

Examining the links between Psychological Ownership and maintenance behaviour in users of a community-managed wastewater system in Jakarta, Indonesia

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Highlights:

- Average users feel more confident asserting ownership when the subject is community rather than individual or family.
- Most users reported making monetary and non-monetary contributions, while some reported perceived influences on system management.
- Non-parametric tests confirmed monotonous correlations between PO, triggering actions, and behavioural outcomes.

Keywords: psychological ownership; decentralized wastewater treatment system; community-managed

INTRODUCTION

Studies reported a sense of ownership as a driver that promotes sustainable behaviour in communal water infrastructure that invites community participation before and after its establishment [1]. The Psychological Ownership (PO) framework is developed to explain the correlations between actions, ownership, and intention to support the maintenance and improvement of a communally owned system [2]. Implementation of a community-based sanitation program (hereafter Sanimas) in Indonesia followed a demand-driven approach initiated by the central government and responded to by interested regional or municipal governments, indicating their willingness to form a partnership with the grassroots level of stakeholders to establish a simplified sewerage system (SSS). In Indonesia, there are multiple levels of basic governmental institutions which maintain immediate relationships with citizens, sub-districts or villages (*kelurahan* atau *desa*) and RT (neighborhood association or *rukun tetangga*) being the farthest and closest entities. Once the sub-district (*kelurahan*) location is selected, the project moves on to the chosen community as the primary decision-makers for the implementation [3].

Community building involves identifying sanitation needs and devising an action plan for construction and post-construction activities. We hypothesized that both active (financial and labor support, and decision-making control) and passive (attendance at meetings and dissemination) participation contributes to the development of ownership perception, thereby fostering various behaviours that sustain the system [4]. Hence, this study aims to discern the impact of different levels of Psychological Ownership on associated maintenance behaviours in a community-managed wastewater treatment system.

METHODOLOGY

The Sanimas project, a community-based sanitation initiative, has been implemented in over 20,000 Indonesian communities. It involves the provision of treatment reactors, household-end facilities, and pipelines for 20-200 families, built in the neighborhood and left to be managed by a group of user-approved representatives (community-based organization or CBO). For this study, a survey was conducted in five selected communities in Jakarta, Indonesia, based on a dataset provided by the Ministry of Public Works and Housing (MPWH). All groups manage a small-scale wastewater system, the operational status of which has been confirmed by the dataset. While the commencement point varied across communities, the year ranged from 2015 – 2017. As the participation had begun before system activation, it suggested that communities had been involved for around 9 – 7 years.

Respondents were enquired about three parts of PO: status (statement of ownership), actions that lead to (Routes), and motivated behavioral intention (Outcome). Ownership can be internalized at the individual or communal level; hence, multiple expressions were surveyed: individual, family, and community. Further, respondents confirmed their involvement in activities including influencing the direction of implementation, contribution to money and labour, and overall participation throughout the program. Finally, nine manifested behaviours comprised satisfaction, comfort, perceived safety, receiving benefits, then perceived responsibility of maintenance, repair, and commitment to continual use. The last items confirmed the supportive intention of maintenance, expansion, and improvement. All questions were to be responded to with a Yes/No. Additionally, questions of socio-demographic characteristics were asked.

A total of 242 responses were administered within two months after obtaining permission from the Tokyo Institute of Technology Ethics Committee (Permit Number: 2023157). Community locations were spread throughout the province, with two in North Jakarta and one in West, East, and South Jakarta. Enumerators administered a paper-based questionnaire face-to-face in an interview manner targeting either male or female parents. Data was summarized in descriptive statistics and presented according to each part of the framework. Factor reduction analysis using Principal Component Analysis (PCA) was implemented to identify underlying components of manifested behaviors. Correlation tests were performed using Kendall Tau-b Tests with non-parametric analysis to identify intervariable monotonic relationships that allow ordinal and continuous data input.

RESULTS AND CONCLUSIONS

Respondents' average age is 44, and they are dominated by females (64%) and have incomes of less than 257 USD (54%). A significant portion work in self-employment (23%). Many own or have relationships with the owners of their property (58%), some 41% of renters co-resident in the neighborhood. The household questionnaire resulted in 'Yes' dominating the answer across 17 questions (Figure 1). The perception of individual ownership coexists with those expressions of community ownership by small gaps of only 3 and 6 points. Of the four types of participation, the highest to lowest point of 'Yes' is regular payment, non-monetary contribution, the testimony of participation in any activity, and perception about their influence in decision making.

A significant portion of respondents showed affirmation in maintenance behavior, which is categorized into three groups (Figure 1): Acceptance and Use (O1-O3), Responsibility (O4-O6), and Support Intention (O7-O9). The last group accumulated 283 points, then 275 points from the Acceptance and Use group and 262 points from the Responsibility group. PCA summarized two components (p -value=0.00; Figure 2). The first component factored by Responsibility and Support Intention group (eigenvalue=3.71), whereas the second was by the remaining items (eigenvalue=1.54). Interpretations are given to each component, where Factor 1 represents 'Committed Group' while the other is 'Contented Group.' Then, regression scores were used to run a non-parametric test, which confirmed correlations in both groups (Table 1). First, correlation tests between Factor 1 and two types of community ownership showed slightly bigger scores than those of family ownership (.247) or individual ownership (.167). Finally, Factor 1 was associated with participating activities of perceived influence (0.311), participation in the past (0.308), the perception that all community members own the system (0.270), and expression of community ownership (0.249).

In conclusion, users feel a high level of acceptance of the system, reflected in their continued support in maintenance for over five years. The correlation analysis confirmed that a communal sense of ownership resonates more amongst users and has a more significant impact in promoting maintenance behaviour, with the most substantial plausible reasons being their perceived influence in system management and past participation. Given the subjectivity of the methodology and the scope of the study area, this research has limited impacts, and thus, we suggest precautions for interpretation.

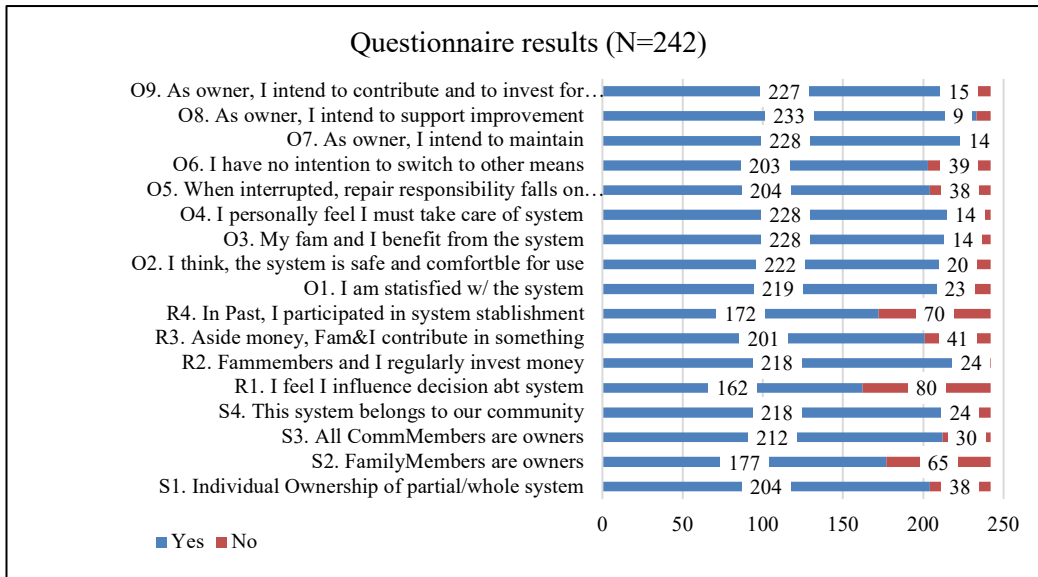


Figure 1 Household questionnaire survey results

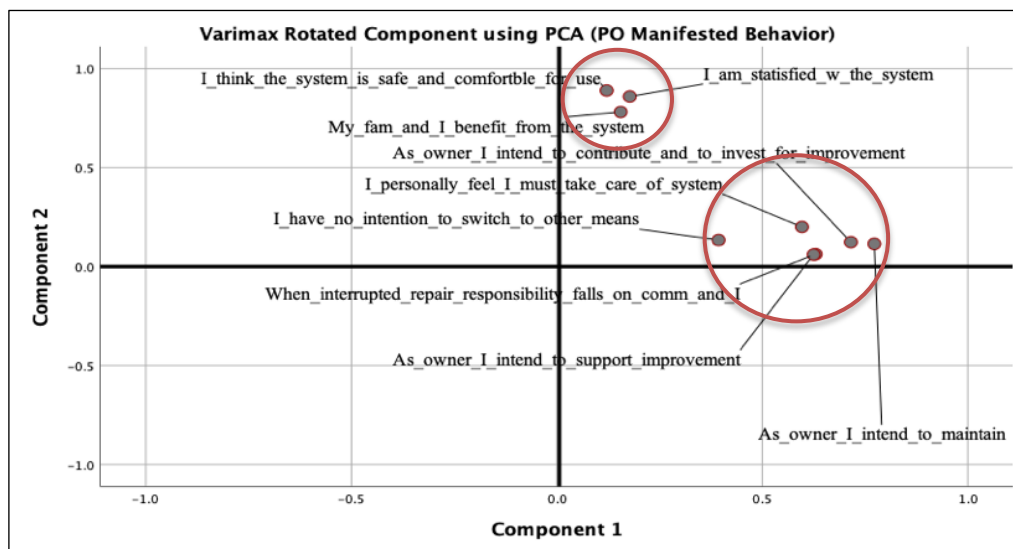


Figure 2 Maintenance behaviour as the outcome of PO (PCA analysis)

Table 1 Correlation analysis results (Kendall tau-b)

Outcome of Ownership (Grouped based on PCA)	Statement of Ownership				Routes of Ownership			
	Individual ownership (S1)	Family ownership (S2)	All community members are owners (S3)	System belongs to community (S4)	Perceived influence (R1)	Past monetary contribution (R2)	Past non-monetary contribution (R3)	Past participation (R4)
Factor 1 'Committed users' (Fac1)	.167**	.247**	.270**	.249**	.311**	.176**	.186**	.308**
Factor 2 'Contented users' (Fac2)	.108	.092	.063	.063	-.030	.057	-.009	.007

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

PCA: Principal Component Analysis

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