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Adoption and use of SATO pan for health promotion in Kigali, Rwanda

Rutambuka Theogene[1], Kunto Adi Wibowo[2]

[1,2]Faculty of Communication Science, Universitas Padjadjaran, Bandung, Indonesia
[1]Rwanda Polytechnic – Integrated Polytechnic Regional College of Gishari, Rwamagana, Rwanda

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ABSTRACT

Background: The lack of proper sanitation facilities, including toilets, creates a barrier to fulfilling sanitation needs. Rwanda also experiences challenges in sanitation whereby many citizens use traditional toilets. With its innovative design, the SATO Pan toilet has the potential to address the sanitation challenges many communities face. Few studies on SATO Pans have been conducted in some countries. However, among reviewed studies, no research has been identified in Rwanda as the milestone demonstrating the efficiency and quality of the SATO Pan, its impact on sanitation issues, and contribution to improving sanitation and promoting health practices in Kigali City. **Purpose:** This research aimed to explore the potential factors for the widespread adoption and use of the SATO Pan toilet and to provide a comprehensive analysis of its efficiency and easy use among Rwanda communities in the City of Kigali. **Methods:** Data were collected using a questionnaire, and 109 respondents were selected based on a purposive sampling technique. The UTAUT 2 Model was used to assess its efficiency and ease of use. The Partial Least Squares-Structural Equation Modelling (PLS-SEMM) method was used for data analysis with the SmartPLS 3. **Results:** The findings demonstrated that, among the hypotheses tested, Behavioural Intention influences Usage Behaviour, Effort Expectancy significantly influences Behavioural Intention, and Habit significantly influences Behavioural Intention. **Conclusion:** SATO Pan can considerably improve community sanitation and promote health initiatives through innovative design and use. **Implications:** The SATO Pan's adoption and use bring about significant sanitation practices to promote hygiene and health practices. Due to the hygienic and comfortable toilet options, the SATO Pan can often overcome the undesirable effects of traditional open-pit toilets.

Keywords: SATO Pan; adoption; sanitation; toilet; health promotion

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Correspondence: Rutambuka Theogene, Rwanda Polytechnic - Integrated Polytechnic Regional College - Gishari. *Email:* trutambuka@rp.ac.rw

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INTRODUCTION

By 2030, the world will be significantly behind schedule in providing worldwide sanitation. Regardless of development, over half of the world's population, or 4,2 billion people, rely on contaminated sanitation systems, threatening environmental and human health. Around 673 million individuals defecate outside without access to toilets, and 698 million pupils do not have access to basic sanitation facilities in their schools. Public health and social and economic development are disastrously affected by inadequate sanitation (UNICEF & WHO, 2020b)comfortable and dignified life. Yet, the reality for billions of people is one of polluted environments, in which one or many of the links in the chain that makes up safe sanitation – toilets, waste treatment, disposal and safe re-use – is missing or out-of-reach. Recognizing this, the global community is committed to achieving universal access to sanitation and hygiene by 2030, paying special attention to the needs of women, girls and those in vulnerable situations, and improving water quality and safe wastewater re-use. But progress against the sanitation targets in Sustainable Development (SDG.

Access to proper sanitation and clean water is essential for the health and well-being of communities with growing populations in urban and rural areas, particularly in developing countries where basic infrastructure may be lacking (Michael et al., 2018). Ensuring access to proper sanitation and clean water is for communities' health and well-being and is crucial for addressing these challenges. Communities can experience significant improvements in public health, leading to a higher quality of life for residents. In developing countries, the need for initiatives that promote proper sanitation and hygiene practices is even more pronounced. Furthermore, researchers argue that serious health risks to patients and medical professionals are associated with inadequate waste disposal, handwashing facilities, potable water, and toilets (Person et al., 2019).

Previous research has explored health promotion through SATO Pan usage. Intending to achieve universal access to at least fundamental services by 2020, Rwanda has set lofty goals for water supply and sanitation (Ekane et al., 2020). In this framework, the Government of Rwanda launched, in 2010, Rwanda's Community-based Environmental Health Promotion Programme (RCBEHP). This program was accelerated by the President of the Republic's Initiative on Sanitation and Health (Ekane & Dickin, 2019).

With its innovative design and sustainable approach, the SATO Pan toilet has the potential to address the sanitation challenges many

communities face. By providing a safe and hygienic sanitation solution, the SATO Pan toilet improves the quality of life for individuals and families and contributes to broader health promotion efforts (Prüss-Ustün et al., 2019).

For better assessment and establishment of health promotion strategies, it is crucial to identify opportunities for integrating the promotion of proper sanitation and hygiene practices with the use of SATO Pan. This integration can further enhance the SATO Pan toilet's impact and improve community health outcomes. Furthermore, exploring the potential for widespread adoption and use of the SATO Pan toilet in areas with limited access to proper sanitation and clean water is essential to this study. By elucidating the benefits and potential challenges associated with widespread adoption, we can better understand the feasibility and impact of scaling up the SATO Pan toilet in underserved communities (Michael et al., 2018).

In line with health promotion and well-being of the communities, a thorough health awareness requires all organisations and systems to consider how their activities affect individuals and community wellness and health (Nutbeam & Muscat, 2021) to fight against sanitation and health-related issues. This process includes measures to improve individuals' skills and actions to change social, environmental, and economic determinants of health to maximise their beneficial effect on the community and personal health.

The primary factors behind the rise in open defecation in Sub-Saharan Africa are high population growth and the slippage of open defecation-free (ODF)-certified communities, which occurs when community members fail to uphold all open defecation-free requirements. According to an investigation conducted in African nations, the ODF slippage rate on the continent is between 10% and 13% annually. The researchers used open-field defecation and poor latrine utilisation to define ODF slippage (Zuin et al., 2019).

Community-led Total Sanitation should support this ODF initiative to end open defecation. Community-led total Sanitation is referred to as CLTS. This program focuses on creating knowledge about open defecation and its harmful impact on human health (Sidjabat & Gunawan, 2020). The initiative additionally motivates populations to establish hygienic toilets.

This comprehensive strategy aims to become and remain open defecation-free (ODF). To help the community take collective action to become ODF, CLTS involves facilitating the community's examination of its sanitation profile, defecation behaviours, and associated repercussions. It is also important to note that

designing more durable interventions requires understanding the causes and level of reversion when communities are labeled ODF (Delaire et al., 2022). Out of 137 communities spread over eight districts of Rwanda, about 51 were pre-declared as open defecation-free (ODF) after multiple coordinated interventions by local administrative officials and stakeholders (Muhinde, 2021).

To facilitate the smooth end of sanitation problems, SATO, a part of LIXIL, introduced the new brand of SATO Pan toilet. This affordable plastic toilet has innovative features, such as an open trap door that prevents terrible odors and insects from moving with the toilet compound. According to Burton et al., (2020), SATO by LIXIL Corporation offers safer, cheaper, and sustainable solutions for an improved and more hygienic toilet experience. SATO Pan toilet model is considered an essential plastic pan with a counterweighted, self-closing door that seals pit latrines to prevent the entry of flying insects and, in turn, the spread of illness. This situation will hinder the progress in sanitation and poor perception and slow the sanitation improvement status.

Innovative toilets also contribute to environmental sustainability and resource recovery, aligning with global development goals. The "toilet revolution" in China highlights the importance of popularising sanitary toilets, alleviating wastewater pollution, and promoting environmental protection for health and well-being improvement (Cheng et al., 2018). Additionally, sustainable toilet designs with safety provisions and hygiene features can protect individuals from adverse health effects, as observed during events like Hajj (Musa et al., 2022).

Chronic under-prioritisation, a lack of leadership, inadequate funding, and a workforce problem plague the sanitation sector. While most nations have national plans and policies to support sanitation, only some have set aside enough time and money to implement those plans (UNICEF & WHO, 2020a). Most of the world's 2.5 billion people who lack adequate sanitation live in underdeveloped nations, where providing sanitation facilities a basic essential for human health, well-being, dignity, and development remains a huge problem. Sadly, there are still not enough clean, respectable, and functional places to go to the bathroom in many parts of the globe, including Sub-Saharan Africa (SSA) (Ekane et al., 2014).

In Rwanda, the sanitation and hygiene sector faces many challenges. These challenges include poor or lack of sanitation-related products and information. Local people need to be more effectively informed about how productive sanitation works. These people, including members of the local Effective

Sanitation Association, should familiarise themselves with the required practical sanitation principles and practices or with sanitation difficulties in general (Ekane, 2016). The Republic of Rwanda proposes using flush toilets, simple pit toilets, ventilated enhanced pit toilets, UDDTs (eco toilets), dehydration vault toilets, and biogas systems as latrine technologies and techniques. Where a particular toilet style is installed depends on several factors, including pricing, available space, cultural customs, water availability, labor availability, and geographic conditions (Ekane, 2016).

Research conducted on the urban infrastructure in Kigali, as mentioned above, raised the issue of the high cost of modern toilets. At the same time, the SATO Pan seems cheap (8.000 Franc Rwandais ~ 7 US $ per unit), SATO Flex (12,000 Franc Rwandais ~ 10 US $ per unit), and SATO Stool (15.000 Franc Rwandais ~ 12 US $ per unit) and a solution to sanitation and hygiene (Muhinde, 2021). Therefore, SATO Pan is chosen for affordability compared to other brands. Except for the design, which makes the difference, the functionality and technical/innovative features are identical. Note also that the SATO Stool is designed to be a sitting toilet, and it targets people with disability, older adults, and pregnant women.

The Rwandan government prioritises hygiene and sanitation in its development plans and sets forth various regulations and guidelines for suitable toilet technologies for different geographic regions. Another study in the Northern Province of Burera District revealed that safety aspects of sanitation, health, hygiene, and convenience practices still require improvement and must satisfy the standards and national guidelines (Ekane et al., 2020).

Poor sanitation expenses are unfairly allocated, with the poorest bearing the most economic burden. Since the most deficient 20% of the population is three times more likely to engage in open defecation than the wealthiest 20%, access to sanitation indicates inequality. The consequences of inadequate sanitation are proportionately more expensive for impoverished citizens. It makes poverty a double-edged sword for them. Roughly 4.6 million Rwandese rely on dirty or communal latrines, 0.3 million people have no latrines and excrete in open spaces, and the poorest quintile is three times as likely than the wealthy to engage in open defection (Republic of Rwanda, 2012).

The same sources indicated that high economic costs result from each person who uses open defecation spending over 2.5 days a year looking for a private place to poop. Women bear a disproportionate share of the cost of caregiving because they frequently spend more time with young children, sick relatives, or

elderly loved ones. Since individuals without bathrooms, especially women will also have to locate a private place to urinate, this expense is probably underestimated.

Rwanda expends $3.9 million annually on open defecation practices, while ending the course would need fewer than 70,000 latrines (Republic of Rwanda et al., 2012). The Water and Sanitation Program's desk research indicates that Rwanda incurs an annual expense of 32 billion Rwandan Francs, equivalent to US$54 million, due to inadequate sanitation. It represents an amount of $5 per Rwandan annually, or 0.9% of the country's GDP (Republic of Rwanda et al., 2012). According to Leong, (2020), despite conflicting priorities, there is also a lack of willingness to carry out changes in sanitation. Therefore, one of the solutions for the extreme sanitation issues might be the use and spread of SATO Pans introduced by LIXIL Group Corporation. Innovative toilets can transform health promotion efforts by integrating technology, sustainability, and community engagement. By embracing these advancements, organisations like SATO Pan can drive positive health outcomes, enhance sanitation practices, and contribute to overall well-being in the communities they serve.

Besides, it is essential to highlight the role of SATO Pan in protecting children with its innovative technology. The report on household latrines shows that young children fear using traditional or open-pit latrines since the opening or hole appears significant. With innovative SATO Pans, they are more secure than the existing open pit latrines. The SATO Pan incorporates water-based and mechanical sealing to isolate pit latrines effectively from the outside atmosphere. This mechanism reduces the risk of unintended incidents where children accidentally fall into the latrine. Pit latrines in the SATO Pan are sealed off from the outside using mechanical and water sealing. This lessens the chance of kids unintentionally falling into the toilet (Federal Democratic Republic of Ethiopia, 2017).

Note also that a few studies have been conducted on SATO Pans in different areas in some countries. However, no research has been identified as the milestone demonstrating the efficiency and quality of the SATO Pans, their impact on sanitation issues, and their contribution to improving sanitation and promoting health practices. Therefore, this research aimed to explore the potential factors for the widespread adoption and use of the SATO Pan and to provide a comprehensive analysis of its efficiency and easy use among the Rwandan community in Kigali City.

RESEARCH METHOD

This exploratory research employed a quantitative approach to explore the technology factors behind SATO Pans' adoption and use. It also examined the efficiency of SATO Pan in dealing with health and sanitation issues in the City of Kigali. This study used the proposed theoretical model of technology adoption by Venkatesh et al., (2012) without including gender, experience, and age moderation variables. This is possible because similar studies have shown that there is no significant relationship between the moderating variable and the primary variable and that the moderating variable cannot always be used universally in all contexts, thus becoming irrelevant in certain contexts (Oliveira et al., 2014; Dwivedi et al., 2019).

Data were collected using a questionnaire spread to 109 respondents within the Kigali City community using SATO Pans toilet products. Other sources, such as reports, surveys, articles, and policies related to sanitation, were also consulted.

Respondents were selected based on purposive sampling techniques because the research targeted people using those toilet pans. According to Venkatesh et al., (2003), the use of purposive sampling considered the need to target a specific group of participants with characteristics crucial for understanding technology acceptance and usage behaviours and factors for adoption in the context of the UTAUT 2 Model. The model also underlines the importance of numerous factors, such as PE, EE, SI, FC, etc. These determinants and moderators significantly shaped individuals' intentions to use technology, making it essential to select participants who could provide insights into these factors (Maruping et al., 2016). According to Kranthi & Asraar, (2018)the current research is undertaken to identify the determinants of the smartwatch adoption. In order to arrive at this objective, the study has employed unified theory of acceptance and use of technology 2 (UTAUT2, innovativeness, aesthetics, and the image of the products are determinants that might influence the behavioural intention of the SATO Pan.

By employing purposive sampling in UTAUT model research, the researchers could ensure that the selected participants possessed the characteristics necessary to explore the nuanced relationships between technology acceptance determinants and usage intentions. This targeted applicability of the study findings and the approach enhanced the relevance within the specific context under investigation. The respondents might have SATO Pans at home or use water taps for cleaning and hygiene. Furthermore, the researchers targeted customers who already owned SATO Pan or had previously used it in the past year. Their

experience was paramount in this research as users/adopters. Note also that this research is not aimed at generalising the whole population (Etikan, 2016). In addition, the research targets participants in the City of Kigali to explore the adoption and use of SATO Pan toilets among the users and get a clear image of those pans. These participants had the knowledge and internet facilities to provide the researchers with the required information during the process.

This research used the UTAUT 2 Model to assess the SATO Pan's efficiency and ease of use as in Figure 1 (Venkatesh et al., 2012). Therefore, UTAUT 2 is the appropriate theory for this research (Attuquayefio, 2014). This study also used the Partial Least Squares-Structural Equation Modelling (PLSSEM) method of data analysis with the SmartPLS 3 software, which included the following tests: Data quality, Measurement Model (Outer Model), Validity Test, Reliability Test, Structural Model (Inner Model), R-Square (R2) Test, T-Statistic Test, and Path Coefficient for hypotheses verification.

RESULTS AND DISCUSSION

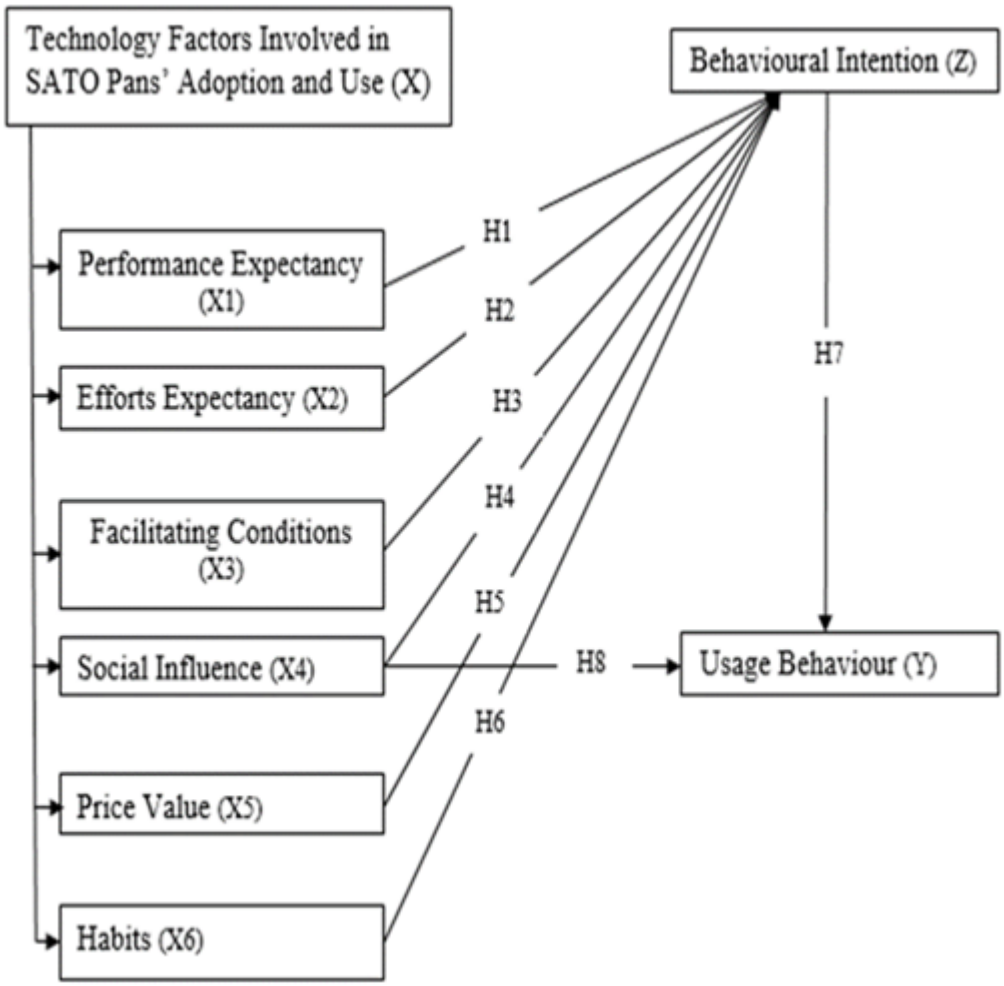
Outer Model Analysis, Table 1 presents the assessment of the reflective model measurement model, which comprises the validity test conducted using the AVE value and the reliability on the indicator using Cronbach's Alpha (CA) and Composite Reliability (CR) Value Testing.

The table above shows that the Average Variance Extracted (AVE) of the variables tested is valid. A variable is said to be valid when the AVE value is > 0.05. One can state that all the variables tested are valid.

If the values of variable CA and CR are higher than 0.7, they are strongly reliable. Every variable has an excellent reliability rating because the CA and CR values are above 0.7. Based on Table 2, all the tested variables are reliable because their values range from 0.08 to 1.

Descriptive Analysis on the Variables, descriptive analysis means classifying the data from informants' responses and converting them into tabular arrangement. The table provides the score and means of each indicator, with mean values ranging from extremely low (<1.8), low (<2.6), average (<3.4), high (<4.2), and extremely high (>4.2).

Based on the data, the X2.4 indicator has the highest mean value (3.79), which indicates that the SATO Pan brand is massively available on the market. On the other hand, the X3.3 indicator has the lowest mean value (3.33), but it is still in the average range. According to the participants, the high availability of the SATO Pan brand on the market is the most influential indicator of the adoption and use of SATO Pan.



Source: Venkatesh et al., 2012

Figure 1 Research Model adapted on Venkatesh's UTAUT 2 Model

Outer loardings: The concept of validity pertains to the degree to which the measured variables accurately assess the constructs to measure. This research employed convergent and discriminant validity tests to determine the discriminant validity. The general guidelines (also known as the Thumb Rule) for convergent validity tests are Average Variance Extracted (AVE) >0.5 and outer loading >0.70. The indicator can be eliminated from the construct if the loading score is <0.70, as it does not appear on the construct. Based on data in Table 4, all question items have a loading value >0.7. These results indicate that the data is valid.

Based on Table 5 above, the R Square value on the variable of Behavioural Intention

to Use (Z) is 0.787, which means that variables Performance Expectancy, Effort Expectancy, Facilitating Conditions, Social Influence, Price Value, and Habit can provide a percentage of influence of 78,7.0% on the Behavioural Intention to the adoption and Use of

Table 1 Average Variance Extracted (AVE) Value Testing

Variables	Average Variance Extracted (AVE)	Status
Performance Expectancy (X1)	0.721	Valid
Efforts Expectancy (X2)	0.712	Valid
Facilitating Conditions (X3)	0.683	Valid
Social Influence (X4)	0.762	Valid
Price Value (X5)	0.729	Valid
Habits (X6)	0.822	Valid
Behavioural Intention to use (Z)	0.874	Valid
Use Behaviour (Y)	1.000	Valid

Source: Primary data, 2024

SATO Pan. The R Square value on the variable Usage Behaviour is 0.79,4, which indicates that the variable of Habit and Behavioural Intention to Use (Y) can provide a percentage of influence of 97.4% on Usage Behaviour. Furthermore, these results indicated that the Behavioural Intention to Use (Z) variable was classified as moderately strong at 0.787 or 78.7%. In contrast, the Usage Behaviour (Y) variable, at 0.794 or 79.4%, was evaluated to be explainable by all external components.

T-Statistics and Path Coefficient: The next step is to test the hypothesis after the suggested model's R2 has been determined. In hypothesis testing, the original sample, or beta score, is employed to examine the exogenous variable's predictive qualities compared to the endogenous variable, and the t-statistic value is utilised to ascertain the model's significant value. A negative beta coefficient value indicates an exogenous variable's negative influence on an endogenous variable, whereas a positive beta

Table 2 Cronbach's Alpha (CA) and Composite Reliability (CR) Value Testing

Variables	Cronbach's Alpha	Composite Reliability	Status
Performance Expectancy (X1)	0.871	0.912	Reliable
Efforts Expectancy (X2)	0.865	0.908	Reliable
Facilitating Conditions (X3)	0.846	0.896	Reliable
Social Influence (X4)	0.896	0.927	Reliable
Price Value (X5)	0.816	0.890	Reliable
Habits (X6)	0.892	0.933	Reliable
Behavioural Intention to use (Z)	0.855	0.933	Reliable
Use Behaviour (Y)	1.000	1.000	Reliable

Source: Primary data, 2024

Table 3 Variables Descriptive Analysis

Variables	Indicator	Mean	Status
X1.1	Usefulness	3.505	High
X1.2	Improvement of hygiene conditions.	3.706	High
X1.3	Self-sealing meachanism to stop bad smells and insects.	3.624	High
X1.4	The use of less water in the flush process.	3.725	High
X2.1	Easy of using the product.	3.780	High
X2.2	Easy maintenance and cleaning.	3.532	High
X2.3	No more skills required for use.	3.780	High
X2.4	Easy availability on the market.	3.798	High
X3.1	Availability of open pit latrine for installation.	3.459	High
X3.2	Availability of SATO Pans.	3.615	High
X3.3	Availability of water for flushing.	3.330	Average
X3.4	Availability of SATO-trained masons for installation and maintenance.	3.578	High
X4.1	Influence of family members.	3.697	High
X4.2	Influence of neighbours.	3.587	High
X4.3	Influence of Health Community Worker.	3.734	High
X4.4	Influence of Executive Secretary.	3.771	High
X5.1	The affordability of the price.	3.486	High
X5.2	The price is relatively cheap compared to other sanitation products.	3.697	High
X5.3	The price is of installation is high.	3.468	High
X6.1	Habit	3.560	High
X6.2	Dependance	3.477	High
X6.3	A must	3.706	High
Z1.1	Preference	3.688	High
Z1.2	Intention	3.642	High
Y1	Frequency	3.725	High

Source: Primary data, 2024

coefficient value denotes a positive influence attribute. Using the SmartPLS 3 Software, the bootstrap resampling approach was employed in this study's data analysis for hypothesis testing. Also, note that the hypothesis is accepted when t-statistics is >1.96 and rejected when t-statistics is <1.96. Table 6 illustrates the outcomes of the hypothesis's testing.

The Effects of Behaviour Intention to Use on Usage Behaviour: Referring to the data produced in Table 6 for hypothesis 1(H1), the value of the original sample of the Behavioural Intention to Use (Z) variable against the variable of Usage Behaviour (Y) is 0.816. On the other hand, the Behavioural Intention to Use (Z) construct has an incontestable impact on the variable of Usage Behaviour (Y). Additionally, a T-Statistic value of 6.036 >1.96 has been

Table 4 Outer Loading

Variable	Item	Outer Loarding	Status
Performance Expectancy	X1.1	0.861	Valid
	X1.2	0.889	Valid
	X1.3	0.786	Valid
	X1.4	0.858	Valid
Efforts Expectancy	X2.1	0.817	Valid
	X2.2	0.907	Valid
	X2.3	0.802	Valid
	X2.4	0.846	Valid
Facilitating Conditions	X3.1	0.816	Valid
	X3.2	0.871	Valid
	X3.3	0.801	Valid
	X3.4	0.816	Valid
Social Influence	X4.1	0.902	Valid
	X4.2	0.885	Valid
	X4.3	0.809	Valid
	X4.4	0.892	Valid
Price Value	X5.1	0.826	Valid
	X5.2	0.884	Valid
	X5.3	0.851	Valid
Habit	X6.1	0.903	Valid
	X6.2	0.919	Valid
	X6.3	0.898	Valid
Behavioural Intention	Z1.1	0.935	Valid
	Z1.2	0.934	Valid
Usage Behaviour	Y1	1.000	Valid

Source: Primary data, 2024

Table 5 R Square Value (R2)

Variable	R Square
Behavioural Intention to use (Z)	0.787
Use Behaviour (Y)	0.794

Source: Primary data, 2024

identified. It confirms that the construct of Behavioural Intention to Use (Z) significantly influences the variable of Usage Behaviour (Y). Therefore, the hypothesis is accepted (supported). According to (Khan & Abideen, 2023), from their previous research, the same

hypothesis was confirmed and highlighted the construct of behavioural intention influences the usage behavior of e-wallet consumers.

The Effects of Effort Expectancy on Behavioural Intention. Based on the test results, hypothesis 2 (H2) shows that the original sample value of the Efforts Expectancy (X2) variable

against the Behavioural Intention (Z) variable is 0.209, which means that Efforts Expectancy positively affects the use of the Behaviour Intention. After that, the t-statistic value is 1.992 >1.96, which shows that the Effort Expectancy significantly affects Behavioural Intention until the second hypothesis is supported. Health promotion and sanitation studies have demonstrated how vital behavioural and social-cultural factors determine toilet adoption (Routray et al., 2015).

The Effect of Facilitating Conditions on Behavioural Intention: According to hypothesis 3 (H3) testing results, the original sample value of Facilitating Conditions variable on Behavioural Intention is 0.093. It indicates that, as long as the t-statistic value is 0.374 <1.96, Facilitating Conditions has no positive effect on Behavioural Intention. The fact that there is no significant relationship between Facilitating Conditions and Behavioural Intention indicates that the third hypothesis is not supported.

Though this hypothesis is not supported, literature highlights the positive relationship between Facilitating Conditions on Behavioural Intention in mobile health applications. According to Chen et al. (2024); Perdana & Abidin (2024), Facilitating Conditions positively influences Behavioural Intentions, so supportive conditions is vital in fostering desired behaviours.

The Effect of Habit on Behavioural Intention. The findings from the hypothesis 4 (H4) testing, as presented in Table 6, indicate that the Habit (X6) variable positively influences the Behavioural Intention (Z) variable, as the original sample value for Habit on Behavioural Intention is 0.553. The fourth hypothesis is accepted since the t-statistic value is 5.459 >1.96, showing that Habit significantly influences Behavioural Intentions. Habit necessitates the development of a first method that assists consumers know how to use innovation. Whenever an instructional method of this kind is successful, consumers have the impression that this technology is simple to operate. Consequently, this view encourages repetitious activity. A person's ability to use technology consistently increases as their familiarity grows.

The Effect of Performance Expectancy on Behavioural Intention: Refering to the testing results of hypothesis 5 (H5), Performance Expectancy (X1) does not positively affect Behavioural Intention (Z) (with a value of 0.011 in the original sample). Besides, the t-statistic value is 0.140 <1.96. Thus, the first hypothesis is not supported or rejected, meaning that Performance Expectancy (X1) has no significant impact on Behavioural Intention (Z). Though this hypothesis is not supported, previous research highlighted the existence

Table 6 T-Statistics and Path Coefficient Results

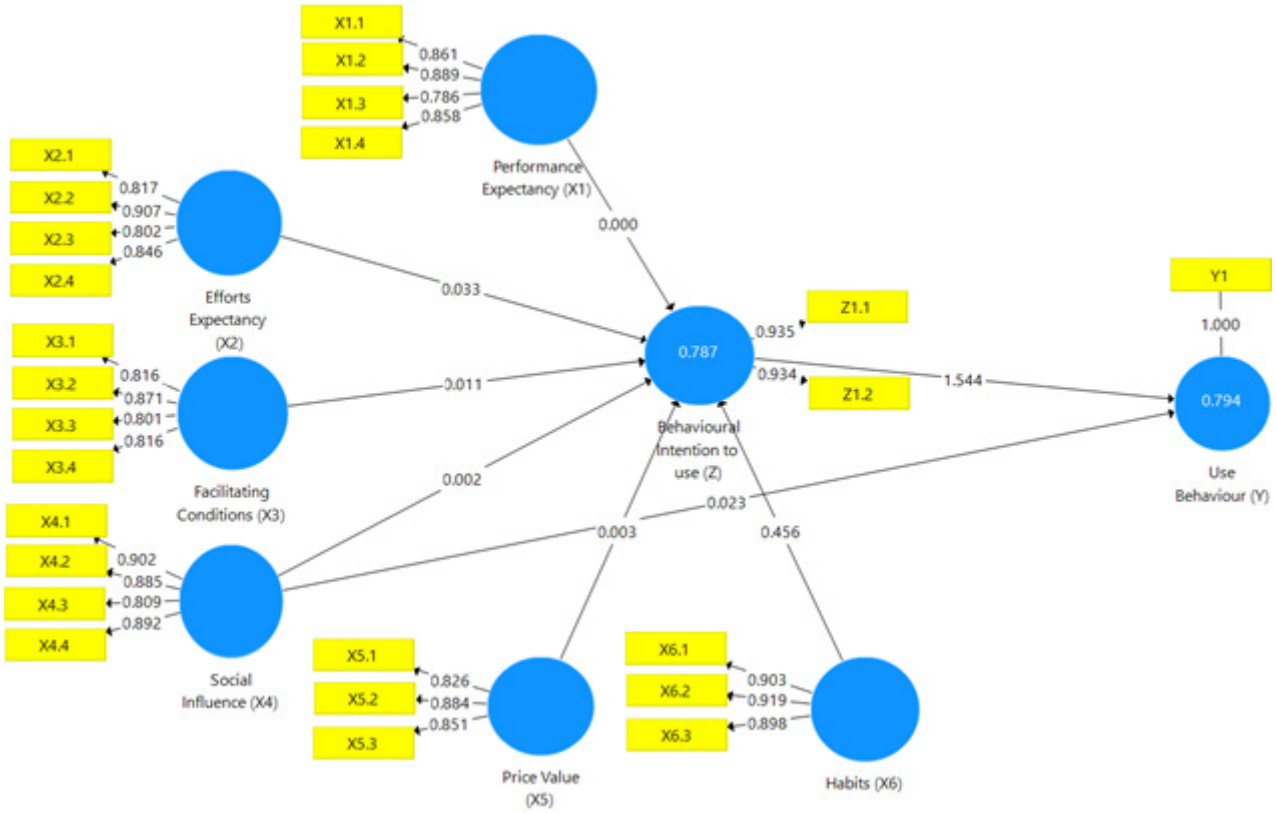
Hypotheses	Path	Original Sample	T-Statistics	Results
H1	Z ->Y	0.816	6.036	Accepted
H2	X2 -> Z	0.209	1.992	Accepted
H3	X3 -> Z	0.093	0.947	Rejected
H4	X6 -> Z	0.553	5.459	Accepted
H5	X1 -> Z	0.011	0.140	Rejected
H6	X5 -> Z	0.060	0.548	Rejected
H7	X4 -> Z	0.050	0.538	Rejected
H8	X4 -> Y	0.100	1.403	Rejected

Source: Primary data, 2024

of the relationship between these variables. According to Setyaningrum & Setyowati (2018), Performance Expectancy exerts a significant effect on Behavioural Intention when using a tax knowledge-based system.

According to the original UTAUT model, a person's behavioural intention to use technology is influenced by performance expectancy, and their actual behaviour is determined by facilitating factors and behavioural intention (Venkatesh et al., 2003). Because it combines eight powerful adoption models that frequently conflict or compete with one another, this theoretical model is regarded as one of the most complete models of technology adoption behaviour.

The Effect of Price Value on Behavioural Intention. The initial sample result from the testing process is 0.060, according to the data in Table 6, which describes hypothesis 6 (H6). However, since the T-Statistic is only 0.548, which is lower than 1.96, there is insufficient evidence to support (reject) the hypothesis that the price value (X5) influences behavioural intention (Z). Consequently, the hypothesis is also rejected. There is a need to carry out research using another approach as it has been highlighted in some previous research that there are other factors for the adoption of new products, especially innovative toilets, and it is in line with the Sustainable Development Goals (SDGs) for ending sanitation and health-related issues. Other studies have also highlighted the importance of demographic, social, and economic aspects in rural families in India, embracing green toilets for toilet adoption (Ali & Khan, 2024). Additionally, addressing socio-economic and environmental health determinants, interventions should concentrate on enhancing environmental sanitation, waste management, and health education to raise public awareness (Demartoto et al., 2023), so



Source: Primary data, 2024

Figure 2 Smart PLS 3 Structural Model Measurement Results

health-related issues can be avoided.

It is crucial to note that SATO Pan's affordability is essential for product adoption. This is evidenced by a study conducted in India, which showed that SATO Pan's toilets are well-received by communities, particularly in rural areas. The affordability and simplicity of installation are key factors contributing to the positive perception of SATO Pan's toilets. The study also highlighted the positive impact of SATO Pan's toilets on health and hygiene practices, with users reporting a decrease in the incidence of waterborne diseases (Mutuku et al., 2021).

For SATO Pan's adoption and use, literature indicated that price influences consumers' behavioural intention to purchase products or services. According to Kwee et al. (2022), price value positively influences Behavioural Intention to use m-health services, indicating that individuals' perceptions of the cost can affect their engagement with m-health solutions.

The Effect of Social Influence on Behavioural Intention: The Social Influence (X4) indicator does not positively affect the Behavioural Intention (Z) variable, as shown by the original sample value of 0.316 in Table 6, based on the test results of hypothesis 7 (H7).

Besides, the t-statistic value is 1.013, which is below 1.96, meaning that social Influence does not significantly effect Behavioural Intention. Therefore, the seventh hypothesis is rejected. Previous research has identified inconsistent correlations between Behavioural Intention and Social Influence, ranging from a significant relationship to a minor relationship that calls for more study (Leow et al., 2021).

The Effect of Social Influence on Use Behavior: Based on the test results in Table 6 for hypothesis 6 (H6), Social Influence (X4) has the original sample of 0.100. In contrast, the t-statistic for Use Behaviour (Z) is 0.1403, less than 1.96, which means there is no relationship between the two variables. Therefore, the hypothesis is not supported/rejected. Though this hypothesis is not supported, previous research revealed a relationship between the two constructs.

Social Influence has a significant impact on how people behave in different spheres. Research has demonstrated that Social Influence affects users' intentions and behaviour. In particular, social impact has significantly influenced users' intention to adopt Bitcoin technology and make mobile hotel reservations. Furthermore, it has been discovered that social influence mediates the connection underlying user behaviour and social presence.

Social influence significantly impacts consumer behaviour and the adoption of innovative products such as SATO Pan. Research has shown that social presence and norms influence individuals' willingness to adopt innovative products (Xu et al., 2019). When innovation is perceived as a social norm, the mere presence of others can increase the propensity to purchase innovative products. Moreover, social influences such as subjective norms and social factors affect consumers' intentions and behaviours regarding the use of innovative products (Lee et al., 2013). Furthermore, social influencers might motivate people to participate in interventions related to health behaviour within their social networks (Smit et al., 2022).

CONCLUSION

SATO Pan is crucial for sanitation and health promotion initiatives. This innovative latrine technology enhances sanitation facilities by reducing odors and flies and improving overall acceptability. It maintains a clean sanitary atmosphere, promotes community health, and stops disease transmission. Previous research has shown that improved sanitation facilities, such as those incorporating SATO Pans, significantly impact health outcomes. Studies have indicated that advancements in sanitation, including new technologies like SATO Pans, can

reduce the prevalence of diseases related to poor sanitation, such as diarrheal diseases. SATO Pans, focusing on odor and flies reduction, can create a more conducive learning environment by ensuring that sanitation facilities are clean and well-maintained.

Furthermore, implementing and accessing SATO Pan in sanitation facilities, particularly in healthcare settings and public spaces such as schools, markets, etc., is crucial for promoting health and preventing the spread of diseases. This innovative technology improves the physical environment by reducing odors and flies.

We recommend further studies to identify factors influencing the adoption and use of SATO Pan. They can focus on understanding the barriers and motivators for its adoption, examining demographic, socioeconomic, and cultural influences. Additionally, involving public and private organisations in promoting SATO Pan usage is novel. This collaborative effort can enhance awareness and education on the health and sanitation benefits, contributing to improved public health outcomes and effective sanitation practices.

This research was conducted in the Capital City of Kigali region with a limited space and time. It is a severe barrier as well. Thus, further research can include more rural locations. As such, this setting may not accurately reflect Rwandan users of SATO Pan. Using the identical methodology, more research can be conducted in several cities and rural locations with the participation of commercial companies such as SATO. This strategy can support businesses and governmental organisations in resolving Rwanda's problems with open-pit latrines' negative health effects and sanitation implications.

Furthermore, each user's behavioural intention may be impacted by additional variables, such as culture, purchasing power, or other variables that the longitudinal research approach may be able to identify. The organisation must prioritise the service's value to ensure that the price accurately reflects the advantages since price value substantially influences behavioural intention.

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