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ARTICLE

# Urban Public Toilets Management in Tanzania: Understanding Cost-effective Approaches

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ABSTRACT

Cost recovery and user satisfaction are among the core objectives of any public or quas-public good provision. Public toilet service provision has been the domain of local government until when liberalisation policies struck the developing south. With stringent condition to reduce the fiscal burden, local government authorities have sought to offload some of its core functions including the management of public toilets to contracted firms. Based on regression and comparative quadrant analysis, this study evaluates cost recovery and user satisfaction in relation to public toilet condition based on a total of 729 user responses and 31 public toilet operators. The observations point to misguided decision to place public toilet management under contracted firms instead of placing then under Public Private Partnership (PPP). The decision to place public toilets management under private contract or individual contract is only secondary to PPP if the focus is to achieve both cost recovery and user satisfaction. However, if the focus was to achieve only cost recovery regardless of the need to protect users, then the decision would have been well founded but can be conspired inappropriate in as long as public toilets remain the domain of public good.

## 1. Introduction

Dar es Salaam is the largest city in Tanzania. The city may as well be regarded as a commercial hub of Tanzania. Given its importance, it is often assumed that the situation of public services such as roads, schools, hospitals and public toilets are generally better than elsewhere in the country [1]. Public services such as toilets are generally available for people who attend public areas such as markets and bus terminals [2]. The provision of clean, safe, accessible public toilets affects all residents and visitors in those areas, and plays a major role in building the image of a city or its neighbourhood [3]. In Tanzania, however, sanitation particularly public toilets have been treated as a household good rather than a public good [4]. While there are no statutory requirements or plans, it may generally be considered that Municipalities in Dar es Salaam City have an obligation in the provision of public toilets. This is so because as with many other developing cities, most of the public toilets in Dar es Salaam are owned by municipalities while the operation is outsourced to independent companies or operators [5]. This

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management structure gives the Municipalities limited operational influence, thereby presenting a number of administrative challenges, including limitations associated with contract enforcement.

The major argument raised in this paper is that given the current condition of many public toilets, it is questionable whether the existing management approaches are compatible with both cost recovery and user satisfaction. This is observable in many public toilets that although are located in prime areas such as markets and bus terminals they are still in a very poor condition. The condition may as well reflect non-compliance to the terms and conditions stipulated in the outsourcing contracts. Additionally, the provision of public toilets to consumers/citizens entails a cost both in terms of initial capital outlay and in terms of ongoing operation, maintenance and management. However, if there is poor management to achieve cost recovery of services delivered, it is questionable on whether public toilets can fully recover all the costs including routine operation and maintenance [6]. This could probably be one of the reasons why some public toilets in Dar es Salaam are unsanitary. However, given the scanty literature on these aspects, it is still not clear whether approaches adopted for the management of public toilets are cost effective in terms of user satisfaction and cost recovery when considered simultaneously.

## 2. Management Approaches of Public Toilets

There are different forms of management of public toilets. Ayee, et al [7] from Ghana and Stirling Council [8] of Scotland, suggest that there are basically four management systems used to manage the operation and maintenance of public toilet services. Firstly, the public control, which entails a direct provision of public toilet services by a public body i.e. the central government or a municipality. The major shortfall of public control is the lack of effective supervisory mechanisms [6]. Another criticism to this approach is the need to have sufficient human and financial resources to allocate staff to the running of toilets. The second is the community management approach, which operates like a direct public toilets management. Public toilets are managed by a committee of public officers of the local authority and community representatives, referred to as Toilet Management Committee (TMC). The third approach is the Franchise management. This approach is part of the delegation approach. This is to say, the local authority could farm out operation and maintenance to a duly registered limited liability company whether sole ownership or partnership, and operating under terms and conditions set out in an agreement between the two parties. According to Dada, et al [9], the advantage of this system is that the local authority can discharge its responsibility to provide public toilets with no drain on its resources, but rather receiving an income (franchise fee). However, Ayee, et al [7] pointed out that fully franchising the toilets will certainly deprive them of funds unless there is a policy to ensure that the private contractors pay a percentage of their proceeds to the local authorities.

The last form of public toilet management is the Comfort Partnership Scheme (CPS). This is a way of providing a public toilet service using a Public/Private Partnership agreement. According to Stirling Council [8], most of the local councils in England, like Stirling Council, Perth and Kinross Council, Fife Council, and Highland Council, are managing and operating public toilets through the implementation of a Comfort Partnership Scheme (CPS). This system has been proved to provide an excellent example of using an innovative approach to Public Toilet provision. This system is quite similar to the Public - Private system which is commonly used in many public service delivery in Africa and Tanzania in particular. The common denominator of this approach is the pooling of resources (financial, human, technical and intangibles, such as information and political support) from public and private sources to achieve a commonly agreed social goal [10]. In Dar es Salaam City, all the three municipalities (i.e. Kinondoni-including Ubungo, Temeke-including Kigamboni, and Ilala) use some sort of Public-Private Systems [5] in service delivery. However, the methods used for selection and contract agreement with the operator (private) are often inadequate. Besides, the respective obligations of the operator and the delegating authority (the Municipality) are not properly defined. Furthermore, there is no performance criterion or incentive measures to private to operators. There is also very little or no public authority control, leading to little benefits being realized by the government and the wider community from public toilet management practices.

## 3. A Conceptual Framework on Cost-effective Management Approach

The conceptual presentation of the core relationships that are central to this study are presented in Figure 1. The figure portrays the cost effectiveness management approach as the intersection of user satisfaction and cost recovery i.e. a grey portion at the centre. User satisfaction is an important factor in the management of public toilets [11]. It is therefore natural that a responsible unit in managing public toilets should be concerned about customer satisfaction as their first priority because of its expected influence on sustainability of service delivery [12]. Frantzen [13] noted

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that it is important to have a clear understanding of comfortability, usability, privacy, convenience and information as important determinants of user satisfaction. The users of the public toilets services get accessibility to the toilets after payment of a certain amount of user fees or charges, being directed or having followed certain signals towards the toilets [13]. Upon satisfaction that the toilets are usable in the sense that the facility functions well, the user needs a sense of comfortability and privacy including feelings of security of his/her personal and belongings [14]. These perceived indicators of user satisfaction tend to contribute towards cost effective managements of public toilets [12]. The direction of effect is however not predetermined but it is envisioned here that the efforts to increase user satisfaction tend to increase both investment and operating costs leading to negative effect on cost effectiveness [15].

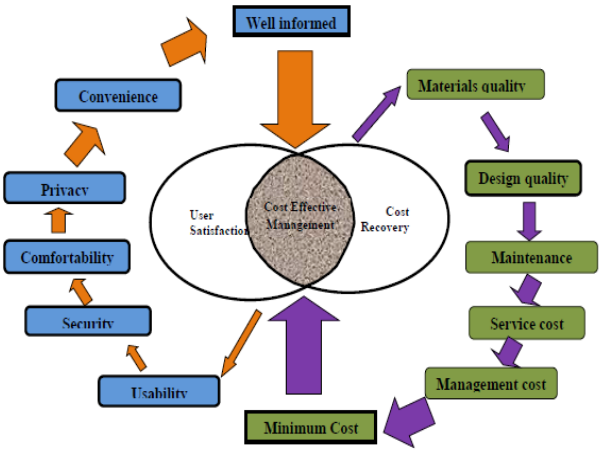


Figure 2: Conceptual framework
Source: Prospective Researcher (2015)

**Figure 1.** Conceptual framework

***Source:*** Researchers construction based on the literature review (2019)

Unlike the interest of users [8], public toilet operators or managers are seriously concerned with the investment and operating costs [16]. Managers would like to minimize costs with cost recovery in mind. Inputs in cost minimization include cheaper but durable materials, simple design and lower operating costs [17]. Easte, et al [18] define cost recovery as a mechanism for pricing access to a "public good" in order to recoup all or some of the costs incurred by the public organization in charge of the good i.e. public toilets. Water Partnership Program [16] defines cost recovery as the recovery of some or all of the costs of a particular activity. KPMG, et al [19] notes that cost recovery can promote more efficient use of public resources by reducing frivolous demand often associated with public services. Alananga [20] classifies cost recovery for the provision of cadastral products into three regimes; (1) full cost recovery with profit, (2) partial cost recovery and (3) non-cost recovery regime. For practical purposes, cost strategies can be classified into four classes [19]. The provider of services aims to recover only a (1) proportion of its development and operational costs; (2) to recover the full cost including fixed costs; (3) planned growth cost recovery; and (4) recover operating cost with profit. The financing of all recurrent expenses of public toilets can be linked to partial cost recovery. Cardone, et al [21] argue that the expenses that are considered recurrent may include; the provision of consumable items (i.e. including utility bills), any possible remuneration of staff employed (i.e. cleaner, cashier, operator), emptying, if the toilet is not connected to the sewerage system (which could significantly reduce operating costs), repairs and rehabilitation, the payment of rent, the lease or the license.

An important factor in cost-recovery is the setting of adequate standards of service. [21] and [2] have shown that users of public toilets are willing to pay for good quality services and are prepared to pay increased costs for improved services in terms of quality service delivery and supply continuity. However, where public toilet delivery services are poor, the collection of revenue is difficult and costs are rarely recovered. In some situations, users may be unwilling to use public toilets from a toilet whose service quality is poor and whose costs are high. In turn, they resort to other unacceptable options such as the use of unimproved pit latrines. Under these conditions, it is worth investigating in the best management approaches that are aligned in favour of cost recovery and user satisfaction. The management approaches that favour both user satisfaction and cost recovery are considered in this study as cost effective.

The cost effective component of any public toilet management approach has to reflect an element of sensitivity to full cost recovery of service supply costs while guaranteeing users an adequate amount of user satisfaction [22]. Cost is measured as the amount of money spent, whereas effectiveness is measured as changes in users' behaviours, thoughts or feelings [23]. There is, however, no single standard for cost effectiveness measure. Generally, the term is used loosely as a way of saying that something probably costs less, or is more effective, than something else [24]. Consequently the overall cost effectiveness of a public toilet can be improved by considering which components of the public toilet contribute most to effectiveness and discovering which of the components have the lowest cost [23]. Cost effectiveness of public toilets may be enhanced by the use more effective and less expensive items while decreasing use of less effective and more expensive items [6]. However, cost effectiveness indicators vary over time and over public toilets' users because of many factors.



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Studies on cost effectiveness allude to a number of factors that can improve services delivery. These factors include user satisfaction and cost recovery.

## 4. Research Approach

### 4.1Sample Size and Sampling Technique

The actual number of potential public toilet users in the three municipalities is not known and therefore the expected sample size for any interview depends on the number of toilets that were identified and included in the sample. On a-priori bases it was not possible to use standard sample size estimation techniques to obtain the sample size. This means that the data collection phase was preceded with a survey of owner/operator of a public toilet to obtain a glimpse of public toilet use in the municipalities. The number of respondents among public toilet workers was fixed to at least two, the maximum being determined by the number of formal and informal employees in that toilet. These included cleaners, security guards and fee collectors. The data on a daily use of toilets determined the sample size needed for public toilet users. The toilets with fewer customers are therefore expected to have a limited number of respondents compared to those with many customers. Generally, since the methods of analysis are based on the probabilistic measures, a larger sample was expected for each category of respondents.

The actual strategy adopted in this study can be considered quantitative. In the initial phases however, for each toilet, responsible service providers were interviewed. Whenever possible all workers of each toilet identified were interviewed. The data in these interviews were however coded and included in the survey dataset. This makes a separate analysis of interviews irrelevant as such they are not presented separately. The focus of the interviews was to gather information relating to condition of toilets, user charges and willingness to improve service delivery, daily operations and revenue collection. The motivation behind this is to establish the levels of cost recovery for each toilet. These suppliers were interviewed in order to probe on the information pertaining to user satisfaction attributes. This is important for assessing whether services delivered are customer sensitive or otherwise. In the second stage, questionnaires were administered in a site based survey. This targeted public toilet users and lastly, tallying was carried out to evaluate frequenting and ultimately to allow the computation of potential cost recovery levels for each public toilet.

### 4.2 Questionnaire Design and Administration

The interview with toilet operators informed the researchers of the core variables in the relationship between use and provision of public toilet services, a questionnaire was designed to encompass these core variables. Both closed ended and open ended questions were included in the questionnaire with a core focus on open ended questions. To gauge the level of cost recovery of public toilets, the preliminary interviews suggested major diversities among operators, on the quality and amount of facilities and services provided in public toilets. As such, the questionnaire for operators comprised the following parts: In the first part, introductory part of the questionnaire, the information about the respondents was included including age, education and economic situation. The section also included information about the toilet for which the operator was responsible. This information sought included the toilet identifier in terms of a common name used and the management approach used. This information was useful during clustering and tracing opt reasons for diverging levels of satisfaction as well as cost recovery of public toilet. The second part of the questionnaire comprised of 5 questions on operational procedures including cleanliness, maintenance planning and operational budgeting. The purpose was to establish costs associated with public toilet management and quality of services. The third part of the questionnaire comprised only one question and required the operator to provide an overall evaluation of the condition of the toilet for which he/she was responsible for its management. This was based on a set of predefined criteria. The last part of the questionnaire also had a single question on satisfaction whereby the operators were required to rank their satisfaction levels based on a number of predefined criteria.

A similar instrument was designed for users of public toilets. In the first part of the users' questionnaire personal particulars were asked mainly on age, social and economic situation as well as occupation. This information, as noted in the operators' questionnaire, intended to provide answers to significant deviation in user satisfaction with regard to public toilets. The second part of the questionnaire solicited information about the user status with regard to a nearby toilet. This was necessary in order to group users based on their respective relative importance of use of public toilets. The third part had only one question which focused on user's evaluation of the condition of the toilet. This provided an important check on the answers provided by the operators on a similar question. The fourth part asked a question on willingness to pay for public toilet services. This question was important in the attempt to establish the prospect for improving public toilets services based on market approaches. Like the operators questionnaire, the last part of the questionnaire asked users about

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their satisfaction levels with the public toilet services.

### 4.3 Data Analysis

The computation of the level of user's satisfaction and cost recovery across management approaches was analysed in order to understand:

(1) The level of user satisfaction and the actual and potential cost recovery in relation to different management approaches; and

(2) The cost effective public toilet management approach that maximises both user satisfaction and cost recovery.

The overall level of satisfaction is evaluated based on the relative importance index which is constructed based on equation 1. The Public Toilet Satisfaction Index (PTSI) measures the level at which a user of public toilet services is satisfied upon being a user of a particular toilet. Based on the questionnaire, PTSI is aggregate variables that are computed based on a number of other variables that characterised public toilet services. The proportions of satisfaction items for which a user assigned a satisfaction score out of the total possible score for that item provide the probability at which a user was satisfied with public toilet use. However, since that is inadequate to provide some generalisation over the full sample, it is divided by the overall probability that a user in the sample would be satisfied. This indicator simply measures how far in the satisfaction scale is a particular user from the imaginary average satisfaction level in the sample.

$$PTSI = \frac{\text{Satisfaction score by individual } i/\text{Maximum satisfaction score for individual i}}{\text{Satisfaction score for all users/Maximum satisfaction score for all users}} = \frac{SS_i/MSS_i}{\sum_{i=1}^{N} SS_i \Big/ \sum_{i=1}^{N} MSS_i} \quad (1)$$

The actual cost recovery for each public toilet user is based on the cost recovery information provided by the operator and thus all users of a particular toilet will face a uniform cost recovery index. The Cost Recovery Index (CRI) is computed as the ratio of revenue over operating cost. The indicator is further standardised to the average cost recovery level across public toilets. Furthermore, for each toilet a Potential Cost Recovery Index (PCRI) is computed based on the average willingness to pay of all respondents who are connected to that toilet. The computation is similar to CRI as provided in equation 2.

$$CRI = \frac{\text{Monthly Revenues for toilet t/Monthly Operating Cost for toilet t}}{\text{Monthly Revenues for for all toilets/Monthly Operating Cost for all toilets}} = \frac{MR_t/MOC_t}{\sum_{t=1}^{T} MR_T \Big/ \sum_{t=1}^{T} MOC_t} \quad (2)$$

Having established both the level of user satisfaction and cost recovery, an analysis into their respective determinants is carries out. The focus here is to generate an understanding of the core determinant of user satisfaction in public toilet and whether these are in any way connected to the type of management implemented at a particular toilet. Similarly for cost recovery, the actual and potential level of cost recovery may be shaped by both the personal characteristics of the respondents and the toilets but more importantly the management approach. These two analyses are based on logistic regression which for PTSI is presented as in equation 3;

$$PTSI = \log\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 X_1 + \ldots + \beta_k X_k \quad (3)$$

The quantity on the left hand side of the equation $\log\left(\frac{p}{1-p}\right)$ is the "linear predictor" of the log odd of the outcome given the values of $k$ explanatory variables $X_1$ to $X_k$. The $\beta$'s are the regression coefficients associated with the $k$ explanatory variables. $PTSI$ was evaluated based on the variables defined in Table 3.2, the $X_i$ are the independent variables one of which is a dummy variable to capture the different management approaches and other $X$ s are the attributes of the public toilets and the users.

Equation 3 can be written in terms of the probability that a public toilet user will be satisfied with public toilet services as in equation 4:

$$p_i = \frac{\exp(\beta_0 + \beta_1 x_1 + \ldots + \beta_k x_k)}{1 + \exp(\beta_0 + \beta_1 x_1 + \ldots + \beta_k x_k)} \quad (4)$$

where $p_i$ is the probability of being satisfied with public toilet services by user $i$; $\beta_k$ are the $k$ coefficients of the explanatory variables considered as determinants of the probability for public toilet satisfaction $p_i$ and $x_k$ are the $k$ independent variables. A similar approach was employed to evaluate cost recovery in terms of CRI.

### 4.4 Evaluation of Cost Effectiveness in the Management of Public Toilets

The final analysis was carried out to determine the combined effect of user satisfaction and cost recovery on management approaches. The assumption here is that municipalities can choose from a pool of management approaches the ones that maximizes both user satisfaction and cost recovery. To achieve this, a four quadrant analysis or importance-performance based on five public toilet management approaches was utilized in order to classify responses in terms of the effectiveness indicators for public toilets management approaches as explained in the conceptual part of this paper.



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**Table 1.** Four quadrant analysis of cost effectiveness in public toilet management approaches

| | | Operator Satisfaction Category | |
|---|---|---|---|
| | | **Low** | **High** |
| **Cost Recovery Category** | **High** | **(C =3 {users} or C= 2 {operators})** Operator-based management approach/es | **(A = 4)** Best Cost effective management approach/es |
| | **Low** | **(D=1)** Weak Cost ineffective management approach/es | **(B =2 {users} or B =3 {operator})** User-based management approach/es |

The findings from the logistic regression analyses form the benchmarks upon which the cost effective quadrant analysis was designed and interpreted. Given the problem of missing data it was found necessary to devise a simpler technique to evaluate the management approaches especially based on counts rather than the restrictive logistic regression results. The final cost effective decision is therefore based on the following computation of log odd of responses on the different management approaches.

The Relative Operators' Effectiveness Indicator (ROEI) is defined for each management approach as the degree at which a public toilet operator under that management approach is more likely to consider that users as being satisfied with services offered and that the public toilet revenues are adequate to recoup operating costs. For the purpose of user satisfaction, the ROEI is computed as the number of responses falling under "high user satisfaction" over those falling under "low user satisfaction" for each public toilet management approach. To obtain "high" or low levels of user satisfaction, the cut-off point along the probability of satisfaction computed based on equation was the median value (high = median PTSI and above and low = below median PTSI). For the purpose of cost recovery, the ROEI is computed as the number of responses falling under "high cost recovery" over those falling under "low cost recovery" for each public toilet management approach. To obtain "high" or "low" levels of both user satisfaction and cost recovery, the cut-off point along the probability of PTSI and PTCRI which were computed based on equation 4 was the median value (high = median PTSI/PTCR and above and low = below median PTSI/PTCR). A similar approach was employed to compute the Relative Users' Effectiveness Indicator (RUEI) which is defined as the degree at which a public toilet users obtaining services from a public toilet under a particular management approach is more likely to be satisfied with the services offered than being otherwise and that the public toilet costs are considered to reflect operating costs. The overall Relative Effectiveness Indicator (REI) was then computed as an average of the satisfaction indices as evaluated by both users and operators for each management approach to populated the different quadrants of Table 1. According to the four quadrant analysis, REI was used to classify all the management approaches into the four quadrants:

(a) Management approach which has high cost recovery and low satisfaction was referred as Operator-based approach which is most likely to satisfy operators need for high cost recovery levels. The response level was weighted as 2 for operators or 3 for users as operator are likely to give more weight to cost recovery.

(b) Management approach with high cost recovery and high satisfaction.This was highly considered approach to be a high cost effective management approach because is most likely to satisfy both operators and users. The Response level was weighted at 4.

(c) Management approach with low cost recovery and low satisfaction was considered to be Ineffective cost management approach as is not likely to satisfy both users and operators.The responses were weighted at 1, suggesting the lowest level of cost-effectiveness.

(d) Management approach with low cost recovery and high satisfaction is termed as user-based cost effective management approach as it is most likely to satisfy users need for high satisfaction levels. The response level was weighted at 2 for users and 3 for operators assuming that users are more interested with maximisation of user satisfaction than operators.

## 5. Findings and Discussion

### 5.1 Description of Respondents and Toilets

The profile of respondents in this study was as presented in Table 2. The age distribution of operators and users revealed that out of the 37 operators and 757 users surveyed, majorities diverging levels of user and operator satisfaction as well as cost recovery of public toilets across municipalities are established and presented, with those below 30 years making up 21.62%. Meanwhile, public toilets users within the same age group accounted for 45.71% of respondents. Within the age group of 30-39 operators of public toilets accounted for 32.43% and users accounted for 29.46%. The respondents belonged to an age group that could be regarded as the youthful adults that falls within the working age bracket. These categories of adults are strong and active to engage in all economic activities. Generally, it can be argued that the age structure of respondents were matured enough to understand the subject matter under investigation, hence could provide reliable information.

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**Table 2.** Respondents demographic data

| Variable | Frequency | Percent | Variable | Frequency | Percent |
|---|---|---|---|---|---|
| **Age Group of Operator** | | | **User Age Group Category** | | |
| **Below 30** | 8 | 21.62 | **Below 30** | 346 | 45.71 |
| **30-39** | 12 | 32.43 | **30-39** | 223 | 29.46 |
| **39-50** | 11 | 29.73 | **39-50** | 134 | 17.70 |
| **Above 50** | 3 | 8.10 | **Above 50** | 47 | 6.21 |
| **Missing** | 3 | 8.10 | **Missing** | 7 | 0.92 |
| **Total** | **37** | **100.00** | **Total** | **757** | **100.00** |
| **Operators Occupation Category** | | | **User Occupation Category** | | |
| | Frequency | Percent | | Frequency | Percent |
| **Others** | 15 | 40.54 | **Crafts** | 138 | 18.23 |
| **Operator** | 15 | 40.54 | **Business** | 452 | 59.71 |
| **Supervisor** | 4 | 10.81 | **Others** | 128 | 16.91 |
| | | | **Professionals** | 33 | 4.36 |
| **Missing** | 3 | 8.10 | **Missing** | 6 | 0.79 |
| **Total** | **37** | **100.00** | **Total** | **757** | **100.00** |
| **Operator Gender** | | | User Gender Category | | |
| | Frequency | Percent | | Frequency | Percent |
| **Male** | 13 | 35.14 | **Male** | 260 | 34.35 |
| **Female** | 22 | 59.46 | **Female** | 484 | 63.94 |
| **Missing** | 2` | 5.40 | **Missing** | 13 | 1.72 |
| **Total** | **37** | **100.00** | **Total** | **757** | **100.00** |
| **Operator Education** | | | **User Education Category** | | |
| | Frequency | Percent | | Frequency | Percent |
| | | | **Degree or higher** | 25 | 3.30 |
| **Diploma** | 1 | 2.70 | **Diploma or VETA** | 28 | 3.70 |
| **form 4** | 9 | 24.32 | **Secondary** | 222 | 29.33 |
| **std 7** | 18 | 48.65 | **Std 7 or less** | 325 | 42.93 |
| **Missing** | 9 | 24.32 | **Missing** | 157 | 20.74 |
| Total | 37 | 100.00 | Total | 757 | 100.00 |
| Operator Marital status | | | User Marital status | | |
| | Frequency | Percent | | Frequency | Percent |
| **Married** | 14 | 37.84 | **Married** | 275 | 36.33 |
| **Otherwise** | 20 | 54.05 | **Otherwise** | 439 | 57.99 |
| **Missing** | 3 | 8.10 | **Missing** | 43 | 5.68 |
| **Total** | **37** | 100.00 | Total | 757 | 100.00 |
| Operator Expenditure category | | | User Expenditure category | | |
| | Frequency | Percent | | Frequency | Percent |
| **150000 or less** | 7 | 18.92 | **150000 or less** | 290 | 38.31 |
| **151000-420000** | 15 | 40.54 | **151000-420000** | 252 | 33.29 |
| **421000-691000** | 9 | 24.32 | **421000-691000** | 95 | 12.55 |
| | | | **692000-961000** | 12 | 1.59 |
| | | | **962000 or above** | 3 | 0.40 |
| **Missing** | 6 | 12.26 | **Missing** | 105 | 13.87 |
| **Total** | **37** | **100.00** | **Total** | **757** | **100.00** |

The general overview of gender of respondents in Table 2 shows that the number of females interviewed outnumbered their male counterpart as both operators and users of public toilets. The females accounted for 59.46% for operators and 63.9% for users, while males accounted for 23.14% for operators and 34.4% for users respectively. Overall, out of the 22 who responded to the question, female operators accounted for 62.9%. On the other hand, female user of public toilets accounted for 65.1%, while male user accounted for 37.14% and 34.9% respectively. This suggests that females are more likely to need public toilets as they are the ones who are out mostly in the day time than men. The analysis of marital status was also carried out due to the fact that it could likely affect satisfaction and cost recovery as well. The general overview of marital status in Table 2 shows that unmarried people accounted for 54.05% for operator and 58.0% for user of public toilets. Meanwhile, the married people accounted for 37.84% and 36.3% respectively. Overall, out of the 20 respondents, unmarried operators accounted for 58.82% and out of the 714 respondents, unmarried users of public toilets accounted for 61.5%, while the married operator and married user accounted for 48.3% and 38.5% respectively.

Moreover, an investigation into the occupational status of the operators and the users of public toilets in Dar es Salaam city was as shown in Table 2. The findings revealed that 'others' and 'business' categories accounted for 40.54% and 59.7% respectively. Users engaged in crafts activities accounted for 18.2%, while 20.9% of operators engaged in operator's activities. The majority of users who amounted to 59.71% were engaged in business. This indicates that respondents who are engaged in business are often outdoors for extended periods of time, hence utilizing public toilets services more. The demographic characteristics on the operator and user level of education were also studied. The analysis of data indicated that majority of the public toilet users had primary education (42.9%) followed by those with secondary education (29.3%). Users with degree or higher and Diploma or VETA were very few, accounting for only 3.3% and 3.7% respectively. This evidence suggests that, the educated people are not frequent users of public toilets. This may be due to the fact that many of them work in offices that have own toilets.



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With regard to operators' level of education, Form four accounted for 24.3% whereas standard seven accounted for 48.65%. Operators with diploma accounted for only 2.7% of respondents. This fact suggests that, public toilets are more operated by people with very low level of education. The expenditure of sampled operators and users of public toilets in Dar es Salaam city as shown in Table 2 indicated that, out of the 31 respondents 48.39% fall within the expenditure bracket of 151000-420000, whereas 29.03% was within the expenditure bracket of 421000-691000. Some respondents (22.58%) from operator group indicated their expenditure to be less than 150000 or less. On the other hand, out of 652 users of public toilets, 44.5% of respondents fall within expenditure bracket of 150000 or less. Those within the expenditure of 151000-420000 accounted for 38.7%. Another group (14.6%) falls between the expenditure of 421000-691000 whereas 1.8% was within the expenditures of 692000-961000. Furthermore, only 0.5% of user respondents fall within the expenditure 962000 or above. It can be noted here that most respondents (i.e. 97.7%) of user expenditure fall between the expenditure group of 150000 or less to 961000.

## 5.2 Public Toilet Management in Dares Salaam

Based on the data provided, public toilets management is done under two approaches namely: public and private. Public approaches involve management by the Municipality itself, Subwards Government, Workplace Committee, Voluntary Association and Joint Ventures. Private approaches involve Management by Private Companies, Private Individuals, Contracts, Land Leases. Table 3 presents the public toilets management approaches.

**Table 3.** Number of public toilets under different management approaches in the three municipalities of Dar es Salaam city

| S/N | Management Approach | Kinondoni Toilets | Ilala Toilets | Temeke **Toilets** |
|---|---|---|---|---|
| **A** | **Public Management approach** | **22** | **10** | **11** |
| **1** | Municipality | 19 | 3 | 5 |
| **2** | Subwards government | 2 | 0 | 1 |
| **3** | Workplace Committees | 1 | 5 | 4 |
| **4** | Voluntary Association (DWA) | 0 | 1 | 1 |
| **5** | Other Authorities i.e. DART and TANROADS | 0 | 1 | 0 |
| **6** | Others | | | |
| B | Private Management Approach | 23 | 31 | 10 |
| 1 | Contract (Proprietary) | 0 | 12 | 7 |
| **2** | Land lease | 0 | 0 | 1 |
| **3** | Joint Venture (Public Private Partnership) | 0 | 0 | 0 |
| **4** | Private Individuals | 23 | 0 | 2 |
| **5** | Private Companies | 0 | 0 | 0 |
| **6** | Others | 0 | 18 | 0 |
| | Total | 45 | 40 | 21 |

***Source:*** Field Survey, 2019

From Table 3, Kinondoni Municipality is managing a total of 45 public toilets which are within its jurisdiction. Out of 45 public toilets, 22 are under Kinondoni Municipal Council (KMC) and 23 are managed by either private companies/individuals or community based organizations, as indicated in Table 3. Ilala Municipality directly manages 22 public toilets. A total of 15 other public toilets are managed by other authorities within the jurisdiction of the Ilala Municipality. Therefore, Ilala Municipality has a total of 37 public toilets. Temeke Municipality directly manages 11 public toilets. The public toilets managed by other authorities within the jurisdiction make a total of 10. Therefore, Temeke Municipality has a total of 21 public toilets.

This section provides findings on the most cost-effective public toilet management approach based on count of responses. These counts were compacted into a measure of effectiveness as explained in the methodology section.

**Table 4.** Responses on cost effective public toilet management approaches from users perspectives

| Management Approch | Effectiveness | Cost Recovery Category | User Satisfaction Category | | Total |
|---|---|---|---|---|---|
| | | | Low | High | |
| **Municipal** | 0.72 | High | | | |
| | | Low | 1 | 16 | 17 |
| | | **Total** | **1** | **16** | **17** |
| **PPP** | 0.75 | High | | | |
| | | Low | | 10 | **10** |
| | | **Total** | | **10** | **10** |
| **Private contractor** | 0.57 | High | 7 | 7 | **14** |
| | | Low | 32 | 43 | **75** |
| | | Total | 39 | 50 | **89** |
| **Private individual** | 0.67 | High | 17 | 37 | **54** |
| | | Low | 24 | 7 | **31** |
| | | **Total** | **41** | **44** | **85** |
| **Working place committee** | 0.63 | High | 54 | 19 | **73** |
| | | Low | | | |
| | | Total | 54 | 19 | 73 |

### 5.2.1 Cost-effectiveness of Public Toilet Management from Users' Perspective

Based on the effectiveness indicator, Table 4 summarises the responses on five public toilet management approaches that have responses associated with them from the users point of view. These approaches show PPP as the

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most cost-effective approach providing some indication that it could be the most effective way to manage public toilets with only 25% distance towards the most effective way to manage public toilets. This is followed by direct municipal management which is around 72% towards the most effective way to manage public toilets. Private individual holds the third position with about 67% towards effectiveness. At the lowest end, private contractors and workplace committees have 57% and 63% respectively. These observations suggest that user-based cost recovery strategy should prioritise PPP approaches and where this does not work, direct municipal management is likely to reach many people and provide adequate satisfaction levels.

### 5.2.2 Cost-effectiveness of Public Toilet Management from Operators' Perspectives

Based on the effectiveness indicator, Table 5 summarises the responses on five public toilet management approaches that have some responses associated with them from the operators' point of view. The analysis suggests that workplace committees are 100% of the distance towards the most effective way to manage public toilets. This observations suggest that all users associated with toilets for which workplace committees are responsible for toilet management, fall under the category high cost recovery. This is followed by direct municipal management and PPP, each being around 75% towards the most effective way to manage public toilets. Private individual and private contractor management approaches hold the lowest position. These observations suggest that an operator-based cost recovery strategy should prioritise workplace committees and where this is not feasible, direct municipal management or PPP are most likely to satisfy operators need for high cost recovery levels.

**Table 5.** Cost effective public toilet management approach based on operators

| Management Approach | Effectiveness | Cost Recovery Category | Operator Satisfaction Category | | Total |
|---|---|---|---|---|---|
| | | | **Low** | **High** | |
| **Municipality** | 0.75 | High | | | |
| | | Low | | 17 | 17 |
| | | **Total** | | **17** | **17** |
| **PPP** | 0.75 | High | | | |
| | | Low | | 10 | 10 |
| | | **Total** | | **10** | **10** |
| **Private contractor** | 0.59 | High | 11 | 3 | 14 |
| | | Low | 25 | 50 | 75 |
| | | **Total** | **36** | **53** | **89** |
| **Private individual** | 0.60 | High | 33 | 21 | 54 |
| | | Low | 20 | 11 | 31 |
| | | **Total** | **53** | **32** | **85** |
| **Working place committee** | 1.00 | High | | 73 | 73 |
| | | Low | | | |
| | | Total | | 73 | 73 |

From users' and operators' perspectives, some commonalities may be observed especially with respect to prioritisation of PPP and direct municipal management approaches. The best option in each case is different. While users-based approach would prioritise PPP, operators-based approach would prioritise Workplace Committees. Striking a balance between the two could be highly challenging. If public toilet serve no any common workplace it is obvious that PPP provide a direct mechanism through which public toilet management could be effective. However this contradicts the observation in the regression analysis where based on 122 observations on cost recovery and 614 on user satisfaction, it was clear that private contact achieve the highest level of both user satisfaction and cost recovery. It should be noted however that, a simple aggregation of the just presented findings leads to a single conclusion that Workplace Committee is the best public toilet management approach as shown in Table 4. Workplace Committee has a Relative Effectiveness Indicator (REI) of 1.161 which is the highest among the evaluated approaches.

**Table 6.** Cost effective public toilet management approach combining users and operators

| Management Approach | Operator | ROEI | User | RUEI | Average | REI |
|---|---|---|---|---|---|---|
| Working place committee | 1.00 | **1.36** | 0.63 | **0.94** | 0.82 | **1.161** |
| **PPP** | 0.75 | **1.02** | 0.75 | **1.12** | 0.75 | **1.068** |
| **Municipality** | 0.75 | **1.02** | 0.72 | **1.08** | 0.74 | **1.047** |
| **Private individual** | 0.60 | **0.81** | 0.67 | **1.00** | 0.63 | **0.900** |
| **Private contractor** | 0.59 | **0.80** | 0.57 | **0.85** | 0.58 | **0.824** |
| **Average** | **0.74** | | 0.67 | | 0.70 | |

To combine the two observations, i.e. the predominance of workplace committees and PPP as the most effective approaches in public toilet management and the statistically significance of private contracts, it is important to devise a common denominator. For that purpose, all management approaches endeavor to achieve relatively higher cost recovery and user satisfaction through improving public toilets condition. Thus public toilet condition



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is a common denominator that works to moderate both user satisfaction and cost recovery. Figure 2 summarises the relationship between cost recovery, user satisfaction and public toilet condition as assessed by users. Both user satisfaction and cost recovery increases as public toilet condition improves but for a larger section below 82% of such improvement cost recovery tends to be relatively higher than user satisfaction. This suggests that any public toilet improvement that does not surpass 82% threshold (exploitation) yields higher cost recovery levels than is necessary to ensure the corresponding level of user satisfaction, given the current state of the public toilets. At the margin, however, each improvement in public toilet condition seems to be more beneficial to user satisfaction than to operators' cost recovery, leading to the convergence observed at some 82% of such improvement.

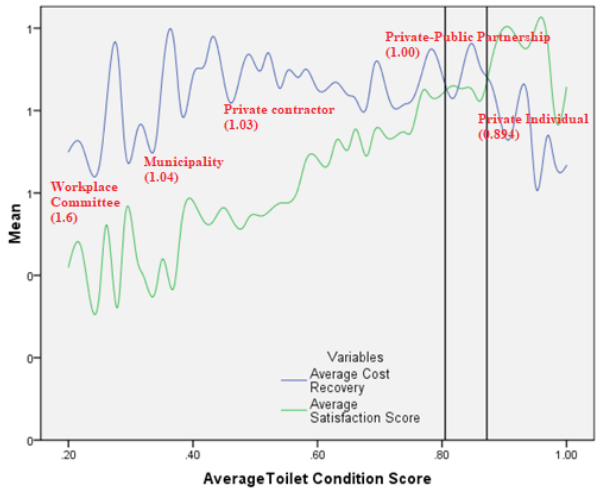


**Figure 2.** Identification of cost effective public toilet management approach

Transposing the proceeding observations in terms of the observation in Table 6, it can be argued that since operators are likely to prioritise cost recovery rather than user satisfaction, all the approaches favouring operators' effectiveness over users' effectiveness can be regarded as falling below the 82% public toilet condition threshold. These approaches converge as the effectiveness tends to be similar i.e. management approaches like PPP are likely to be around the convergence of 82%. Public toilet management approaches that prioritise operators' interest include workplace committees, direct municipal management and to a smaller extent private contractors. To the other extreme, private individual slightly favours the interest of users than operators. Therefore both private individual and private contracts engulfs PPP as shown in Figure 2 and therefore are preferred to workplace committees and direct municipal management.

## 6. Discussion, Conclusion and Recommendations

The observations in this study suggest that user-based cost recovery strategy should prioritise PPP approaches and where this does not work, direct municipal management is likely to reach many people and provide adequate satisfaction levels. These observations suggest that an operator-based cost recovery strategy should prioritise workplace committees and where it is not feasible approaches of direct municipal management or PPP are likely to satisfy operators need for high cost recovery levels. Similarly, findings on the best public toilet management approach from all the three municipalities in Dar es Salaam is Public-Private Partnership (PPP). It was observed that this approach equally serves the interest of both users and operators and gives them approximately the same weights in terms of satisfaction. This outcome is consistent with the findings in Stirling Council [8] that most of local councils in England like Stirling Council, Perth and Kinross Council, Fife Council, and Highland Council, are managing and operating public toilets through the implementation of a Public-Private Partnership (PPP). According to Stirling Council [8], this system has been proved to provide an excellent example of using an innovative approach for public toilet provision. Likewise, the study by Ayee, et al [7] observed that the Public-Private Partnership approach is a common approach used in many public service deliveries in Africa for the fulfillment of traditional state functions such as health, water, education, and sanitation and citizen security.

In the users and operators perspective some commonalities may be observed especially with respect to prioritisation of PPP and direct municipal management approaches. The best option in each case is different. While users-based approach would prioritise PPP, operators-based approach would prioritise Workplace committees. Striking a balance between the two could be highly challenging. If public toilet serve no any common workplace it is obvious that PPP provide a direct mechanism through which public toilet management could be effective. However this contradicts the observation in the regression analysis where based on 122 observations on cost recovery and 614 on user satisfaction, it was clear that private contract achieve the highest level of both user satisfaction and cost recovery. It should be noted however that, a simple aggregation of the just presented findings leads to a single conclusion that workplace committee is the best public toilet management approach as shown in Table 4. Workplace committee has a Relative Effectiveness Indicator (REI) of 1.161 which is the highest among the evaluated approaches.

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The observation made in the preceding discussion suggests that both user satisfaction and cost recovery increase as public toilet condition improves but for a larger section below 82% of such improvement cost recovery tends to be larger. This suggests that the current practice yields higher cost recovery levels than is necessary to ensure user satisfaction, given the current state of the public toilets. However, each improvement in public toilet condition seems to be highly beneficial to users than to operators' cost recovery, leading to the convergence observed at some 82% of improvement. The study has also revealed that workplace committees, direct municipal management and to a smaller extent private contractors, are Public toilet management approaches that prioritise operators. It also accords with the work of Toubkiss [25] which states that this system can discharge its responsibility to provide public toilets with no drain on its resources, but rather receiving an income. However, Ayee, et al [7] pointed out that these public toilet management approaches will deprive them of funds unless there is a policy to ensure that the private contractors pay a percentage of their proceeds to the local authorities. Since operators prioritise cost recovery rather than user satisfaction, all the approaches favouring operator effectiveness over user effectiveness can be regarded as falling below the 82% threshold. These approaches converge as the effectiveness tends to be similar i.e. management approaches like PPP are likely to be around the convergence of 82%. Public toilet management approaches that prioritise operators' interest include workplace committees, direct municipal management and to a smaller extent private contractors. To the other extreme, private individual slightly favours the interest of users than operators. Therefore both private individual and private contracts engulf PPP as shown in Figure 2, hence are preferred to workplace committees and directly municipal management.

The findings suggest for at least four important observations:

(1) A user-based cost recovery strategy would prioritise PPP approaches and where this does not work, direct municipal management is likely to reach many people and provide adequate satisfaction levels.

(2) Operator-based cost recovery strategy would prioritise workplace committees and where it is not feasible, approaches of direct municipal management or PPP are most likely to satisfy operators need for high cost recovery levels.

(3) Since operators are likely to prioritise cost recovery rather than user satisfaction, all the public toilet management approaches that favor operators' effectiveness over users' effectiveness are regarded as operator based approaches and these include workplace committees, direct municipal management and to a smaller extent private contractors.

(4) Since users are likely to prioritise user satisfaction over cost recovery, all public toilet management approaches that favour user satisfaction effectiveness rather than operators' cost recovery effectiveness are regarded as users-based public toilet management approaches and include private individual. Both private individual and private contracts engulf PPP, hence are preferred to workplace committees and direct municipal management.

Alongside the key observations of this study, the following policy recommendations are worthy putting forward:

(1) The long enshrined belief that public toilet can effectively be managed through contracting to private firms need to be abandoned. Contracting out the management of public toilet is not a solution to the poor performance of public toilets that were operated directly under municipality. If the focus is to enhance cost recovery and relieve the municipality off the burden of managing public toilets, they need to adopt Private individuals' contract;

(2) For private individuals who own public toilets they are better placed to recover the costs if they contract to private firms. Therefore, as an investment, public toilet need to be detached from its owners and a private firm take charge of the revenues and costs of all activities associated with the toilets;

(3) If the local government or private toilet operators are interested in increasing user satisfaction, they must abandon local government, Mtaa management approach as well as community based approaches in favour of either Private contract, private company or to the extreme left lowest direct Municipal and contract to private firm approaches;

(4) If the focus is, however, to achieve both user satisfaction and cost recovery, public toilets must be managed through Public-Private Partnership (PPP) with some lee way for a slight favour of users under the private individual or a slight favour for operators under the private contracts.

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