessons are valuable to other social entrepreneurs in terms of understanding the socioeconomic context and piloting ventures.

2. Design criteria for a more nutritious food option

2.1. Importance of Street Food

One of the United Nations' primary Millennium Development Goals (MDGs) is to halve the proportion of undernourished people in the world by 2015. Sub-Saharan Africa is one of the major regions lacking progress on this MDG, with 204 million of its 804 million people suffering from malnutrition [4]. Lack of sufficient and variable nutrients can lead to detrimental health consequences such as increased susceptibility to disease and even death [1]. High disease prevalence also increases financial burdens on families whose members may no longer be able to work or attend school. This increases families' risk of financial insecurity and decreases their purchasing power to obtain adequate nutrition [1].

Problems with gaining proper nutrition are related to high unemployment rates and the uncertainty of agricultural yields each year due to climate change. Extremely high unemployment rates (upwards of 40% in Nyeri) impede health by preventing households from purchasing the proper quality and/or quantity of food [5]. Without sufficient wages, families must eat only the foods they can afford and often neglect nutrition to focus only on consuming adequate calories. The changing climate also poses a threat to agricultural production as it results in lower or highly variable crop yields from year to year. These changes negatively affect regional food security and can directly influence food prices and availability, especially with regards to lower income populations.

Street foods are the main source of food for many people in Kenya. A study conducted in Nairobi investigated the nutritional contribution of street foods and found that non-home prepared foods contributed to 13-36% of dietary energy, 11-20% of vitamin A intake, and 7-20% of iron intake for urban residents [6]. A study done in Nyeri, Kenya also identified the most popular street foods currently on the market. The most popular meat-containing street foods were typically fried, most notably smokies, samosas, and miniature kebabs. The most popular vegetarian products are maize, cassava, arrowroots, and potatoes. Fruits were almost always served fresh as individual slices, the most popular of which were pineapple, watermelon, bananas, and oranges. Aside from these food groups, other popular street foods included popcorn, boiled eggs, peanuts, candy, biscuits, and githeri—a traditional dish of maize and

beans. While produce was a popular street food, the other most commonly consumed foods were fried and/or high in starch, which contributes to an unbalanced diet [7].

Street foods serve as convenient, quick, and affordable snacks or meals for customers of all ages and socioeconomic groups in both urban and rural communities. Research in West Africa has shown that those who eat street foods on a frequent basis were considerably more likely to have diets consisting of higher amounts of saturated fats, trans-fatty acids, sugar, salt, and high-density carbs; infrequent street food customers consumed more fruits and vegetables [8]. Given this information, the integration of healthy street food is a valid way to target the malnutrition challenge in Kenya. While street foods remain key to achieving the MDG of combating malnutrition, few studies have been conducted investigating the factors influencing consumer decisions.

2.2. Zima Pizza

2.2.1. Concept development

The rate of urbanization in Kenya has been accelerating in recent years. This movement has transitioned more individuals from a rural to an urban lifestyle, which is known to reduce daily physical activity by 10-15%. With lower caloric demand, traditional meals tend to be too high in calories for daily consumption. This trend leads to a higher prevalence of obesity and diabetes throughout cities in these developing countries [3].

Urbanization has numerous consequences, one of which is the attention from large multinational corporations. This increase in global capital inflow tends to improve access to mass media, foreign suppliers, and imported food products. Such changes can often result in an increase in consumption of international foods [3]. This pattern has been observed in recent years in Kenya. Ranked as the second most preferred destination in Africa for multinational corporations by Frontier Strategy Group, Kenya has an increasing number of restaurants providing westernized food options. In Nairobi, at least eight Domino's Pizza and ten Cold Stone Creamery Outlets would be established by the end of 2016, according to Eric Andre, two brands' local franchise holder [9]. In Nyeri, there are two high-end restaurants selling pizzas. Westernized options like American fast food pizza are rich in fat, high in calories, and often appeal to younger generations and urban populations. A modified version of westernized food that incorporates healthier ingredients could help alleviate the current lack of micronutrient diversity.

2.2.2. Recipe development

In this case study, a vegetable pizza recipe was developed. The pizza base was derived from a local staple food called chapatti. Chapatti is traditionally a thick tortilla-like bread product eaten on the side of a meal. It is cooked using oil, wheat flour, and water. The pizza dough incorporates wheat and soy flour into the chapatti recipe to provide enough fiber and increase the protein content. Amaranth flour was mixed into the pizza dough to increase micronutrient content and appeal to the health food niche market. Further, instead of deep-frying the dough as chapatti is traditionally made, the pizza base is pan-baked.

Three different pizza sauces were designed: tomato sauce, kale sauce, and bean paste, each made of locally available ingredients. The pizza sauces were designed to provide a richer diversity of nutrients. The amount of protein and carbohydrate contained in each serving of Zima Pizza meets daily recommended values, in contrast to current food options that are too low in protein. The nutrition comparison between Zima pizza and the current food options of ugali, chapatti, mandazi, and corn, beans, and potatoes, is presented in Table 1.

Table 1. Comparison of nutrient content in Zima Pizza and current food options per one serving size; baseline nutrition data from USDA [10]

Zima Pizza

Comparison to competitors

	Zima Pizza			Comparison to competitors		
	Kale Pizza	Tomato Pizza	Bean Pizza	Ugali	Chapatti	Mandazi
Calories	860.0	670.6	698.5	181.0	540.0	411.9
Total Fat (g)	51.3	26.8	23.2	2.0	35.6	8.5
Cholesterol (mg)	0.0	0.0	0.0	0.0	0.0	65.0
Sodium (mg)	3971.5	3734.9	4124.1	82.0	292.0	315.1

Carbohydrate (g)	108.0	112.9	122.5	39.0	50.8	75.5
Sugar	4.0	4.0	4.3	1.0	3.3	96.0
Protein (g)	33.5	34.1	38.1	4.0	6.5	9.0
Calcium (mg)	139.2	133.4	125.0	0.0	8.0	186.3
Iron (mg)	7.9	8.0	9.8	0.4	1.0	3.8
Vitamin A (µg)	134.0	44.7	5.0	0.0	0.0	78.0
Vitamin B12	0.0	0.0	0.0	0.0	0.0	0.3
Vitamin C	33.0	14.9	1.1	0.0	0.0	0.0
Vitamin D	0.0	0.0	0.0	0.0	0.0	0.6
Phosphorus	360.2	377.5	425.9	105.3	53.0	166.1
Zinc	3.3	3.6	4.0	0.5	0.3	0.6

Key: White indicates recommended value not being met, grey indicates fully met. Recommended values from USDA [10]

2.2.3. Operations

A partnership was established with a small hotel and restaurant in the center of Nyeri town. This facility was used for recipe testing, preparing pizzas, storing ingredients, and selling finished products. An empty indoor space was utilized as Zima Pizza's temporary food preparation station, as shown in Figure 1. The business opened each day at 11:00 am and closed at 6:00 pm to accommodate Kenyan preferences for later lunches.



Figure 1. Zima Pizza set up inside Tickles Hotel

Prior to arrival in town each morning, a local chapatti maker prepared the pizza dough according to the Zima pizza recipe. This process took 4 hours per day. Toppings were prepared 3 hours before opening by the Zima Pizza team with the help of three local youths. These youths were also employed to assist in conducting interviews and to prepare and sell pizzas. Pizza pastes were prepared three times per week based on consumption patterns, each paste taking around 2 hours to prepare. Leftover sauces were stored in the freezer provided by the restaurant, an uncommon luxury that would not be available to most vendors. All ingredients were purchased from the local market at competitive prices. During daily operation, one employee was assigned to cook the food, and the other

two were responsible for marketing and bringing in more customers. Once a customer was brought in, toppings and pizza sauces were customized based on the order. The pizzas were cooked fresh with a charcoal oven purchased from a Nairobi-based company called CooksWell. Baking one pizza took 10 minutes, and the oven is shown in the Figure 2.



Figure 2. Jiko Oven

3. Lessons learned in Kenya

Fieldwork was conducted in Kenya throughout May 2014, in order to test both the recipes and the business model for this venture. Sensory evaluation surveys were conducted to study the taste preferences of local customers, and partnerships were established with local businesses to further advance the venture. A variety of community volunteers were involved in the taste-testing process and aided in interpreting sensory evaluation information for practical integration into the recipes. Several other community members facilitated the implementation process by translating between Swahili and English, helping to locate potential interviewees, working in the kitchen to prepare pizzas, attracting customers, and other related tasks. Throughout these interactions, several notable lessons were learned regarding daily operations, relationships with stakeholders, preferences towards westernized food and nutritious food, and barriers to entry.

3.1. Business model

Zima Pizza was developed to be a nutritious meal suitable for street vending. However, Kenyan regulations forbid the preparation methods piloted in 2014 from being conducted on the street. Specifically, Kenyan law requires that all food sold by mobile food vendors be fully processed and prohibits cooking procedures on the street. Because precooking and then reheating of this pilot recipe could result in a loss of nutrients, the preliminary business model was adapted into a franchising method wherein the pizza recipe would be sold to restaurants. This pilot was thus intended to test its concept design in order to inform future nutritional ventures in both the restaurant and street food industries.

3.2. Sensory

Sensory evaluations were conducted with 30 randomly selected local citizens to learn more about their food preferences and to gain insight into their general reactions to the product. It is impractical to assume the data collected were unbiased, due to the limited sample size and the challenges of language and cultural barriers. However, some steps were taken to minimize the influence of these biases, and best practices can be applied to wider studies.

Specific biases were identified as follows:

3.2.1. Cultural etiquette

In contrast to the acceptability of public complaints in western societies, Kenyans rarely complain publically due to senses of cultural etiquette and respect. This difference made it difficult to collect valid data because individuals were unwilling to openly critique the product. Broad, open-ended questions such as, "How do you like the taste of the pizza" were best avoided. Instead, more specific questions such as "What about the appearance is unappealing?" generated more honest responses and more valuable feedback.

3.2.2. Response Bias

Another bias in the sensory evaluation responses came from having foreign researchers conduct the surveys. People are mostly friendly towards visitors and are likely to attempt to appear welcoming, possibly resulting in inaccurately positive reviews. To attempt to mitigate this issue, the surveyors referred to themselves as a third-party unrelated to Zima Pizza so as to separate themselves from the product and get more honest feedback.

Trends observed from the data collection process and analysis included:

Most of the participants had heard of pizza as a famous western food, but had never tasted one before. Thus, they expected a more exotic aspirational product that conformed to their expectations of a tomato sauce and cheese pizza, foods that are uncommon in their region. This trend was also observed in Zima Pizza's sales. The tomato sauce's consumption exceeded the sum of the other two sauces, as kale and beans were viewed as every day, mundane foods and tomato sauce was viewed as the authentic, western pizza sauce.

3.2.2.1. Young and wealthy demographics are more interested in trying new things

Professionals and younger generations were found to be the most familiar with the concept of pizza. Their perceptions of pizza being a luxury food made these demographics willing to pay higher prices for pizza than for more traditional street food options. These customer segments are also known for their relatively high interest in trying new things. Another facilitating factor was their level of disposable income; young professionals and wealthy individuals are likely to be more financially stable. Moreover, pizza is currently viewed as an elite food option in the local market. Professionals may be more willing to pay as a signifier of their wealth status, while the younger generation tended to try pizza for its "cool" factor.

3.2.2.2. A mix of exotic and familiar

During sensory evaluations and concept validation, people expressed their desire for a more "exotic" taste. Yet when asked "how can the taste be improved?", many interviewees made suggestions based on their daily diet preferences. For example, many people suggested adding cilantro and eggs as toppings. These foods are common in the Kenyan diet but not in American-style pizza. This phenomenon is common in other countries, such as with the Americanization of Chinese food in US fast food markets.

3.2.2.3. Sweet tastes are preferred

The sensory evaluations indicated that most participants preferred sweet tastes to spicier ones. However, younger generations were more tolerant and fond of spicy foods. This trend is also observable in other local foodstuffs, including a street food called smokies. Smokies, which are similar to a mini-hotdog, are usually served with a chili pepper sauce known as kachumbari. According to these street food vendors, the majority of their customers are young, and their smokies would not sell well without the spicy kachumbari.

3.2.2.4. Nutrition is not a top concern

One major observation from the interviews was that locals did not place much value on nutrition when deciding what to eat. Despite the numerous health benefits of consuming kale and beans, individuals did not desire these pizzas because kale and beans are seen as everyday food in this region. Therefore, these ingredients did not positively represent the unique and special American-style pizza that many had in mind. Because pizza is seen as a unique western luxury in Nyeri, locals did not want to consume ingredients that were associated with the diets of local lower-income citizens. Social status, taste, and price seemed to trump concerns over nutritional content.

3.2.3. Operations

In Kenya, the most common type of public transportation is matatu, shown in Figure 3. Matatus function as commuter buses, stopping whenever there is a passenger waiting alongside the street. This occurs regardless of seat availability inside the van. Thus, taking a matatu into town frequently results in time delays of varying length. The ride is also often too crowded to accommodate large items. Finally, matatus do not have official fees; oftentimes a matatu worker will attempt to charge higher rates to foreigners. Unreasonably high prices were similarly an issue when purchasing raw ingredients from local markets. Market research was necessary to prevent being overcharged, and shopping with local partners can be useful. In Nyeri and other developing regions, electricity is not a reliable power source. Thus, most work is done by manual labor. This increases preparation time, particularly for cooking.



Figure 3. A matatu in Kenya. These mini-buses are the most common public transportation used in Nyeri Town.

3.3. Stakeholders

3.3.1. Customers

Specific marketing strategies were used to target certain customer segments, including younger and wealthier individuals and those who were open to trying new and aspirational dishes. Marketing began with strategies common to resource-constrained contexts, including traditional press, billboards, flyers, and hand-outs. However, non-traditional approaches were also leveraged to reach the aspirational market segment. Branding was important, and Zima Pizza founders and employees wore uniform t-shirts during all operations. A prize wheel game was also used to attract target customers, and the prizes were specially designed coupons. Samples were carried to offices and schools that were identified as initial target customer locations. Guerrilla marketing, which consists of chanting the brand name in the street and directly speaking with potential customers, was also an effective tool. Guerrilla marketing is rarely used in this region, and was likely effective due to the presence of westerners.

3.3.2. Partners

Maintaining good relationships with partners is important for all local business owners. Maintaining these positive relationships is especially valued in rural Kenya, where there is a strong sense of community. Giving these partners a voice in business strategy is a sign of respect and keeps them engaged. Minimizing conflict and building these relationships requires significant negotiation and compromise.

Partnerships must create value for both parties in order to be successful. In Kenya specifically, businesses' reputations often disproportionally benefit from being associated with westerners. In this case study, the restaurant that Zima Pizza partnered with benefited from public perception, and Zima Pizza benefited from the connections, resources, and customer base of this popular restaurant.

3.3.3. Employees

As mentioned earlier, relationships and a sense of community are highly valued in Kenya. Due to the previously established friendships between local employees, many members did not feel comfortable being promoted or given more responsibility if their counterparts were not given the same duties. Stakeholders were instead willing to turn down promotion offers and compromise their individual gains in order to maintain relations with co-workers. Personal and professional relationships need to be treated carefully while distributing differing levels of responsibility.

3.4. Barriers to Start-up

3.4.1. Entry barriers

In Kenya, people spend around 30-50 KSh (around \$0.50 USD) per meal on street foods and around 150-200 KSh (\$2.00 USD) for a meal at a restaurant. Even though Zima Pizza was half the price of similar pizza products sold in restaurants, it was still too expensive for those looking to purchase street foods. Consumers who were used to paying less for street foods reported that they could only afford a pizza as an occasional treat rather than as a regular part of their diet.

The perceived value of a food was also directly related to its location. Being located at the Tickles Hotel, a nice hotel in the center of Nyeri, added to the perceived value of Zima Pizza. This perception justified, for some, the relatively high price. While this view helped build Zima's status and brand development, it also limited the customer base to those with relatively high disposable incomes. As such, this pilot study had limited access to its original target customers. More work is necessary to successfully introduce an affordable and healthy street food to typical, lower-income consumers.

3.4.2. Gender inequality

Another noteworthy barrier in some of the venture's operations was gender inequity. Despite the general ease of establishing business relationships with locals, Zima Pizza always needed a male present when discussing business matters with partners or government officials. Though many businesses in the region have a strong female presence, the decision-maker is expected to be male. Although the number of women proactively involved in the local market is continuing to increase, males in this region tend to favor working alongside other males regardless of their position within the company.

4. Concluding remarks

The high popularity of street food in developing countries combined with their high rates of malnutrition means that healthier street foods could have a major positive influence on community health. The challenge is to introduce diverse and healthy foods within local regulations and preferences for cost and taste. This pilot venture introduced a modified western-style pizza business into a local restaurant in Nyeri, Kenya. Three pizza sauces were developed with locally available produce. The pizza base was designed around a staple food, chapatti, but provided more micronutrients via the addition of soy and amaranth flour. Zima Pizza was developed specifically for local production and sale and was sold at half of the price of similar pizza products available in the local market. This

initial pilot moved the street food business model into an unused restaurant space in order to quickly accommodate regulations regarding in-street food preparation. The recipe and business model were iterated based on lessons from implementation, sensory evaluations, and interviews.

During sensory evaluations, local customers showed their interest in trying the pizza, but feedback was biased by cultural norms. An aversion to public critique resulted in many overly positive responses. This phenomenon complicated the process of studying preferences and examining the potential for improvement. Nonetheless, common responses included suggestions for toppings that were indigenous rather than westernized. Young and wealthy demographics showed higher interest in the product due to their relatively higher disposable incomes and the food's status as an elite option in the local market. In fact, most sensory evaluation interviewees were indifferent regarding the nutritional benefits of the product. The pizza's perceived elite status, its taste, and its price were the main reported motivations.

In light of these results, the authors do not recommend pizza as a street food in its current context. While most people showed interest in this healthy choice, Zima Pizza was viewed as an elite food option purchased in order to show one's social status. These consumers would generally rather have paid more to sit down in a nice restaurant as opposed to purchasing a similar product at a street food stand. In addition, even though Zima Pizza was sold at half the price of similar local pizza products, it was still too expensive for most of the street-food consuming population. As such, accessibility was limited to the more affluent restaurant-goers. The feasibility of pizza as a street food in Nyeri might improve if the price could be further reduced and preparation redesigned to meet local regulations.

Although this venture did not succeed in introducing a healthy mobile street food option, the lessons learned concerning social norms could help guide future ventures. Zima Pizza could be a healthy café/restaurant option in towns like Nyeri, and a more popular and less expensive healthy street food can be designed based on the results of these sensory evaluations. The information discussed regarding the design of healthier meals for street businesses, the challenges that arose in this case study, and the lessons learned from piloting this social venture can serve as beneficial knowledge to social entrepreneurs focused on combatting malnutrition in developing countries.

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