

# Toilets, Tourism & Technology

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## Abstract

Sanitation and toilets are of paramount importance for tourists, playing a pivotal role in ensuring a safe, comfortable, and enjoyable travel experience. Access to clean and well-maintained restroom facilities is not only a matter of convenience but also a fundamental aspect of public health and tourism sustainability. Inadequate sanitation can lead to health risks and discomfort for tourists, potentially impacting their overall travel satisfaction. Moreover, the availability of proper sanitation facilities influences a tourist's perception of a destination's hospitality and infrastructure. This paper scopes out current research themes which include how toilets affect the tourism experience, the appropriate location of toilets for tourists' use and good practice of design, as well as highlighting instances where toilets have become a tourist attraction. We note how technology can be used to address sanitation issues and waste water management and finish with suggested future research topics.

## Keywords

Sanitation, technology, toilets, public health, waste management

## 1. Introduction

Bathroom, restroom, washroom, lavatory, men's room, ladies' room, latrine, WC (water closet), loo or toilet. Everyone needs to go to the toilet. Being on holidays is no exception. Even when traveling on holidays. And maybe especially when you are on holidays.

Sanitation and hygiene are important for sustainable tourism development. Hutton [1] notes the World Health Organization estimates that poor sanitation annual global costs are \$US 260 billion. Loehr, Dwipayanti, Nastiti, Powell, Hadwen and Johnson [2] highlights that access to water, sanitation and hygiene (WASH) contributes to the health, environmental and community benefits to tourists, hospitality employees and the wider community, resulting in safer destinations, healthier staff and happier tourists. Naumov, Varadzhakova and Naydenov [3] notes that, especially in the context of the COVID-19 pandemic, Bulgarian tourists do not generally trust the sanitation measures and cleanliness at rented places and there is an overall agreement that family-owned apartments and second homes would provide the best hygiene and sanitation comfort. Yet, health and hygiene are of crucial importance for many tourists in choosing a destination [4].

Much of the extant research tends to focus on broader issues of sanitation and hygiene and resultant ailments [5], rather than the experience itself. Given the importance of everyone needing the toilet, but possibly due to being a taboo subject, it is surprising there is little research into tourists' perceptions of the toilet experience, how sanitation affects the tourist experience, the cultural differences in using the toilet while travelling, public health and waste management for tourists, and how technology impacts tourists' toilet experience.

This research reviews academic literature on the different ways toilets impact the tourism experience and how technology can contribute to improving that experience. We identify eight different but related topics concerning toilet tourism. Issues to be addressed by research are both

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supply driven, such as sustainable sanitation solutions for tourism destinations, accessible tourism and inclusive toilet facilities, public health and hygiene in tourism toilets, waste management in high-traffic tourism areas, toilet design and architecture in tourism, and smart toilet technology and enhanced tourist experiences. Other topics are more demand-focused: toilet facilities' impact on destination choice, tourists' perceptions of sanitary facilities, cultural differences in toilet etiquette and tourism, and behavioral studies and toilet usage in tourist sites. Lastly, there are issues that pertain to both the demand and supply side of tourism, namely, promoting hygiene education in tourism and the economic impact of toilet infrastructure in tourism. This scoping study suggests several possible streams of research. These topics offer a range of perspectives to explore the relationship between toilets and tourism, touching on sustainability, accessibility, cultural considerations, public health, technology, design, and economics. To date, there has not been coverage of this vital topic.

## **2. Toilets as a proxy for development**

The construction of toilet facilities is perceived as a symbol of regional development [6]. The People's Republic of China's President Xi instituted a "toilet revolution" in 2015 whereby significant investment was devoted to installing sanitary toilets [7]. The goal of the toilet revolution was to retrofit 100% of rural toilets by 2030 [7]. In 2015 the China National Tourism Administration launched the 1st National Tourism Toilet Design Competition. Improved sanitation and hygiene benefits tourists, local communities and tourism and hospitality workers [8].

## **3. Tourist Experience**

Sufficient and good quality toilet facilities impact tourists' destination choice, destination image and the tourist experience. Destinations recognize the importance of clean toilet facilities. Singapore launched a Happy Toilet program in 2003 while Malaysia instituted a toilet revolution in 2006 to address the poor hygiene and dirty facilities [9]. Indonesia's Ministry of Culture and Tourism conducted a Clean Public Toilet Competition in 2019 which targets improving public toilets in commonly frequented areas used by tourists including airports, zoos, museums and public transport stations [10].

International tourists often complain about the condition of public toilets, especially in developing countries, where there may not be the resources to provide the upkeep of these facilities. Sunarsa and Andiani [10] examine the perceptions of tourists regarding the cleanliness of public toilets in Bali. Sampling ten users across twenty different public toilets in the destination, they find that tourists find the toilets dirty and smelly with no soap or toilet paper available. On a 5-point Likert scale the average rating was 2.18 out of 5 across a range of attributes covering cleanliness, lighting, odor, functionality and signage. Along similar lines, [11] survey users of public toilets in the tourist Daoming bamboo art village in Western Sichuan Province. They find that while the surrounding countryside is aesthetically beautiful, this contrasts with the public toilets which tend to be dimly lit and lack privacy. Toilet cleanliness is extremely important among certain tourist groups including Muslims who require water-friendly facilities [12].

## **4. Tourism Toilet Logistics**

It was estimated that an international tourist uses a public toilet eight times, on average, on their visit to China. Multiplied by the number of international tourists to China, this equates to 1.07 billion toilet-stops in 2015 [13]. Hence the proximity of toilets to tourist attractions is an important planning issue. Public toilet site selection is an important issue [14]. Oman's Ministry

of Tourism used GIS to propose future public toilet sites, taking into considering the location of existing public toilets and existing tourist attractions.

“Good” public toilets are characterized as clean and dry with adequate ventilation, easy to clean, and accessibility-friendly for people with disabilities. Bu [8] highlights aspects of China’s toilet revolution, which would include tourism toilets that would be star-rated based on the following criteria: 1) design and construction, 2) adaptability to special user groups, 3) toilet seats and urinal designs, 4) hand cleaning facilities, 5) discharge and excrement treatment, 6) toilet settings, 7) bilingual signage, and 8) management.

Sun, Wang and Niu [15] find layout planning, basic function, detailed design, toilet culture, use of science and technology, and management are positively correlated with tourist satisfaction. The toilet facilities need to be in alignment with the style and atmosphere of the tourist attraction, otherwise, this will lead to low satisfaction with the tourist experience, as in Robben Island Museum in South Africa [16].

Higher standard eco-toilets can benefit the environment by efficiently treating the wastes and producing less footprint [17]. Technology can be used to reduce tourists’ waste. Ali, Lintang Lestari and Dyasthi Putri [18] show how the design of an eco-friendly toilet in conjunction with recycling cycle of water, rain water, and wastewater treatment facility can result in using only 20% of the current water usage.

## **5. Toilets as a tourist attraction**

While the bodily function of using the toilet is considered taboo in many cultures, several entrepreneurial restaurant owners have opened toilet-themed restaurants [19]. Lonely Planet, the guidebook producer, has published a coffee-table book showing more than 100 toilets from around the world with incredible views, luxury lavatories and outstanding outhouses. The International Toilet Tourism Awards were established so that tourists could nominate the most thoughtfully designed public toilets available to tourists [20]. Toilets can also be a tourist attraction in and of themselves. In Foshan, China, artist Shu Yong spend two months installing public art, in the form of a fountain built out of 10,000 recycled toilets. Originally designed for the 2009 Foshan Pottery and Porcelain Festival, it is now a permanent piece of public art [21]. Other toilet-based tourism attractions include the Sulabh International Museum of Toilets in India [22], the oldest toilet in Paris [23], George Washington’s toilet in Virginia [24], also in the USA is Barney Smith’s Toilet Seat Art Museum in Dallas [25], while the UK has both London Loo Tours [26] and the National Poo Museum located on the Isle of Wight [27].

## **6. Toilets and Technology**

Technology can be used to achieve health benefits for tourists and residents alike. Various technological innovations can elevate sanitation standards. Advancements in sensor technology enable real-time monitoring of toilet usage, aiding maintenance and ensuring cleanliness [28]. Smart toilets equipped with automated cleaning mechanisms reduce water wastage and enhance hygiene. Furthermore, decentralized sanitation systems, such as self-contained off-grid toilets, offer solutions for remote areas lacking traditional infrastructure [29]. These systems can be particularly useful in rural areas. The integration of renewable energy sources into sanitation systems not only reduces carbon footprint but also ensures uninterrupted service in resource-scarce regions, potentially contributing to sustainable rural tourism development. Additionally, data-driven approaches enable efficient waste management and resource recovery from human waste, contributing to circular economies [18]. In essence, sanitation and toilet facilities are not mere amenities but vital components that significantly contribute to the overall appeal and success of a tourist destination, making them indispensable for the tourism industry.

## 7. Future Directions

Given the scant existing research on this important topic, we propose the following areas of potential research:

Policymakers destination management organizations would be particularly interested in sustainable sanitation solutions for tourism destinations, where researchers would investigate innovative and eco-friendly toilet technologies that can be implemented in popular tourist destinations to minimize water usage, reduce environmental impact, and promote sustainable tourism. Additionally, they would be interested in feedback on public health and hygiene in tourism toilets to examine the hygiene practices and sanitation measures in place in public toilets of tourist areas, assessing their effectiveness in preventing the spread of diseases and promoting the health of both tourists and local communities.

Waste management in high-traffic tourism areas is an important area for research, where studies could be conducted to study the challenges and solutions associated with managing and disposing of waste generated by tourism activities, with a focus on the proper handling of toilet waste in crowded tourist spots.

Given the important characteristics of toilet design, further research is needed to analyze the architectural and design considerations that go into creating aesthetically pleasing, functional, and culturally appropriate toilet facilities in tourist destinations, contributing to the overall ambience of the place. Related to this is smart toilet technology which might enhance tourist experiences. Researchers could explore the integration of smart technologies, such as Internet of Things (IoT) sensors and data analytics, in public toilets to enhance the tourist experience by providing real-time information about toilet availability, cleanliness, and other amenities [30].

From the demand side, tourist perceptions of sanitary facilities is a topic to be explored to understand how tourists perceive the quality and cleanliness of public toilets in different tourism sites, and analyze the impact of these perceptions on their overall travel experience. Further, cross-cultural research could be undertaken concerning differences in toilet etiquette among tourists. Varying cultural norms and etiquettes surrounding toilet use impact tourists' experiences and behaviors, and strategies could be examined to bridge these cultural gaps for a more inclusive tourism environment.

The accessibility of toilet facilities in tourist destinations for people with disabilities is an important topic to investigate [31]. Research could uncover strategies to improve inclusivity and accommodate diverse needs in tourism infrastructure while it would be important to test the awareness of hygiene education among different tourism stakeholders, in particular to understand the importance of proper hygiene practices in public toilets, which can contribute to the overall cleanliness of tourist destinations.

As noted above, toilet facilities' impact on destination choice and the availability and quality of toilet facilities can influence tourists' decisions when choosing travel destinations. More research is needed in this area when can then be used to estimate the potential economic implications for regions that prioritize superior sanitation infrastructure, increased tourist satisfaction, longer stays, and positive word-of-mouth recommendations.

Lastly, behavioral studies on toilet usage at tourist sites will shed light on how tourist behavior, such as toilet usage patterns and habits, is influenced by factors like crowd density, availability of facilities, and cultural norms. One question which might arise is: at a macro-level, do the countries with more international tourists have a higher level of public toilets? To address this question, we use World Bank data for international tourist arrivals, as well as population, and GDP per

capita. The database for the number of public toilets is obtained from Toilet Finder which lists the number of public toilets by country.

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