

Behavioral indicators of household decision-making and demand for sanitation and potential gains from social marketing in Ghana

Marion W. Jenkins^{a,*}, Beth Scott^b

^a*Department of Civil and Environmental Engineering, University of California Davis, One Shields Avenue, Davis, CA 95616, USA*

^b*London School of Hygiene and Tropical Medicine, UK*

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Abstract

Household demand for improved sanitation in developing countries is an important social and behavioral process with implications for public health, sanitation policy and planning, and sanitation design and technology development. This paper develops a behavioral approach to assess household demand for improved sanitation in Ghana. Adoption decision stages of preference, intention, and choice to install a toilet in Ghana are defined, measured in a survey, and used to estimate sanitation demand, identify factors affecting demand at each stage, and classify households by adoption stage to identify targeted demand-stimulation strategies. Results from a representative national sample of 536 households indicate that of 74% of households without any home sanitation, 31% have some likelihood of installing a toilet within the next year, but only 6% are very likely to do so; 62% had not considered the idea. Motivating and constraining factors are compared at each adoption stage and strategies likely to increase toilet installation in Ghana discussed. The approach is useful for assessing behavioral indicators of sanitation demand in developing countries and suggesting where marketing approaches can and cannot work to accelerate adoption of household sanitation improvements.

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Introduction

Good sanitation is a foundation for health that affords protection from a wide range of infections including diarrhea, a leading cause of child deaths, yet 2.6 billion people still do not have a safe means of excreta disposal at home (WHO & UNICEF, 2004).

A target to halve this number by 2015 was added to the Millennium Development Goals in 2002. The enormity of the challenge, however, comes with the acknowledgement that public resources alone are unable to solve this global problem and new demand-oriented approaches are needed (Metha & Knapp, 2004; Water supply and Sanitation Collaborative Council (WSSCC) & World Health Organization (WHO), 2005).

Few large sanitation investment programs have been effective in increasing household sanitation in developing countries, yet people in these countries

*Corresponding author. Tel.: +1 530 754 6427; fax: +1 530 752 0782.

E-mail addresses: mwjenkins@ucdavis.edu (M.W. Jenkins), beth.scott@lshtm.ac.uk (B. Scott).

continue to install household toilets on their own without subsidy (Cairncross, 2004; Jenkins & Sugden, 2006). Increasingly, marketing techniques are advocated to stimulate household investment in sanitation at a larger scale, as a way to leverage household and community resources to sustainably close the sanitation gap (Cairncross, 2004; Mehta & Knapp, 2004). While a full discussion of the marketing approach is beyond the scope of this paper, at its core is a consumer focus which allows the development of an integrated mix of strategies designed to facilitate and achieve an exchange process leading to behavior change on the part of the target consumer (Kotler, Armstrong, Saunders, & Wong, 2002; Rothschild, 1999). Social marketing, the application of marketing to achieve behavior change for social good, is used in public health to achieve large-scale changes in health-related personal and household behaviors (e.g., use of bed nets to prevent malaria, condoms to prevent HIV, household disinfectant to treat drinking water) (Donovan & Henley, 2003). It has been argued among sanitation managers that a marketing approach will give households a greater choice to meet their individual sanitation needs, motivate the accompanying behavior changes for improved health, and stimulate development of a local sanitation industry to sustain improvements over time (Cairncross, 2004; SDC, 2004).

Within both commercial and social marketing, formative/consumer research, market analysis, audience segmentation, and targeted products, campaigns, and interventions to promote behavior change by reducing environmental constraints and increasing awareness and motivation are fundamental components of program design (Donovan & Henley, 2003; Kotler et al., 2002). Public funding of the development of social marketing interventions is justified by the public health benefits gained through the promoted behavior change. In the case of sanitation marketing, public financing of promotional campaigns and product and supply-chain development would be warranted by the huge potential public health gains and improved environmental quality expected from increased safe defecation and excreta management, while household payment for the latrine itself is justified through substantial private gains (Jenkins & Sugden, 2006).

A marketing approach to sanitation involving public sector and household level financing is particularly attractive given the overall failure of supply-side sanitation investments to yield any

significant sustainable impact over the past 25 years, particularly at scale. However, marketing alone may not be enough to stimulate and support private behaviors to achieve public goals. With this wider perspective in mind, Rothschild (1999) developed a framework for the strategic use of marketing along with two other primary tools for behavior change—education and law—to achieve public social or health goals. The degree to which a target population is prone, resistant, or unable to adopt a new behavior derives from the presence or absence of three things: self-interest (motivation), opportunity, and ability to voluntarily adopt the new behavior (Rothschild, 1999). Marketing operates to enhance awareness of self-interests and create opportunities to act, and can sometimes overcome lack of ability. When the target's self-interests are not served regardless of opportunities or abilities, the law may be needed to gain compliance, particularly when large negative externalities from non-adoption exist as they typically do for sanitation.

Recognizing where and how marketing can affect household sanitation decisions is the first of several challenges for sanitation managers wanting to apply commercial marketing techniques and approaches to increase demand for and access to improved sanitation. Where marketing is likely to be effective, a second challenge is to understand existing household sanitation behaviors and adoption decisions in ways that inform development of specific cost-effective marketing strategies to increase adoption. In this study, a model of household sanitation adoption decision-making that accounts for motivation, opportunity, and ability was developed and applied in Ghana to allow sanitation managers to better measure, understand, and predict behavioral determinants of demand for sanitation and strategically plan interventions based on marketing principles. The approach is broadly applicable where household sanitation coverage is low, but can also be adapted to areas where sanitation coverage might be high, but toilets (or latrines) unsafe or in poor condition. The model and survey tool serve three major purposes:

- Measure baseline household sanitation adoption and demand patterns.
- Predict changes in demand for sanitation improvements by mapping the decision-making process into behavioral stages, classifying households within this process, and understanding barriers to adoption at each stage.

- Identify actions and policies to increase sanitation demand among households in different adoption stages.

A study of the decision to install a home toilet among households in Ghana illustrates how this assessment approach achieves these purposes. We label households who have already installed a toilet or latrine in Ghana ‘adopters’, while new demand is approximated by the portion of ‘non-adopter’ (without sanitation) households projected to pay for and build a new home toilet in the next 12 months. We describe our model of sanitation adoption stages and how the survey was conceptualized and applied nationally in Ghana. Then we present and discuss the survey results related to estimating new household demand for sanitation in Ghana. Finally, we examine the segmentation of households by adoption stage and how this information can be used to design demand stimulation strategies based on marketing principles in the Ghanaian context.

Few studies have assessed consumer demand for sanitation in developing countries, and most of these have applied economic contingent valuation methods to approximate demand with willingness-to-pay bids (Altaf, 1994; Altaf & Hughes, 1994; Wittington et al., 1993). WTP estimates provide a measure of the hypothetical monetary value people place on what is often a narrowly prescribed sanitation change (crucial for bid accuracy) but are unable to provide time-bound predictions of demand. WTP studies typically ignore the transaction costs and constraints households encounter in real life and the tradeoffs they face when deciding to adopt and purchase new sanitation systems for the first time in developing countries. Yet these features emerge as important determinants of household demand for sanitation in this and other studies (Jenkins 1999, 2004). Contingent valuation studies also offer limited insight into weak demand, apart from price and income, and minimal guidance on ways to stimulate demand and change behavior.

Applying decision-making models to estimate new sanitation demand draws from cognitive psychology and consumer purchase decision behavior to explain and predict changes in individual sanitation behavior over time by observing past and future sanitation adoption decisions, measuring their behavioral determinants, and mapping population into categories useful for understanding behavior change. Of particular interest are the

individual attitudinal and structural determinants of preferring and choosing different competing behavioral outcomes, rather than socio-economic characteristics, to explain and predict household demand. Although commonly applied in WTP and other surveys, socio-economic characteristics typically lack explanatory power and provide poor predictors of individual changes in behavior for strategic planning and policy evaluation.

Sanitation change adoption in developing countries

A model is developed of the household decision to adopt a sanitation change, focusing on the process, observable stages, and households’ logic behind each decision stage.

Adoption decision process

For a household without adequate sanitation in a developing country, deciding to improve sanitation by installing a toilet (e.g., pit latrine, bucket latrine, flush toilet, water closet, or another excreta disposal facility) for the first time, changing to a new toilet system, or connecting to a sewer, can be a complicated and lengthy process. To first contemplate this decision, a household must be aware of the personal benefits of the sanitation change and the availability of products and services. Consumer theory and empirical evidence suggest that with sufficiently strong interest, a household will actively seek information about options, perhaps discuss with family members and technical specialists how and when to make a change. An adoption plan might mean choosing a sanitation technology (or service level) to fit the household’s budget and lifestyle, picking a site, finding a mason and supplier of construction materials, negotiating costs, saving money, and acquiring a building permit in some settings. Viewing the adoption decision as a progression of evolving attitudes, knowledge, and actions provides a more detailed causal understanding of what generates demand for sanitation, and where sanitation coverage is low, factors that may constrain it.

Broadly speaking, non-adopter households can be categorized by whether or not they have thought about making a change to home sanitation, and if so, how far they have taken such thinking. While some may have considered a change, for example, installing a latrine, others will have little awareness of options or meaningful benefits of having a latrine

and therefore never considered adopting. Among those who have considered installing a latrine, intention to actually build it will vary with priority given to the outcome and with the time frame and level of planning and preparations. Some may want a latrine but have ruled it out as unobtainable or ‘wishful’ thinking. Perceived lack of ability to control arises from personal context or resources, or from absence of local information and opportunities, making the choice to build improved sanitation unavailable or beyond reach.

Preference, intention, and choice stages

Drawing from behavior change models and cognitive theories of individual decision-making, particularly the theories of reasoned action (Fishbein & Ajzen, 1975), and planned behavior (Ajzen, 1985) and empirical study of household sanitation choices in Benin (Jenkins, 1999, 2004; Jenkins & Curtis, 2005), we develop a simplified model of three progressive stages of the decision to adopt a sanitation change called preference, intention, and choice. Fig. 1 illustrates the key theorized determinants of progression at each stage.

Preference

The adoption decision starts with development of ‘preference’ for a sanitation improvement over one’s present defecation practice. Preference captures purchase motivation and the expected relative advantages, benefits, and reasons (perceived utility gain) for wanting a sanitation improvement. Motivation to change sanitation arises from dissatisfaction with current household defecation or excreta management practices coupled with sufficient

awareness of advantages of new options (Jenkins & Curtis, 2005). In this stage, households are interested in and have considered a sanitation change but have not necessarily begun to plan it.

Intention

Households in the intention stage have begun to plan a sanitation change, but vary in their degree of plan development. For many behavior changes, once awareness and motivation are sufficient, change is within the voluntary control of the individual or household. This is the case for example with hand washing, when soap, water, and technical knowledge usually exist within the household. However, changing sanitation infrastructure for the first time requires more than awareness and motivation, including new and unfamiliar materials, products/services, technical knowledge, and skills, much of which must be acquired outside the home. These less controllable inputs often entail uncertainty and risks for households without prior sanitation experience. Even do-it-yourself latrine construction usually requires special materials and new technical knowledge. Starting a plan to change home sanitation technology or practice (‘intention’ in Fig. 1) depends directly on the availability, quality, and cost of opportunities to acquire materials, products, construction services, financing, skills, and knowledge, and on the personal resources, experience, and abilities of individual households to take advantage of these opportunities. Commitment to changing sanitation reflects the priority given to this change compared to expected outcomes from alternative uses of limited savings, time, effort, and other household resources. If required abilities or

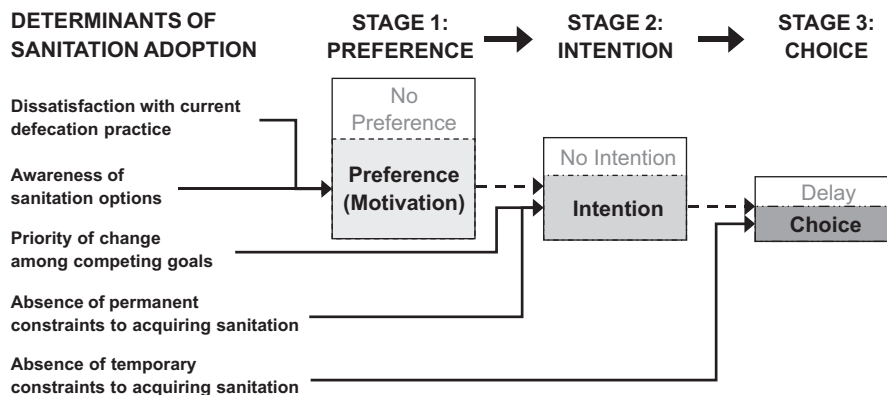


Fig. 1. Adoption decision stages and determinants of new sanitation demand.

opportunities are perceived to be lacking, or priority low, a household is unlikely to form an intention to adopt a sanitation change (Ajzen & Madden, 1986).

Choice

Choice, the last stage of a successful adoption process, involves the individual's *actual* ability to use and control opportunities to carry out their intention to adopt (Ajzen, 1985). This stage carries a very high likelihood of adopting a sanitation change within a short time. Choice requires a well-developed intention and concrete actions consistent with a strong imminent intention to change sanitation practice, including acquisition of relevant knowledge (e.g., cost), saving money, and site and toilet technology or service provider selection. Observed sanitation choices are the outcomes of this decision process and collectively generate new demand for a sanitation change (in general and for specific technologies, services, and products).

Role of constraints

Perceived inabilities, inadequate resources, and lack of opportunities are different kinds of 'constraints' to adoption (Fig. 1). In Benin, 13 constraints were found related to construction problems, individual situations, and psychosocial factors that blocked the choice to build a home toilet (Jenkins, 1999, 2004). Similar constraints have

been reported elsewhere (Jenkins & Sugden, 2006). Increasing absence of perceived constraints, or 'perceived behavioral control' in the theory of planned behavior, similar in function and concept to self-efficacy in the Health Beliefs Model (Ajzen, 2002), directly strengthens intention to change sanitation practice while actual behavioral control determines whether the intended behavioral choice is achieved (Ajzen & Madden, 1986).

Constraints vary in their effects on sanitation decisions. Those perceived as unchangeable (permanent) are thought to act early in the decision process to block progression from preference to intention, while constraints perceived as removable (temporary) are expected to act later in the decision process to delay preparations and final choice (Jenkins, 1999). The differential effects of constraints on adoption are explored in the Ghana study.

Adoption stage indicators, determinants and question formats

Indicators were developed and questions constructed in a survey format to measure the three decision stages and their determinants (Table 1). Sanitation demand in Ghana was assessed by the number of non-adopter households at each stage of preference, intention, and choice, and new demand estimated by households in the last stage of 'choice' who expressed a 'high' likelihood of building a home toilet within 12 months.

Table 1
Question formats and decision stage indicators and determinants for measuring sanitation demand

	Question formats	Decision stage indicator	Decision stage determinant
1	Have you considered installing a household toilet? "YES"/"NO"	P	
2	Reason stated for not considered: "SATISFIED WITH CURRENT PLACE"		P
3	How satisfied are you with your current place of defecation? "VERY SATISFIED, SATISFIED, UNSATISFIED, VERY UNSATISFIED"		P
4	What are the top three reasons for building a household toilet/latrine?		P
5	For those who have considered, what is the likelihood that if I come back in a year you will have a latrine built? "HIGH, MEDIUM, LOW vs. NONE"	I	
6	What are the three biggest constraints to your installing a household toilet/latrine? (absence of most permanent constraints, e.g., don't have space, tenancy issues, poverty)		I
7	Mention in answer to Q6: "COMPETING PRIORITIES"		I
8	Mention in answer to Q6: "SATISFIED WITH CURRENT DEFECTION PLACE"		P
9	Of those who have considered, likelihood in Q5 HIGH that if I come back in a year you will have a latrine built	C	
10	What are the three biggest constraints to your installing a household toilet/latrine? (absence of permanent and most temporary constraints)		C

Note: P, preference; I, intention; and C, choice.

While the household is our unit of analysis, dynamics of intra-household decision-making are beyond this research. To capture a household's adoption decision behavior in an interview format, the household member most responsible for making decisions about changes in home sanitation infrastructure should be interviewed. In our experience, this has consistently been the head of household in non-tenant households but is less clear who this should be in tenant households in developing countries where tenancy is often informal and takes many different forms under complex occupancy patterns (see Gilbert, 1983; Rakodi, 1995; UNCHS, 1996).

Materials and methods

A questionnaire based on the indicators in Table 1 was developed to achieve the following objectives:

1. measure baseline household sanitation coverage levels,
2. estimate new demand for household toilets among those without adequate sanitation, measured by a high likelihood of installing a toilet within 12 months,
3. classify households by adoption stage to assist in designing marketing strategies,
4. examine predictors at each stage, related to awareness, dissatisfaction, motivations, and constraints, and
5. be quick and easy to implement in developing countries.

Ghana questionnaire and survey execution

Table 1 shows the question formats used in the Ghana survey to measure the three adoption stages and their determinants. The questionnaire was divided into five sections:

1. Description of current defecation places and technologies, satisfaction with current situation, and most and least appreciated features of present defecation place.
2. Information related to ownership, age, decision-making, cost, and trigger reason for installed toilet asked of adopter households, identified from Section 1.
3. Expected benefits of installing home sanitation, asked to all households.

4. Perception of constraints and awareness of toilet technologies asked to households without home sanitation, consideration of home toilet installation, and strength of intention within 12 months.
5. Socio-economic and demographic characteristics.

Thirty-four structured questions (15 on socio-demographics) were included in a larger baseline survey for the National Handwashing Promotion Program (www.globalhandwashing.org) under the Ghana Community Water and Sanitation Agency. Coded responses were initially informed by a small qualitative study of reasons for and barriers to home toilet installation conducting using in-depth individual interviews in one town in the Ashanti Region (Obika, Jenkins, Curtis, Howard, & TREND, 2002). Question formats and coding were refined following pre-testing of the survey in late July 2003 and field work conducted from 29 August through 22 September 2003. Trained enumerators conducted one-on-one interviews under the management of Research International, an international market research agency with offices in Accra.

Study site

Ghana has a population of about 21 million. Most urban and peri-urban households use public latrines while a majority of rural households defecate in the open. The wide-spread traditional use of public toilets and historic dependence on bucket (pan) latrine technologies for sanitation in Ghana is rather unique among developing countries in Africa and reflects a historical government policy of actively constructing, operating, and managing public toilets for household use and a conservancy labor system for bucket emptying. As a consequence, private investment in sanitation and household coverage is relatively low and stagnant (less than 30% in urban areas and lower in rural areas) (Aye & Crook, 2003; WHO & Unicef, 2006). Public toilets are run mostly by local governments, charging a fee of about 1.25 cents US. They are often in very poor condition and lack privacy. Public toilets are commonly non-water based and include cesspit, ventilated improved pits (VIP) and Kumasi VIP latrines (KVIP) designed as a double vault composting toilet, but rarely operated this way in public settings. Bucket latrines in public and private use, while previously common, are being phased out with the end of the conservancy labor system. In some cases, flush toilets (water closets or

WCs) have been installed in public toilets but this is rare. Much confusion exists around the terms KVIP and VIP in Ghana. While technically distinct, they are commonly misunderstood as the same technology in Ghana, with the term KVIP used for public toilets and VIP in domestic settings.

Sampling and sample description

A sample of 536 rural and peri-urban households was selected following a sampling approach used by professional market researchers in Ghana for a representative national sample. A subset of regions, including Greater Accra, Ashanti, Eastern, Western, and Northern, was selected to represent the three socio-ecological zones of Ghana. Within each region, ten Census Enumeration Areas (EAs) were randomly selected from the list of all EAs. Within each EA, 10–11 households with children under 5 years were selected using the random route walk technique, for a total sample of 536 households. Screening ensured that only households with a mother of young children were interviewed as this was the primary target audience of the National Handwashing Promotion Campaign.

Descriptive characteristics of the sample are reported in Table 2. Mothers had a mean age of 30, were mostly Christian, predominantly Akan, living in compound houses, and more than 50% were not educated beyond primary school. In most cases (86.4%), the father of the child lived with the mother. Less than one fourth of these men were educated beyond junior secondary school and a quarter of them worked in agriculture. Almost three quarters of all households earned 500,000 cedis/month (about \$55 US) or less, with one third earning less than 250,000 cedis/month (\$39).

Data analysis

Descriptive statistics were computed. Chi-squared values for the likelihood ratio were used to test for significance differences in satisfaction levels, motivations, constraints, and other hypothesized determinants at each stage of the adoption model.

Results

Existing household sanitation

Adults in over half (58.2%) of the sample households used public toilets while 14% practiced

Table 2
Sample socio-economic description

Category	Characteristic <i>N</i> = 536	Sample description
Respondent's age	Range	17–68 years
	Mean	30 years
Region	Greater Accra	21.9%
	Ashanti	27.3%
	Eastern	15.7%
	Western	16.3%
	Northern	18.7%
Ethnicity	Akan	53%
	Ga/Adangbe	17%
	Ewe	6%
	Mole-Dagbani	16%
	Other	8%
Respondent's education	None	27.1%
	Primary	28.4%
	Junior secondary	31.9%
	Senior secondary	11.8%
	University	0.9%
Occupancy	Tenancy	34.7%
Dwelling type	Compound	50.8%
	One family house	26.2%
	Flat/apartment	3.4%
	Room(s)	20.2%
Father's occupation	Professional (white collar employment)	20.1%
	Sales/commerce	12.5%
	Services	17.7%
	Trader	4.1%
	New trade	4.1%
	Agriculture	24.8%
	Unemployed	1.9%
	Father absent	14.6%
Income /month	<250k Cedis	34.7%
	251–500 K	35.1%
	501–900 K	20.0%
	901 K +	11.2%

open defecation. Only one quarter (25.6%) can be described as household toilet *adopters*, possessing a private toilet either in their individual household (11.0%) or shared compound (14.6%). Those with compound toilets are included here as household *adopters* as compound houses composed of multiple households represent a common living arrangement in Ghana; half of this sample lived in compound houses (Table 2). These figures are comparable to other estimates of sanitation coverage in Ghana ranging from 27% for urban to 11% for rural households with a private toilet (WHO & Unicef,

2006). Children under 5 years predominantly used potties (82.0%), while the toilet habits of children above this age broadly reflected those of their parents, particularly in adopter households. Among non-adopters, a higher percentage of older children (25.2%) than adults (14.0%) practiced open defecation.

Five household toilet technologies presently exist in Ghana—the flush toilet (WC) (15%), bucket latrine (20%), traditional pit latrine (21%), and KVIP/VIP latrine (44%). Among the 137 household toilet adopters, two thirds were able to recall when their current toilets had been constructed. Of those recalling, less than 5% had built their toilet prior to 1990, with adoption accelerating in the late 1990s.

In over half of cases (56.2%), landlords (generalized term for compound owner) were reported to have decided to build the household latrine (consistent with shared compound living), while household heads were the decision-maker in one in four adopter households. It was extremely rare (1.5%; 2 out of 137) for tenants to decide to install a toilet. Where household heads had taken the decision, the perception of ownership was sometimes more broadly defined. In over a third of these cases, women stated that it was the whole household, not just the head, who ‘owned’ the toilet.

Although rarely making the decision themselves, nearly 80% of respondents were able to cite motives for constructing the facility. The most common reasons given were:

- for sick or old relatives (23.2%),
- to offer safety at night (18.8%),
- for convenience (12.5%),
- to make it easier to keep the facility clean (9.8%).

Non-adopter households—satisfaction levels

Non-adopters were 74.4% of sample households, reflecting the general population in Ghana. Among these, 65.2% were dissatisfied with their current place of defecation. The two most disliked attributes of current defecation places were that they were smelly (27.1%) and dirty (26.6%). Other cited dislikes included the distance to toilet facilities (8.3%), lack of comfort (7.0%), having to pay to use them (6.0%), and having to share with others (5.8%).

A third of non-adopters could cite no positive attributes for their place of defecation. Among those that could, the most liked attributes were that toilets were convenient (26.6%) and clean (17.8%).

Dissatisfaction with one’s defecation facility was significantly associated with being unable to cite any positive attributes, with citing privacy as the most positive attribute, and with disliking its dirty state (Table 3). Conversely, satisfaction was significantly associated with valuing its cleanliness and safety.

Non-adopter households—motivating reasons for toilet installation

All non-adopters were asked to give three top reasons for building a household toilet. The most heavily cited reasons were convenience (51.4%), that they are easy to keep clean (43.1%), good health (41.9%), and general cleanliness (27.8%). Presently non-adopters travel to open defecation sites and public latrines, and in the latter case, join long queues in the morning or evening. Widely used in Ghana, public latrines in particular tend to be

Table 3

Most and least liked attributes of current defecation place (non-adopter households)

	Satisfied N = 139 (34.8%) (%) citing)	Unsatisfied N = 260 (65.2%) (%) citing)	p-value*
Most valued attribute			
Nothing	7.2	47.7	<0.01
Cleanliness	41.0	5.4	<0.01
Privacy	2.2	6.9	0.03
Safety	5.0	1.5	0.05
Good health	7.9	3.8	0.10
Comfort	4.3	1.5	0.10
Convenience	28.8	25.4	ns
Get to work/ school on time	3.6	5.0	ns
Least liked attribute			
Dirty	14.4	33.1	<0.01
Pay to use	12.9	2.3	<0.01
Distance	12.9	5.8	0.02
Share with others	9.4	3.8	0.03
Hard to maintain	0.7	3.1	0.10
Lack of comfort	4.3	8.5	0.11
None	7.9	5.0	0.25
Smell	25.9	27.7	ns
Queuing	5.0	3.5	ns
Fills up quickly/difficult to empty	2.2	2.7	ns

*chi-squared p-value for log likelihood ratio comparing ‘Satisfied’ with ‘Unsatisfied’.

dirty and squalid, with feces lying around squat holes which emit heat, gases, and bad odors, believed to cause ill health (Obika et al., 2002). Indeed, while 41.9% of respondents cited good health as a key reason to build a household toilet, only one third said that germs were the cause of ill health, two thirds believing illness to be caused by heat, smell, feces or dirt. Thus toilets need to be clean to protect health, but further, in Ghana, people have a particular need or desire to be neat, clean, and not smell, reflecting not just physical but mental and moral purity (van der Geest, 1998, 2002). In his anthropological studies on this topic among the dominant Ghanaian ethnic group—the Akan, van der Geest (1998) reports a strong association between bowel elimination and personal moral cleanliness. The Akan language and culture uses a different much more negative word for ‘dirt’ that is inside the body, including feces, vomit, and other such matter, while concepts of cleanliness are tied closely to notions of beauty, respect, civility, pride, goodness, and purity (van der Geest, 2002). Our qualitative study confirmed the importance of eliminating ones bowels first thing each morning so as to be ‘clean’ inside before starting the day. Informants explained how they greet friends in the morning only on the way back from the public toilets and not on the way there because of their full bowels, and identified numerous other ways that people hold themselves differently before and after their morning ablutions (Obika et al., 2002).

Non-adopter households—constraining factors blocking adoption

Respondents also were asked about the constraints to constructing household toilets. The major constraints cited by non-adopters were limited space

(48.4%), high costs (33.6%), no one to build (32.3%), competing priorities (31.8%), and savings and credit issues (30.1%).

These constraints were also commonly cited in in-depth qualitative research conducted in a small Ghanaian town broadly representative of peri-urban Ghana (Obika et al., 2002). Households are densely packed into tight areas, compound housing common, and spare space highly limited, existing toilet technologies are expensive to install apart from the bucket latrine, and there is limited knowledge of their operation and of masons to construct them. School fees are a priority for limited savings and few if any formal credit mechanisms exist for home improvements (Obika et al., 2002). The influence of these motivations and constraints on sanitation adoption decisions and new demand is examined next.

Determinants of new demand in Ghana

Among non-adopter households, most (61.7%) had never considered installing a household toilet and therefore not yet entered the adoption process (Fig. 2). Among those with preference for installing a toilet (38.3%), the proportion at the intention stage was high (81.7%), as measured by some likelihood of building a toilet in the next year. However, of the sample of 399 non-adopter households, only 5.8% expressed a high likelihood of building within the next 12 months, resulting in a low rate of new demand. The next sections explore factors contributing to preference for toilet installation and to the likelihood of toilet building in Ghana.

Households with preference

Households who had considered installing a home toilet were less satisfied with their current defecation place and stated significantly more

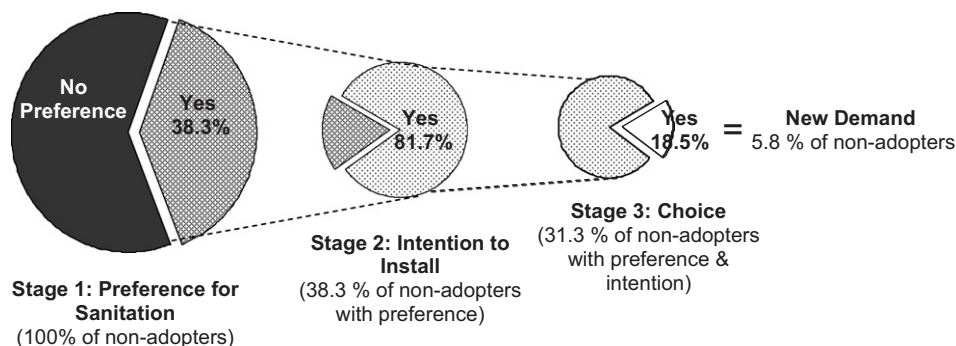


Fig. 2. New sanitation demand and adoption stage rates in Ghana 2003.

reasons for building household toilets than those who had not considered installing one (Table 4). Such households were more likely to mention six reasons: good health, ease of cleaning, cleanliness, privacy/dignity, safety/security, and avoid sharing with others. Differences in dissatisfaction and their tendency to cite reasons related to good health, privacy/dignity, and safety/security were significant

($p \leq 0.05$), while the others were nearly so (Table 4). Those who had considered installing sanitation and stated good health as a reason were significantly ($p \leq 0.05$) more likely to say that feces was the cause of ill health than those stating good health who had not considered installation. Relationships between health and use of public and poor condition latrines or open defecation in Ghana were probed in the

Table 4
Non-adopter households differences at preference, intention, and choice stages

Variable	No preference (<i>N</i> = 246 of 399)	Preference (<i>N</i> = 153 of 399)	Preference but No intention (<i>N</i> = 28 of 153)	Preference and intention (<i>N</i> = 122 of 153)	Intention but No choice (<i>N</i> = 102 of 122)	Intention and choice (<i>N</i> = 20 of 122)
Satisfaction with current defecation place						
Dissatisfied	61.4% ^a	71.2%	67.9%	72.1%	71.6%	75%
Very dissatisfied	15.4%	16.3%	10.7%	18%	14.7% ^b	35%
Top three reasons for building						
Convenience	50.4%	52.9%	50%	54.9%	52.9%	65%
Good health	35.8% ^a	51.6%	53.6%	50.0%	53.9% ^b	30%
Cause germs ^c	29.5%	36.7%				
Heat ^c	20.5%	19.0%				
Smell ^c	26.1%	16.5%				
Dirt ^c	5.7% ^b	13.5%				
Feces ^c	1.1% ^b	7.6%				
Pests ^c	6.8%	3.8%				
Easy to keep clean	39.8% ^a	48.4%	42.9%	50.8%	52%	45%
Cleanliness	24.4% ^a	33.3%	39.3%	32.8%	32.4%	35%
Privacy/dignity	17.1% ^a	27.5%	32.1%	26.2%	28.4%	15%
Safety/security	17.1% ^a	26.8%	32.1%	25.4%	27.5%	15%
Visitors/guests	23.6%	24.2%	25%	24.6%	23.5%	30%
Avoid sharing with others/strangers	13.8%	18.3%	28.6%	16.4%	17.6%	10%
Comfort	11.4%	13.1%	14.3%	11.5%	13.7% ^b	0%
Prestige/pride; don't have to pay to use; old age/illness; for children to use	≤4.1%	≤2.6%	≤3.6%	≤3.3%	≤2.9%	≤5%
Number of reasons cited	2.4 ^b	3.0	3.2	3.0	3.0 ^a	2.5
Constraints						
High costs	26.4% ^a	45.1%	28% ^b	50%	53.9% ^b	30%
No one to build	27.6% ^a	39.9%	21% ^b	45%	49% ^b	25%
Water table/soil conditions	10.6% ^a	22.9%	14%	25%	27.5%	15%
Technical complexity	4.1% ^b	11.1%	3.6% ^a	13%	15.7% ^b	0%
Savings, credit issues	29.7%	30.7%	50% ^b	27%	26.4%	30%
Competing priorities	32.8%	30.1%	55% ^b	25%	25%	30%
Tenancy issues	29.3%	25.2%	50% ^b	20%	18.6%	30%
Limited space	54.1% ^a	39.2%	71% ^b	33%	33%	30%
Permit problems	11.8% ^a	6.5%	7.2%	6.6%	6.9%	5%
Satisfied with toilet	8.5%	5.9%	3.6%	6.6%	6.9%	5%
Lack decision making	4.9%	2.6%	0%	3.1%	2.9%	5%
Poor options	0.8%	1.3%	0%	1.6%	2%	0%

^{a,b}*** $p < 0.05$, * $p < 0.10$ chi-square value likelihood ratio for difference in prevalence between two groups.

^cAsked only of those mentioning 'good health'.

initial qualitative study and revealed a web of beliefs linking feces to ill health that hardly featured germs. Respondents felt risks to health arose when latrine users were exposed to heat and foul gases from decomposing feces which transmitted diseases and that vomiting, stomach ache, loss of appetite, constipation, headache, and even infectious illnesses, among other health problems, could be induced through the sight or smell of fresh feces. The miasma theory rather than the germ theory appears to be the more relevant operating principle in these beliefs about avoidance of feces and good health, echoing previous findings from the neighboring country of Benin (Jenkins & Curtis, 2005).

Households with intention

The likelihood of building a latrine, rated as ‘no chance, low, medium, or high’, was measured for the 153 non-adopter households who had considered installation. Of these, nearly 4 of 5 expressed some positive intention to build within 12 months. No significant differences in either satisfaction levels or motivation were found between those with and without intention to build (Table 4). As hypothesized in the adoption stages model and consistent with planned behavior theory, significant differences between the two groups were only found for constraints and priority. Those with no intention to build within 12 months were 2–2.5 times more likely to mention limited space (71% to 33%), competing priorities (55% to 25%), savings/credit issues (50% to 27%), and tenancy issues (50% to 20%) than those with positive intention, showing these constraints block the formation of intention.

Households who have chosen to build a toilet

Only 1 in 6 of the 122 households with some intention to build in the next year said they had a high likelihood of completing construction. The remaining 5 of 6 intender households expressed medium or low likelihoods of completion. Satisfaction levels, motivating reasons, and stated constraints of these two groups were compared (Table 4). Those with a high likelihood of building were twice as likely to be very dissatisfied with their current defecation place as those with medium or low likelihood. Choosers were also statistically less likely to give good health and comfort as top reasons for installation, but were otherwise motivationally similar to those with medium or low

intentions, although convenience, cleanliness, and visitors/guests were more commonly mentioned as top reasons. Constraints blocking final choice to build included high costs, no one to build, water table/soil conditions, and technical complexity. These constraints were positively correlated with progression from preference to intention stages (Table 4). The statistical significance or near significance of their relative absence among choosers suggests these four factors are important barriers to new demand that operate late in the decision process after intentions take shape, to block implementation by postponing or delaying construction.

Three of the four factors blocking early intention relate primarily to structural factors associated with the individual household’s situation, abilities, and resources (i.e., tenancy, savings/credit, and limited space). Difficult to change in the near to medium term and perceived early in the decision process, these would make it futile to explore plans to build. Conversely, all four factors that later block choice relate to the nature, quality, and availability of opportunities to build a toilet which are external to the household, but essential for adoption (i.e., high cost, no one to build, water table/soil conditions, and technical complexity).

Preferred toilet types

No statistically significant preferences for toilet type emerged for any adoption stage. Slightly more households with positive intention chose ventilated improved pit latrines (KVIP/VIP) than those with preference but no intention, while slightly more households with a high likelihood of building within the year picked flush toilet than those stating medium and low likelihoods, but these differences were not significant.

Discussion

The survey results, summarized in Table 5, support a model of three adoption stages of preference, intention, and choice as a practical tool for assessing demand for sanitation among households in Ghana. *Preference* for changing sanitation is largely created by dissatisfaction with current practices and good awareness of the benefits of home toilets in Ghana. *Intention* to build is determined by positive preference, prioritization, and the absence of structural constraints related to

Table 5
Households without home sanitation by adoption stage in Ghana

Decision stage	Factors blocking decision to adopt improved sanitation
Preference	Lack of awareness of benefits of household toilet Weak or few motivations Satisfaction with existing defecation practice
Intention	Lack of preference Lack of priority or competing priorities Permanent constraints related to individual situation, including: limited space, tenancy issues, credit and savings difficulties
Choice	Lack of preference and intention Satisfaction with existing place Temporary constraints related to opportunities: high cost, no one to build, water/soil conditions, and technical complexity

individual situational factors or abilities that may appear insurmountable to the household. The final *choice* to install a toilet depends on the additional access to appropriate opportunities to build, related to product choices, cost, building services, soil conditions, and access to good technical information and support.

High levels of dissatisfaction with one's current defecation place in the choice stage suggest added urgency to put an existing plan into action. Trigger events such as an embarrassing accident or missing an important school or work event due to queues at the public toilets (Obika et al., 2002), or sudden sickness or deteriorated health of an aged parent, may increase dissatisfaction with the household's present defecation situation and raise priority for a home toilet above other demands on household resources. Other trigger events identified in our qualitative research included building a new house, hosting a important social event with many invited guests for such affairs as funerals in Ghana, or an extended visit from a relative from the city or abroad.

Strategies to increase sanitation demand in Ghana

Strategically designed and targeted marketing and market-based interventions could remove or reduce some barriers to adoption identified in Ghana. We discuss strategies to increase demand for household toilets in Ghana at each adoption

stage and examine where marketing approaches are unlikely to change decision behavior. In such cases, approaches involving legal mechanisms and educational/informational campaigns may be needed as complementary tools (Rothschild, 1999).

Increasing preference

Significant determinants at each stage of toilet adoption in Ghana show that awareness, dissatisfaction, and motivation are needed to start the decision process. Large-scale marketing communications using advertising and consumer information dissemination methods to enhance awareness of options, highlight benefits, and arouse motivation offers a promising strategy to stimulate non-adopter households in Ghana who have not considered toilet installation (>60%) to do so. The campaign should focus on the salient benefits of installing household toilets in the Ghanaian context—convenience, safety, and cleanliness—and increase awareness of negative aspects of current defecation practices associated with dissatisfaction, specifically their dirty and smelly state. Motivations for adopting sanitation in Ghana appear largely unrelated to the fecal–oral transmission of disease, confirming similar findings elsewhere (Cairncross, 2004; Jenkins, 2004). Reasons to change sanitation have been shown to vary considerably across households as a function of lifestyles, local environment, and socio-cultural aspects of excreta handling and defecation practices, but typically have little to do with preventing fecal–oral diseases (Frais & Mukherjee, 2005; Jenkins & Curtis, 2005; Mukherjee, 2001; Obika et al., 2002). In Ghana, cleanliness and neatness are particularly salient motivations for a wide range of hygiene behaviors. Neatness is culturally tied to notions of moral and social purity, while diseases associated with feces are believed to be transmitted via sighting feces and by fecal heat and odor produced in open latrines (Obika et al., 2002; Scott, Curtis, Rabie, Garbrah-Aidoo, & Research International, 2002; van der Geest, 1998).

Increasing intention to build

In Ghana, household situational constraints related to limited space, tenancy, and savings were the main factors preventing households with positive preference for a home toilet from forming an intention to build one. Tenant households in Ghana have little or no control over the sanitation

infrastructure where they live. Only two of the 76 tenant adopter households said they had made the decision to build and only one indicated some claim to ownership of the latrine. This explains the disproportionately higher fraction of non-adopter households stalled at the preference stage who are tenants (55%) compared to the intention stage (20%). Interestingly 100% of tenant households stated competing priorities as a main reason for not building a toilet compared to just 5.6% of other non-adopter households. Investigation of the variety of tenant occupancy patterns, tenant priorities, and how different kinds of landlords make sanitation installation decisions in Ghana is warranted to understand the unique sanitation access problems of non-owner households and identify strategies for this distinct population segment. Tenancy in tenant-only houses is likely to create a housing situation where marketing is ineffective in achieving sanitation improvements without legal action to encourage landlords to add sanitation facilities to their properties.

Limited space is also a more complex constraint to overcome—it may require development of new sanitation technologies and services before marketing can be applied. Expression of this constraint is symptomatic of lack of pit emptying services in poor urbanizing areas and of sanitation technologies that require excessive amounts of space, relative to the cost and opportunity value of space in poorer dense neighborhoods and over-crowded slums. The bucket latrine with frequent and regular emptying service was a product-service package that worked well for decades for hundreds of thousands of Ghanaian households who lacked space and capital, until national policy called for fazing them out and public conservancy labor arrangements ended in many towns. Indeed many respondents in the qualitative work spoke positively of the bucket latrine, its major limitation being that it was now difficult to find people, and often expensive, to empty them. People valued their low cost, their limited smell due to regular emptying and the removal of feces from their home. In Tanzania, the importance of pit emptying services for sustaining on-site urban sanitation has emerged as a critical factor for adoption and maintenance of household toilets (Jenkins & Sugden, 2006).

The savings constraint reflects two structural problems: real poverty and a lack of financing and credit options for home improvement. Marketing is unlikely to be able to fully address either of these

and laws, public policies, and other mechanisms are required. However, work in Vietnam is finding that development of flexible payment schemes can help reduce savings difficulties related to the high initial cash cost of sanitation installation (Fraiss & Mukherjee, 2005).

Increasing final choice

Approximately 30% of non-adopter households in Ghana have begun planning to install sanitation as shown by their positive intention to build. However 5 of 6 are stalled in the process, failing to carry through their intention. Major reasons for failure to progress are: perceived high costs of toilet options, no one to build, the complexity of building related to lack of information, and water table and soil problems. These constraints to new demand could be addressed by actions to improve the quality, range, and costs of toilet technologies offered in the market place, innovative ways and incentives to extend the private sector supply chain of toilet products and related services (e.g. vault or pit emptying) needed to build, operate, and maintain toilets closer to these households, and sales promotion and product education and marketing to reduce households' transaction time and effort costs involved in searching for good information about technologies and how to get them built; product, place, price, and sales promotion comprising the four basic 'Ps' of a marketing plan (Kotler et al., 2002).

Sanitation gains using marketing strategies

Projections to 2015 were made for Ghana to examine sanitation access scenarios in light of development goals and the potential gains from marketing strategies emerging from this national demand assessment. Assuming a uniform annual rate of new household toilet adoption at 5.8% of non-adopter households, 100% maintenance of installed household facilities, phasing out bucket latrines by 2010, current housing patterns, and a population growth rate of 1.9%, calculations indicate home toilet access in Ghana would rise from 25.6% of households in 2003 to 54.3% by 2015 (Fig. 3) without additional action. This projection approaches 57.5%, the coverage required for Ghana to meet its 2015 millennium development goal for sanitation, assuming coverage in 1990 was 15% as recently re-estimated (WHO & Unicef,

2006). How much would proposed marketing strategies to reduce blockages at the preference and choice stages be expected to increase adoption rates and coverage?

In total, 2015 projections for two marketing scenarios were compared to the “no action” base case. Scenario 1 assumes a national advertising and communications campaign raises household awareness and interest in home toilet installation and increases the rate of preference (those who have considered installing a toilet) by 50% (from 38.5% to 57.8% of non-adopter households). No actions to change the base rates of intention and choice are assumed. Scenario 1 increases adoption rates to 8.7% per year and achieves 65% projected sanitation access by 2015. Scenario 2 adds a mix of marketing strategies to scenario 1 to reduce barriers and increase the rate of choice in the last stage of adoption by 50% (from 18.5% to 27.8% of intenders). Again, no change is made to the intention rate, determined largely by constraints which marketing appears ineffective at addressing. Combining the changed rates of preference and choice, Scenario 2 yields a 13.1% annual rate of adoption and projected 77% sanitation access by 2015, achieving an estimated 1.2 million more households or 5.8 million more people with home sanitation by 2015 over the baseline in Ghana. Although these projections reflect the simplified assumptions of a static adoption rate and instantaneous effects, they illustrate causal

pathways by which marketing strategies would be expected to work to accelerate adoption rates above baseline trends.

Segmenting households

This analysis reveals how population subgroups blocked at the intention stage would remain without access to a home toilet unless other non-market-based actions and policies were developed to address constraints of extreme poverty and tenancy that block home toilet installation in Ghana. Consumer segmentation is a fundamental planning tool in marketing, whereby the target population is divided into more manageable homogenous segments for which a specific mix of marketing activities can be developed. A core implication of our sanitation adoption decision model and this analysis is the need for different interventions at different stages in the adoption process. Programs may choose to design a set of strategies that target only one adoption stage, or all of them, but one blanket intervention for everyone is unlikely to work. Using a behavioral approach to assess demand allows managers to work out where most of their target population lies in the adoption process and how vulnerable subgroups compare to the majority, enabling development of actions that target barriers at each adoption stage for any population segment of interest.

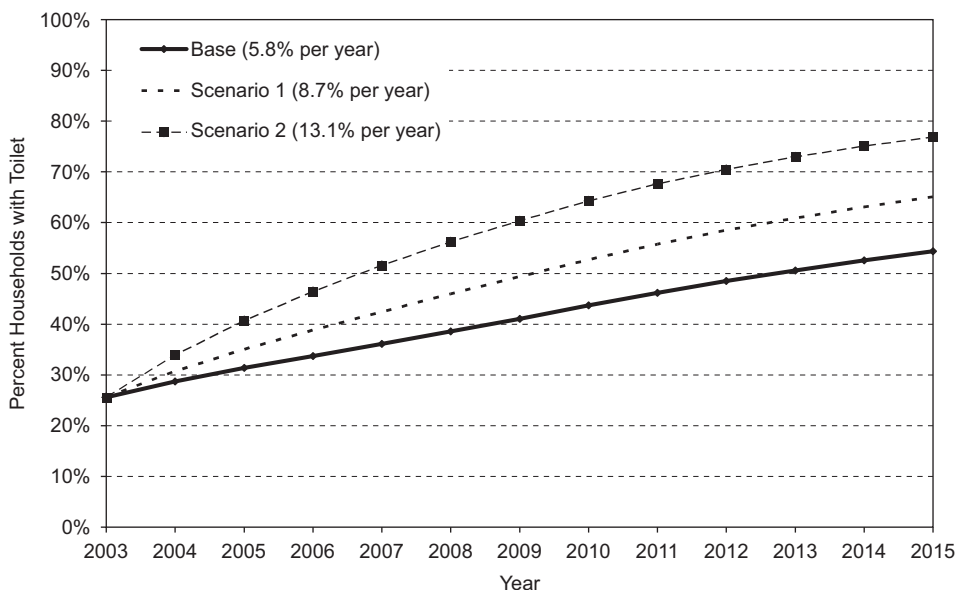


Fig. 3. Projected household toilet coverage rates in Ghana.

Limitations and recommendations

Response rates and reliability for some questions in the Ghana survey would have been improved by interviewing the person in each household responsible for decisions about building or improving housing facilities. One third of the respondents in this survey were unable to say when their toilets were built and over 20% unable to say why they had been built because they were not the decision-makers. Nonetheless, the results indicate that mothers in Ghana in most households participate in infrastructure decisions sufficiently to be able to answer many of the questions related to future toilet acquisition and demand. Using the tool, it was possible to categorize all non-adopter households in terms of their preference, intention, and choice to install household sanitation. Three non-adopters with preference had missing intention and choice data because a section of non-adopter questions was mistakenly skipped.

Prior to adapting the survey for another setting or context, a small qualitative study using in-depth interviews or focus group discussions, as mentioned earlier is required to establish sensible codes for questions related to motivations, constraints, toilet types, and preferred attributes. We drew from a recent qualitative study of these issues and supplement it with pilot testing.

Overall, the survey was relatively straightforward to conduct and took about 20 min to administer. It required no additional training or skills beyond those of personnel trained and experienced in quantitative household survey methods and sampling techniques and familiar with the project population. An experienced market research agency was able to conduct the field work with oversight developing the questionnaire and coding schemes, and pilot testing.

Conclusions

Findings from a national survey to assess sanitation demand in Ghana fit a preference–intention–choice behavioral decision model of household sanitation adoption. Results show how satisfaction with existing defecation practices, motivations for improving sanitation, priority over competing household concerns, and situational and implementation-related constraints affect preference for and likelihood of household toilet installation and can lead to new demand for sanitation in

Ghana. This survey-based behavioral approach provides a quick and effective method to assess and understand what drives household demand for improved sanitation, segment households by adoption stage, and pinpoint focused strategies to stimulate increased rates of preference, intention, and choice to improve sanitation. In the Ghana case, categorizing the target population in terms of the adoption stages that generate new demand for home toilets provides useful information to identify policies and design interventions to stimulate higher rates of demand. In particular, marketing strategies aimed at the preference and choice stages appear to be promising ways to increase household sanitation demand and coverage in Ghana.

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