



DESIGN FOR MICRO-ENTERPRISE: A FIELD STUDY OF USER PREFERENCE BEHAVIOR

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Abstract

Product development serving the Base of the Pyramid (BoP) is an increasing part of many organizations' growth strategies, from social enterprises to large multi-national companies. In response to this need, research has focused on developing new design approaches for reaching these users. Previous work by the authors identified targeting micro-entrepreneurs as one increasingly used strategy. This field study expands on the previous work by examining micro-entrepreneur purchasing decisions in the public toilet sector in East Africa. Results from interviews with thirty-three franchisees of a public toilet franchise and other stakeholders in the system are presented. Analyses of purchasing practices and interview responses highlight how the micro-entrepreneur's business strategy is key to the purchasing decisions and therefore should be closely examined by designers.

Keywords: User centred design, Requirements, Business models and considerations

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1 INTRODUCTION

Product development serving the Base of Pyramid (BoP) is an increasing part of many organizations' growth strategies. Small social enterprises to large multi-national companies view emerging markets such as India and China as important pieces of their future business (London, 2010). Expanding to these markets poses a number of challenges from a lack of existing market research to poorly developed local research and development capabilities. Existing design tools may not be adequate for overcoming these challenges, and there is a clear need for tools tailored to the emerging market context (Sridharan, 2012). In response to this need, research has focused on developing new business models and design approaches for reaching these users. Prahalad has made a case for businesses to focus on BoP users (2009). London investigated how emerging markets may necessitate new business models for success, proposing methods for establishing successful partnerships with local firms (2010). Khanna and Palepu use emerging market characteristics to help guide identification of business opportunities (2013). In the engineering design field, Mattson and Wood draw emerging market-specific design principles from a meta-analysis of methodological papers (2014).

Previous work by the authors examined how some organizations target micro-entrepreneurs (Austin-Breneman, 2013). Given their unique operating constraints, organizations have approached these users with new strategies. Through designer interviews and case studies, the authors proposed three factors as crucial to successful product development for these users: 1) ability to generate revenue, 2) product and brand reliability, and 3) product multi-functionality. These findings were notable for their contrast with a common construct of reducing cost and performance to meet low price points. However, an examination of the purchasing decisions of micro-entrepreneurs in emerging markets could refine this understanding. Exploring the needs and behaviours of micro-entrepreneurs can help tailor design tools to focus on issues important to these users. Given this context, this paper seeks to address the following research questions:

1. What factors affect purchasing decisions for micro-entrepreneurs in emerging markets?
2. Should designers use a new development approach for emerging market micro-entrepreneurs?

In order to answer these questions, a field study of franchised public toilets in East Africa was conducted. The field study consisted of extensive interviews with both employees of the parent company and the franchisees. The goal was to categorize user preference behaviour of the micro-entrepreneurs in order to create a roadmap for future product development.

2 RELATED WORK

2.1 Theoretical Framework

Defining emerging markets is a critical task to understanding the context of this study and related work. Traditional definitions have used geographic demarcations (Holtbrugge, 2012) or financial metrics such as per capita Gross Domestic Product (GDP) (Booth, 2014). This study defines emerging markets as those that lack institutional support for the fluidity of product, capital or labour markets (Kahn and Palepu, 2014). For example, an emerging market may have a large informal sector not well supported by the legal framework of the country. This can correspond with limited access to capital markets for enterprises in that market. This definition describes the operating context of the firms and the conditions which may affect entrepreneur preferences.

The definition of "entrepreneur" should be examined carefully to determine applicability of this framework. Although a large percentage of the workforce in emerging markets is made of up self-employed individuals (Ayyagari, et al., 2007), this does not necessarily mean that they behave in the manner ascribed to "entrepreneurs" in other markets. Banerjee and Duflo describe the behaviour of many self-employed individuals in emerging markets as the "reluctant entrepreneur (2011)." They demonstrate that people who own small businesses in emerging markets are less likely to take risks to grow their business. Other researchers have also examined the unique constraints facing entrepreneurs in emerging markets and how this may affect their behaviour (London et al., 2010, Bruton, 2008). The South African government categorizes micro-enterprises as employing less than 5 people and having total annual revenues of less than ~\$20,000 (Abor, 2010). This study defines micro-entrepreneurs as

those who operate micro-enterprise as defined above, which includes most of the self-employed individuals in emerging markets (Ayyagari et al., 2007).

2.2 Design for BoP

Engineering design literature has examined designing for the BoP with many researchers describing the unique challenges posed by the context (Mattson and Wood, 2014). A key challenge identified has been correctly identifying and understanding user needs (Donaldson, 2006). The majority of the literature suggests a collaborative participatory co-design approach to involve end-users throughout the design process (Viswathanan, 2011). Other strategies have focused on cost-saving, product-service systems, and user requirements (Kahle et al., 2013; Parks and Schafer, 2011; Jagtap et al., 2011). These methods focus on consumer products and serve as a comparison for the population studied here.

2.3 Business-to-Business Relationships

Management literature has highlighted differences between Business-to-Business (B2B) and Business-to-Consumer (B2C) transactions as a way to evaluate business opportunities and to manage new product development. Mudambi demonstrates how service and branding are important to B2B markets in differentiating competitors (2002). Lam makes a similar connection between service and customer loyalty in B2B (2004). Intangible characteristics such as customer perception of service quality and brand image have been shown to be more important than product features in some B2B situations (Ballantyne et al., 2007). This area of research shows that firms often evaluate quality of products or services differently from individuals with an emphasis on service over product features. However, in the population of interest the firms often consist of a single person. In investigating the purchasing decisions of micro-entrepreneurs, this paper draws from these works to provide a theoretical framework for understanding which factors may influence these decisions.

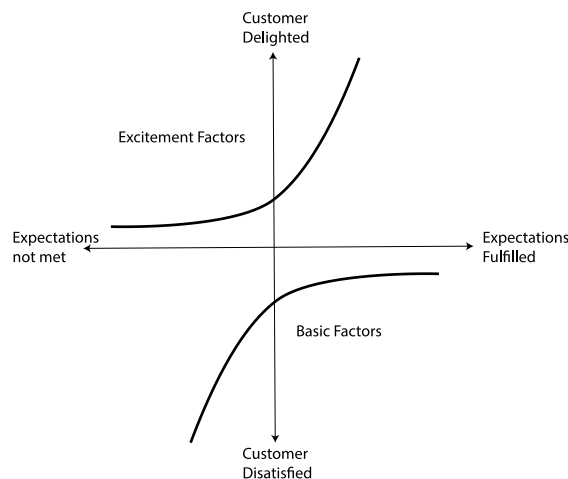


Figure 1. Adapted Kano Model (Matzler and Hinterhuber 1998)

2.4 Product Purchasing Decisions

There is a rich body of work investigating consumer purchasing decisions in engineering, economics, marketing and other fields (Gavin, 1984). Researchers have studied many factors affecting user purchasing decisions, including in emerging market populations. Foster and Rosenzweig survey factors affecting technology adoption (2010). Studies have shown the importance of the information pathway, or where the user learns about the product to purchasing decisions (Bandiera and Rasul, 2002). Risk preferences are another area of research, with procrastination (Banerjee and Duflo, 2011) and individual risk profiles (Liu, 2013) both affecting technology adoption rates in emerging markets. Other studies have focused on purchasing decisions in business transactions. Demographic factors, such as variable fixed costs (Suri, 2011) and varying levels of business knowledge (Weir and Knight, 2000, Cole et al., 2013), have been shown to affect product purchasing decisions of business people in emerging markets. These works are used to inform the direction and content of the interviews with the micro-entrepreneurs by establishing the set of possible factors.

One framework for understanding how product attributes affect user preferences is the adapted Kano model of customer satisfaction from Matzler, see Figure 1 (Matzler and Hinterhuber, 1998). Attributes that place a product above the upper curve are known as “excitement factors” while those below the lower curve are defined as “basic factors.” Matzler, et al. suggest that companies should focus on developing a competitive advantage in “excitement factor” areas (1998). This paper uses insights from these works to frame purchasing decisions within a larger context of entrepreneurial strategy.

2.5 Research Gap

Researchers have demonstrated that entrepreneurs at the BoP are an important market. However, there is a lack of literature on product development for enterprises in emerging markets, as represented in Table 1. Traditional enterprise design strategies differ from consumer product design tools in their focus on service and the relationship between the two businesses. Design for BoP strategies also differ from consumer product design tools, but focus on new methods for correctly identifying user needs. In response to research which suggests emerging market entrepreneurs behave significantly differently from their counterparts in other markets, this study seeks to fill the gap in understanding how to best develop products for this important user group by examining the purchasing decisions of these users.

Table 1. Research Gap for Design for Micro-Enterprise

	More Industrialized Markets	Emerging Markets
B2C	Traditional consumer product design tools	Design for BoP
B2B	Traditional enterprise and service design tools	Design for Micro-Enterprise

3 FIELD STUDY: SANITATION IN EAST AFRICA

For this study, a research collaboration with a social enterprise in East Africa was established. The company produces and sells public toilet franchises in the slum areas of a capital city. The company was chosen as a collaborator because of their customer base was comprised of micro-entrepreneurs. At the time of the interviews in April 2014, the company had existed for four years and had sold ~400 toilets in the slum area to ~150 micro-entrepreneurs. The parent company was interested in researching the purchasing decisions of their franchisee partners because they had observed counter-intuitive behaviour and wanted to improve their service.

The parent company sells a product-service system in which the franchisee purchases a specially-designed branded public toilet and also receives after-sale support. The micro-entrepreneur charges the public a fee per use of the toilets. The parent company sells the toilets to the micro-entrepreneurs at near-cost levels and collects the waste which they convert into fertilizer and other products for sale to third parties. In order to provide a high-quality standardized end-user experience, a franchise agreement requires toilet paper to be provided, sawdust placed on the floor to absorb moisture, and soap and water be available for hand washing.

As part of the after-sale support, the parent company offered high-quality toilet paper and soap brands at wholesale prices to their franchisees. However, only 17% of the franchisees bought the offered toilet paper and only 30% bought the soap. These are unexpectedly low purchase rates for a “better” product offered at the same price as the lower-quality alternative. Franchisees were choosing to buy a lower performing product at the same price point. It is therefore important to gain a better understanding of how product quality is perceived by these entrepreneurs.

3.1 Methodology

This field study consists of two sets of interviews and market research. At the time of the study, the parent company provided services to 143 franchisees distributed throughout seven neighbourhoods in a slum area. A stratified random sample of this population was obtained by randomly selecting a field officer to shadow on each day, as each field officer was responsible for a different area. The number of times each field officer was followed was weighted based on the number of franchisees in their area. For example, the area with the most franchisees had 70 franchises, so this field officer was shadowed

twice. Each franchisee on the field officer's route for that day was asked to participate. This corresponds with three to five interviews per day. Additionally, two franchisees considered by the parent company to be the most "entrepreneurial" were added to the interview pool. All six field officers were separately interviewed after the entrepreneur interviews.

Field interviews were performed on-site and consisted of 20 minutes of questions regarding the purchasing decisions of the franchisees. Each interview began with "Which products do you consider most important for the operation of your business?" Then participants were asked the following about each product type identified: 1) what products of that type are available to the subject, 2) which specific product and brand do they currently buy, 3) what product attributes contribute to their preference for that particular product, and 4) which product attribute contributes the most to their preference. Every participant was asked about their purchasing decisions for soap, toilet paper, and mops as these are required by their franchise contracts. The questions were phrased as to compare specific available products to avoid abstract concepts. For example, one respondent suggested lasting longer was an important factor in purchasing toilet paper. The follow-up question was "Please compare the Toilex toilet paper to the Jumbo brand you said was available in the local market, which one do you think will last longer?" Field officers were asked about general trends in sales in their areas and why they felt these trends existed. They were also asked about what differences existed at a macro level between their area and other areas.

4 RESULTS

Thirty-three micro-entrepreneurs responded to the interview questions about their purchasing decisions. In five cases, employees of the micro-entrepreneur who ran the day-to-day operations and made purchasing decisions were interviewed instead of the named franchisee. Results from interviews with six field officers about their experiences with micro-entrepreneur purchasing are included below.

4.1 Market Research

Respondents identified soap, toilet paper, sawdust, and mops as the most important products to the operation of their toilets. Mops were sold unbranded from local shops with little variation and sawdust was sold as a commodity. Based on these responses, presented results will focus on purchasing decisions for soap and toilet paper. Table 2 shows the locally available brand or source of toilet paper and soap and the corresponding price range. These had fairly clear breaks in price between what respondents viewed as high-cost, low-cost, and bulk offerings. The soap and toilet paper offered by the parent company were reported by interviewees to be high-quality at a reduced price.

Some respondents discussed the use of solar lanterns as important to keeping their public toilets open at night and thus offering additional opportunity to generate revenue. Brands available to participants were D.light and Greenlight Planet Sun King Pro. Some solar lanterns were available from local stores unbranded but were reported to be from Chinese manufacturers.

Table 2. Available Brands and Prices

	Toilet Paper Source	Toilet Paper Price	Soap Brand	Soap Price
High-Cost	Local kiosk, Parent company	0.22-0.24	Ushindi, Whitewash	0.25-0.33
Low-cost			Safegaurd, Flamingo, Kipande, Aero, Kibuyu, Sawa, Omo, Soco, Toss, Parent company	0.13-0.16
Bulk	Wholesaler, Sstreet hawker	0.12-0.13	Jamaa, Panga, Concentrated liquid soap	0.06-0.09

4.2 Major Themes

Based on the interviews with the micro-entrepreneurs and with the field officers, the following themes emerged and are supported by direct quotes from the interviews.

4.2.1 Two Business Strategies

The main result from the interviews is that the business strategy of the entrepreneur strongly influenced their purchasing decisions. The respondents can be broadly categorized as using one of two business strategies: cost-reducing or customer-centric. In coding responses, an entrepreneur was grouped into the “customer-centric” group if he or she used the word “customer” in explaining a purchasing decision. Of the 33 subjects interviewed, 20 were categorized as “cost-reducing” and 13 were categorized as “customer-centric.”

Subjects using the customer-centric strategy reported making purchasing decisions based on attributes which improved their customers’ experience and would increase their number of customers or revenue. One subject in the customer-centric group summarized their strategy as “get quality products to increase customers.” These respondents discussed the products in relation to how their customers perceived them. Two participants commented that they bought air freshener in order to attract female customers: “Ladies like the smell”, “I buy air freshener to cater to the ladies.” Another discussed toilet paper, “customers appreciate the softness of the tissue, they complain if I change it.”

Subjects in the cost-reducing group reported making purchasing decisions based on attributes which reduce the lifetime cost of the purchased product. This focus was typified by one respondent, “I’m only making this amount of money, the only way to make more profit is to cut costs.” Another subject responded, “I prefer to buy it once and then not pay a long term recurring bill.” “Higher quality means lasts longer, and won’t give you complications when using it.”

4.2.2 Product Attributes

Figure 2 shows the number of respondents which listed a particular attribute as most important to their purchasing decision for soap and toilet paper by categorization. The subjects differed on how to approach product purchasing decisions, but one notable theme emerged from many of the interviews. In response to the question of why they preferred a given product to other options respondents offered a variation on “cheap is expensive.” Seven of the thirty-three respondents said it directly. Other variations included “cheapest is very expensive, costing you all the time,” and “you know what they say, cheap is expensive.” When asked to explain, respondents indicated that it was a general idiom that products with the lowest price point signalled lower quality and would actually cost you more over time. The lowest price point was not attractive to these participants. It should be noted that two respondents did say they would buy the cheapest possible mop. This does suggest that the subjects were not concerned with the cost of the products, but that they were concerned with the cost over time, not the price point. These quotes illustrate that these participants avoid the lowest price point in the market and focus on the cost over time.

The following responses clarify how respondents defined each attribute. For toilet paper, cost, long-lasting and size all related to the lifetime cost. Long-lasting and size refer to the length of time or number of customers for which the entrepreneur can use the toilet paper. Ease of separation, softness and thickness are all attributes of toilet paper reported to improve the customer’s experience using the toilet. One nuance in understanding the entrepreneur’s decision regarding thickness, is that some participants reported buying a slightly thicker toilet paper because customers were satisfied with fewer squares of toilet paper if the paper was thicker. One respondent explained that they bought 2-ply toilet paper which although more expensive than single-ply per roll was cheaper per customer because the customer was satisfied with 4 squares instead of 7 squares.

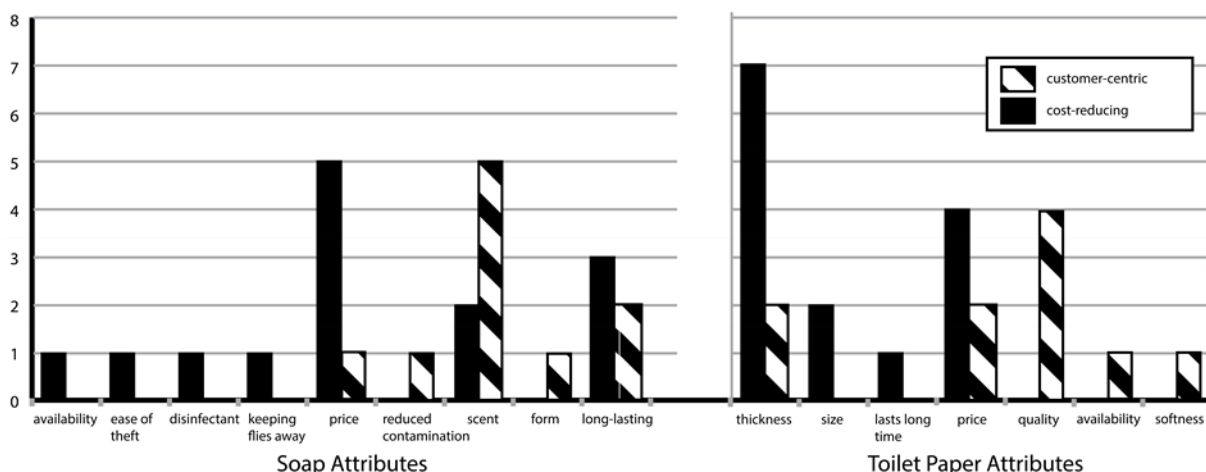


Figure 2. Product attributes considered most important

The soap attributes individual amount control, cost, ease of stealing by customers, size, splittable, long-lasting and form were all different forms of cost-reduction. The individual amount control was only applicable to liquid soap. Participants reported using liquid soap instead of bar soap because it allowed them to control costs by limiting how much each customer received. Several subjects also indicated that they preferred liquid soap because it was perceived to last longer than bar soap, which left a residue on the soap dish described as “wasted soap.” Ease of stealing and the ability to split into smaller pieces are also related to cost-reduction. Several respondents reported buying a “lower quality” brand of soap, one that they felt performed worse on metrics like smell and ability to clean, even when the “higher quality” soap was available at the same price point. These respondents stated that the “higher quality” soap was more likely to be stolen and therefore cost more over time. They used similar reasoning to explain a preference for soaps they had the ability to split into small pieces because if the small piece was stolen it did not represent as big a loss. Feel, performance and scent were attributes reported to improve the customer experience. Scent in particular was the attribute that was reported to have the greatest effect on customer experience. One franchisee bought Whitewash, which was two to three times the price of other brands, due to its scent.

The solar lantern attributes of durability, cost, likelihood of theft and the solar-powered nature of the lantern were. Durability was brought up the most often. A notable result is that many respondents thought the Sun King Pro was made out of glass and therefore less durable, going so far as to suggest metal mesh covers for the product. The Sun King Pro is actually made out of heavy plastic and is robust to large falls, but the weight and shape of the light led respondents to suggest that it was glass. Brightness, lighting time and phone charging were all reported to increase revenue. One respondent had purchased the Sun King Pro and was using it to charge phones for money.

The mop question had fewer responses than the other products. The main concern when buying a mop was how long the mop handle lasted before needing to be replaced. Most respondents reported they bought the mop which they felt would last long and had a “strong” handle. Several respondents discussed the mop’s ability to clean. One respondent reported that a higher-quality fabric left the toilet cleaner and therefore was a better choice for their customers.

4.3 Product Purchases

Purchased soap brands were split into four groups: bulk soap, low-cost soap, high-cost soap, and sunlight from the parent company. Toilet paper brands were split into groups based on source. Figure 3 shows the number of respondents from the customer-centric and cost-reducing groups that purchased from each soap segment and from each toilet paper source. Participants also reported purchases of accessories. Ten of the thirteen “customer-centric” franchisees bought air freshener. The air freshener was relatively expensive and was not required. One of the twenty remaining participants purchased air freshener. Franchisees are required to provide a tank with water and a spigot for washing hands outside of the toilet. Two of the franchisees in the customer-centric group bought electric heaters for the water so that the customers could wash their hands with warm water.

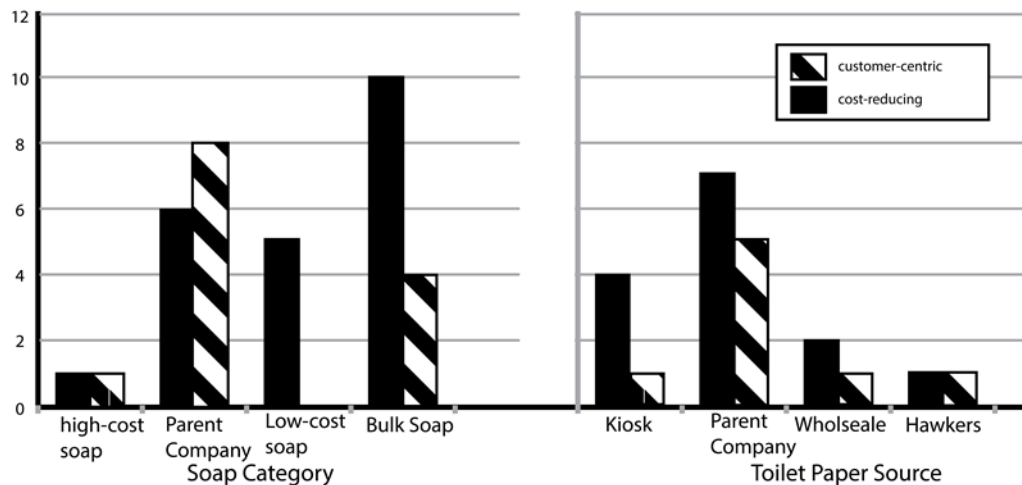


Figure 3. Product purchases

5 DISCUSSION

These results highlight the importance of the individual micro-entrepreneur's business strategy to their purchasing decisions. Perceived quality of a product was filtered through a customer-centric or cost-reducing lens. Both the attributes identified as most important and actual purchases showed significant differences based on this categorization as seen in Figure 2 and 3. Placed in the framework of the adapted Kano model, the cost-reducing entrepreneurs purchasing decisions focused on basic factors, while the customer-centric group focused on excitement factors. Interview responses suggest that cost-reducing participants sought to increase profit by minimizing cost, while the customer-centric group tried to increase revenue through attracting additional customers. For example, cost-reducing participants reported buying a soap brand they felt performed worse than others but was likely to be stolen less often. Excitement factors such as scent were more important for the customer-centric group. This was also reflected in the purchases of air freshener and electric water heaters. These entrepreneurs reported trying to attract more customers or repeat business through a better customer experience. One respondent specifically mentioned dominating the competition as an important driver of their purchasing decisions. A traditional view of small entrepreneurs, especially in development, is one of constant search for growth, or "hustle." (Bannerjee, 2011) Corresponding enterprise design solutions would focus on features which attract additional customers and thereby increase revenue. However, interviews suggest that this strategy is used only by a small segment of the enterprises. Design for BoP would suggest that using collaborative co-design would be best to identify important product features. Success in this approach would be highly dependent on the selection of the user for collaboration since the two groups had very distinct requirements. A new approach centered on understanding the entrepreneur's business strategy first and then identifying important features that support this strategy could be more effective. It is unclear which strategy is most profitable, however both field officer interviews and the sample indicate that the cost-reducing group is much larger than the customer-centric group. This aligns with the reluctant entrepreneur body of research. The cost-reducing entrepreneurs may simply be entrepreneurs with a lower tolerance for risk. Area effects may also be producing these differences as some neighborhoods are in more commercial areas. The differences in average income and the level of competition in these areas may be pushing entrepreneurs towards one strategy. For example, an entrepreneur in a commercial area may need to persuade possible customers passing by to stop in and therefore be more likely to be customer-centric. In contrast, if an entrepreneur is in a residential area, they may have a fixed customer base and be only able to increase profits through cost reduction. However, in the sample of entrepreneurs interviewed, the "customer-centric" group included entrepreneurs from every area.

Based on previous work, the initial hypothesis was that revenue generation, reliability and multi-functionality were the most important attributes in product purchasing decisions. These results suggest that while revenue generation and reliability are still important characteristics, they may appeal to separate groups. This study suggests that designers should use the adapted Kano model as a way of categorizing the entrepreneur's strategy. In this case, the manufacturer of the public toilets has to satisfy

two different groups and may choose to go after both or only consider one. This framework also explains the observed behavior regarding the sale of toilet paper and soap. The manufacturer reported sales of 17% and 36% for their toilet paper and soap respectively. This toilet paper and soap was considered to be high value as they were “quality” brands being offered at wholesale prices. Franchisees were choosing to buy outside options of lower “quality” at the same price point. In interviews with the field officers, estimates of 20-30% of the entrepreneurs were in the customer-centric group. This matches with the number found in the interviews and in the number buying this high-value soap and toilet paper. In fact, some of the customer-centric group bought higher-performance soap and toilet paper which were more expensive than the company option.

These results are limited due to several factors. First, the interviews were carried out among franchisees of a single company in one country in one sector. This specificity allows for greater granularity in analyzing product purchasing decisions but does not allow for generalizations. However, these results suggest starting points for other practitioners and researchers to follow. Secondly, English was spoken by all of the interviewees but was not necessarily their first. To mitigate this effect, translators were present at all interviews to clarify any questions or responses the interviewees had. In a related limitation, the nationality of the interviewer may have produced distortions in the reported answers. Subjects may have given answers that they thought the interviewer wanted (Dell et al., 2012). However, the interview questions did focus on existing verifiable information as much as possible. Since the interviews were carried out on-site, the interviewer was able to confirm participants’ answers by directly observing the products used.

6 CONCLUSIONS

This study reported results from thirty-three interviews with entrepreneurs running public toilet franchises in East Africa. The product attributes considered and their relative importance to product purchasing decisions for their businesses was also reported. In conclusion, this study answered the following questions:

1. What factors affect purchasing decisions for micro-entrepreneurs in emerging markets?

Purchasing decisions were most influenced by the micro-entrepreneur’s strategy. The customer-centric group were influenced by excitement factors such as the scent of the air freshener, the softness of the toilet paper, brightness of the solar lantern and the temperature of the hand-washing water. The cost-reduction group were influenced by basic factors such as the durability of the solar lantern, the minimum amount of toilet paper for customer satisfaction, the durability of the mop, the likelihood of theft of the soap and the ability to control the amount of soap given to an individual customer.

2. Should designers use a new development approach for emerging market micro-entrepreneurs?

Current enterprise approaches assume entrepreneurs behave “entrepreneurially” and purchase products which will help them grow their business. Designers select product features which offer this type of value proposition, as the parent company in this case did by offering high-end soap at wholesale prices. Results suggest that a new approach is needed to better respond to differences in how entrepreneurs perceive product quality. This study proposes that designers should focus on features that closely align with either a customer-centric or cost-reducing approach. For example, the parent company should have identified the business strategy and chosen either a higher-performance soap or a lower lifetime cost soap depending on the target entrepreneur group.

This field study examined the behaviour of one set of franchisees in the public toilet sector in East Africa. Future work will involve expanding the scope to include other sectors and other markets. In particular, small-scale manufacturing, food service and micro-retail are among the largest segments of micro-entrepreneurs in emerging markets and will be the focus of future studies. Producing prototypes and doing small-scale tests of product feasibility and usability will also be included in future studies.

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