



Original research article

Beyond buying: The application of service design methodology to understand adoption of clean cookstoves in Kenya and Zambia

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ABSTRACT

A shift to advanced cookstoves can bring significant health and environmental benefits, but only with proper and consistent use. Despite this, the empirical evidence of what drives the initial purchase, and in particular, the continued use of advanced cooking technologies remains limited. This paper describes two case studies in peri-urban Kiambu County (Kenya) and urban Lusaka (Zambia) where we examine the factors influencing the purchase and use of clean biomass cookstoves over time. We apply service design methodology to build “user journeys” to illustrate the cook’s experience with the technology, from the point of hearing about it, to purchasing it, learning to use it, and making it part of their daily routine. We find that often, the primary factors influencing initial purchase do not motivate people to use the stove regularly in the longer term. From the user-journey mapping, we identify some key behaviour change techniques that could be applied, primarily by cookstove implementers, at different phases in the adoption journey to support users in the process of overcoming behavioural barriers to adopting a new technology. Our findings emphasize that complex factors affect people’s decision-making around the purchase and use of clean cookstoves, and highlight the need to carefully map user’s experience to pinpoint where support is most needed in the process of change.

1. Introduction

More than 40% of the world’s population still relies on traditional biomass for their cooking needs [1]. Beyond its negative impact on the wider environment, the use of traditional biomass energy is associated with a significant negative effect on public health with an estimated 4.3 million global deaths directly associated with the consequences of household air pollution. The damaging respiratory effects of such domestic cooking and heating practices are felt disproportionately by women and children whose typical household roles increase their relative exposure to harmful pollutants [2,3].

Governments around the world are looking to address these problems by scaling up access to cleaner cooking technologies and fuels (notable examples include the Indian National Biomass Cookstove Initiative) [46] and the Indonesian National Liquid Petroleum Gas (LPG) Programme [4]. African governments are increasingly looking to modernize household energy options for the 700 million people who still rely on traditional biomass fuels such as wood, charcoal and dung for cooking and heating, through for example providing finance options to make electricity grid connections affordable [5] and by including measures to reduce dependence of households on traditional biomass for cooking in national development plans (see for example strategic

plans of Ethiopia, Kenya and Ghana [6–8]).

Achieving long-term health and climate benefits requires sustained, proper use of clean cooking technologies, coupled with the disuse of inefficient polluting stoves [9]. The question is how to achieve this shift at scale. Although advanced cookstoves have been promoted for decades by governments, NGOs and the private sector in different parts of the world, the level of adoption still falls far short of what is needed to achieve substantial benefits [10].

To date, empirical studies looking at this problem have primarily focused on understanding the effects of a range of factors on the initial adoption of advanced cookstoves including availability, purchase cost and ease-of-use [11–13]. Yet even when these barriers are overcome, we know that large numbers of households only use their advanced stoves sporadically, or discontinue their use over time [11,14–18,10]. There is a need for more context specific, qualitative evaluation to fully understand the various aspects of adoption behaviour amongst [11]. This paper attempts to shift the field’s focus beyond better understanding what motivates people to purchase advanced stoves for the first time, to what makes households *continue using* them over time. Such information is crucial for practitioners and policy developers who design and implement cookstove intervention programmes.

We used case studies from Kenya and Zambia to examine what

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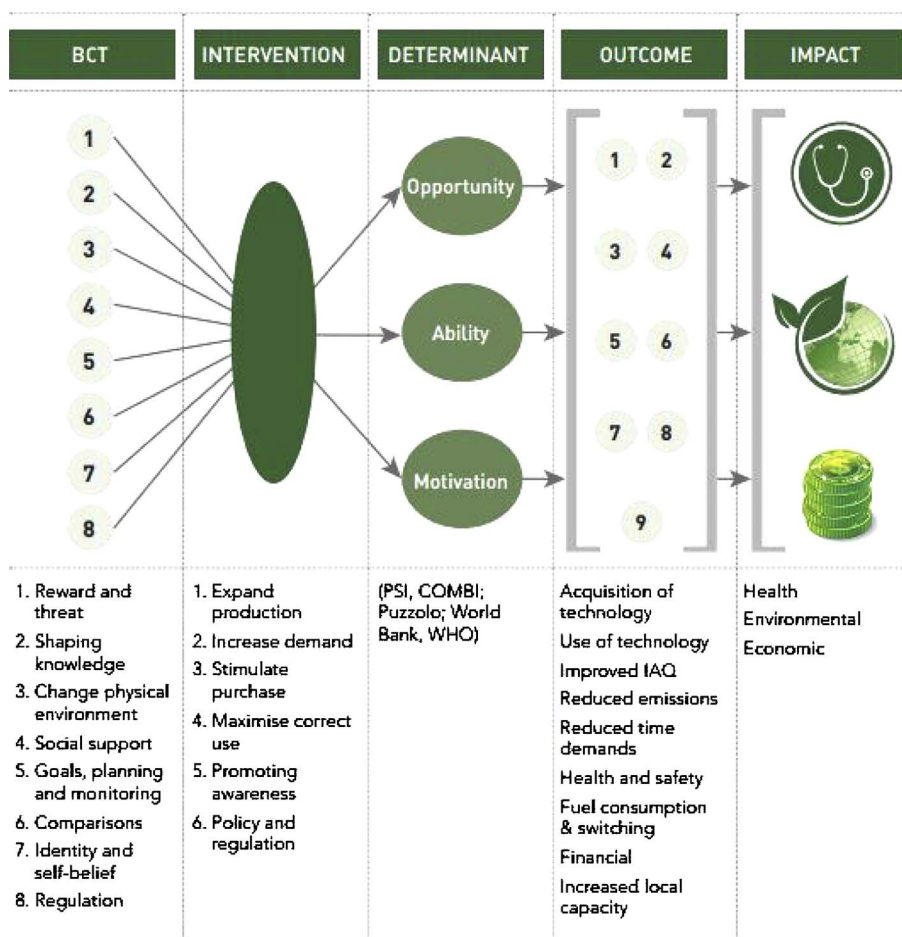


Fig. 1. CCI Framework [22].

drives households to adopt clean stoves for most or all of their cooking needs. We applied a service design methodology to build detailed “user journeys” that illustrate the household’s experience with the technology, from the point of hearing about it, to purchasing it, learning to use it, and making it part of their daily routines. We relate the insights from the user journeys to an established behaviour change framework to illustrate strengths and weaknesses in the approaches taken in Kenya and Zambia to shift user behaviour to adopt a new cookstove. The research aims to generate recommendations on specific mechanisms and approaches that can be used by cookstove implementers and other organisations working to scale up the use of cleaner cookstoves to support households in the transition to a new cooking routine.

2. Theoretical framework

Advanced cookstoves typically function differently than traditional biomass stoves. They often use different fuels (e.g. gas or ethanol instead of wood, or pellets instead of branches and twigs), or require preparing traditional fuels in a different way (e.g. chopping wood into very small pieces). They may regulate temperature differently and by producing less or no smoke, they may flavour the food differently. As such, and given the habitual nature of the technology use in daily life, the adoption of a new stove requires a willingness to adapt to a new behaviour or practice. There is no commonly accepted definition of cookstove adoption, but we follow Shankar et al. [19] to understand it as correct and consistent use over time. Adoption of a new cookstove requires changing deep-rooted patterns of behaviour [20]. Given the shift in behaviour required, consideration must be given by proponents

as to the determinants of human behaviour and decision-making.¹

2.1. Behaviour change frameworks and techniques

There are a plethora of frameworks for understanding behaviour change² that are used to improve the design and practice of development interventions. We conducted a literature review of behaviour change frameworks applied in the cookstove sector [21] and selected the “cleaner cooking intervention” (CCI) framework [22] as the theoretical backdrop to our study. This framework captures elements of two well established behaviour change models, the World Bank SaniFOAM [23] and Population Services International (PSI) PERFORM framework [24] but has the advantage of being theoretically driven by a National Institute of Clinical Excellence (NICE) recognised model of health behaviours [25]. In addition, it has the advantage also of having been applied systematically and rigorously in an evaluation of 48 studies in the field, and is proven to be robust and pertinent to the Behaviour Change framework for this sector [22]. It uses an “opportunities,

¹ We start from the premise that adopting advanced cookstoves is a good thing, with benefits for both the household and society as a whole. That may not always be the case: a stove could be prohibitively expensive, or be poorly built and dangerous, or simply not reduce smoke enough to make a difference. People also may not use them to the extent that is required to reap significant (health) benefits. While our analysis touches upon some of these issues, they are mostly beyond the scope of this paper. For further discussion of such concerns, see Jeuland and Pattanayak [11] for a comprehensive overview [11].

² See Appendix 1.1 for expansion of the studies conception of behaviour change.

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