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MODELING OF ORGANIZATIONAL BEHAVIOR FRAMEWORK FOR ROAD USAGE CHARGE MANAGEMENT

Nguyen Luong Hai[a,*]

[a]*Faculty of Construction Management, University of Transport and Communications, No 3 Cau Giay street, Dong Da district, Hanoi, Vietnam*

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Abstract

Organizational behavior plays a crucial role in effective management. However, there is limited research on organizational behaviors in road usage charging management. This study aims to address this gap by identifying six dimensions of organizational behavior through focus group studies. Questionnaires were administered to 138 professionals in Vietnam, and the data were analyzed using structural equation modeling. The findings revealed six behavioral dimensions: Responsibilities fulfillment (OR1), Progress assurance (OR2), Aligned implementation organization (OR3), Hierarchical and delegated management (OR4), Efficient operation system (OR5), and Transparency and accountability assurance (OR6). Among these dimensions, OR2, OR4, and OR6 significantly impact management performance. Additionally, OR2 mediates the relationship between OR1 and management performance, OR4 mediates between OR3 and OR5, and OR5 indirectly influences management performance through OR6. It is expected that the efficacy of this approach will strengthen the significance of the organizing function and offer a valuable instrument to aid professionals in the field of road usage management.

Keywords: road usage charging; organizational management behavior; organizing function; organizing behavior; road infrastructure.

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1. Introduction

Road usage charging (RUC) system has gained attention as a potential solution for sustainable transportation funding and congestion management. The existing works have identified key factors influencing the adoption, implementation, and effectiveness of RUC. It explores various dimensions, including policy considerations, technological aspects, public acceptance, equity, and legal frameworks. Verhoef and Rouwendal [1] investigated the interconnections among pricing, capacity selection, and financing within transportation networks. This study extends the concept of self-sustaining, efficiently planned road systems and explores their application within a network context while considering different forms of secondary regulatory mechanisms. To mitigate driving speeds, one strategy involves introducing explicit financial incentives. The research evaluates the impact of a Pay-As-You-Drive insurance fee on driving speeds [2]. The findings contribute to a deeper understanding of the factors that shape RUC systems and provide insights for policymakers, researchers, and practitioners involved in the design and management of RUC schemes.

Policy considerations explore policy factors that influence road usage charging [3]. It examines the role of government objectives, policy goals, and political considerations in shaping RUC schemes. It also investigates pricing strategies, exemptions, and revenue allocation mechanisms adopted in different jurisdictions. Technological aspects focus on the technological dimensions of road usage charging [4–6]. It discusses the types of technologies employed for data collection, billing, and enforcement,

*Corresponding author. *E-mail address:* hainl@utc.edu.vn (Hai, N. L.)

and their impact on system efficiency and accuracy. The section also examines interoperability, data privacy, and security considerations in implementing RUC systems. Public acceptance and behavioral factors investigate the influence of decision-making behavioral factors on the success of road usage charging [5, 7]. It examines public attitudes, perceptions, and concerns regarding privacy, fairness, and the perceived benefits of RUC. The review also explores strategies for promoting public acceptance and engagement. Equity considerations explore equity issues associated with road usage charging [8]. It examines the distributional impacts on different socioeconomic groups and geographic regions. The review discusses strategies for addressing equity concerns and ensuring that RUC systems do not disproportionately burden certain populations. Legal and regulatory frameworks examine the principles and procedures that shape road usage charging. It explores the legal authority to implement RUC, the legal constraints, and the role of regulations in governing system design, data protection, and enforcement practices. Implementation challenges identify encounters in road usage charging [9]. It discusses technical, administrative, and political hurdles that may hinder successful implementation. The review highlights lessons learned from past experiences and provides insights into effective strategies to overcome these challenges. Evaluation and performance metrics discuss evaluation methodologies and performance metrics used to assess the effectiveness of road usage charging systems. It examines indicators such as revenue generation, congestion reduction, environmental impact, and system efficiency. The review highlights the importance of robust evaluation frameworks for evidence-based policy decisions.

On the contrary, it may seem unreasonable to give undue importance to a group factor when assessing the success or failure of management performance. Instead, it is essential to delve into the specific behaviors that underlie effective organizational management functions and explore how these behaviors impact management performance. Hence, it is crucial to meticulously analyze distinct organizational behaviors in the context of road usage charge management and investigate their interconnectedness with management performance. This approach represents a novel perspective, as prior studies have not extensively explored this aspect. These insights into organizational behaviors are instrumental in elucidating the mechanisms through which the organizing function can effectively operate within the realm of road usage charge management.

The objectives of this research endeavor are to identify and scrutinize the characteristics of organizational functions and evaluate their impact on management performance. This study contributes to the academic realm by extending the existing knowledge on conventional organizational functions through the introduction of a conceptual model that empirically examines specific organizing behaviors in relation to management performance. In the practical sphere, this approach holds significance as it offers a valuable management framework for professionals engaged in organizing and executing road usage charge-intensive operations.

The study's structure comprises four distinct sections: Section 2 establishes the theoretical foundation by delving into organizing functions and their impact on management performance, where the research hypotheses are formulated. Section 3 outlines the research methodologies employed. Section 4, a pivotal segment of the paper, reveals the research findings and initiates discussions. Ultimately, in Section 5, the study draws conclusions, outlines its limitations, and suggests potential avenues for future research.

2. Theoretical Foundation

2.1. Organizational behavior development

The organizing function is a fundamental aspect of management theory and practice, with extensive research and literature dedicated to understanding its role in organizational effectiveness. Schol-

ars and practitioners have emphasized the significance of establishing an appropriate organizational structure to facilitate the implementation of plans and achieve desired objectives.

Defining tasks is a critical component of the organizing function. Task definition involves breaking down complex objectives into smaller, manageable units of work that can be assigned to individuals or teams. This process requires careful consideration of the organization's strategic goals, as well as an understanding of the skills and capabilities of its workforce. By clearly defining tasks, managers can ensure that work is allocated effectively, leading to increased productivity and goal attainment [10, 11].

Moreover, the allocation of human and physical resources is a key consideration in organizing. Human resources encompass the knowledge, skills, and abilities of individuals within the organization, while physical resources refer to the tangible assets required to carry out tasks. Effective resource allocation involves identifying the right individuals for specific roles, matching their skills to the requirements of the tasks, and providing the necessary equipment and facilities to support their work. Research has shown that strategic resource allocation positively influences organizational performance and contributes to competitive advantage [10, 11].

Establishing communication systems is another essential aspect of organizing [10, 11]. Effective communication is crucial for sharing information, coordinating activities, and fostering collaboration within the organization. A well-designed communication system ensures that information flows seamlessly between different levels and departments, facilitating the timely exchange of ideas, feedback, and instructions. Research has highlighted the importance of communication in reducing uncertainty, enhancing employee engagement, and improving overall organizational performance.

Furthermore, the determination of decision-makers' roles is integral to organizing. Decision-making authority needs to be clearly defined and delegated within the organizational structure. This ensures that decisions are made by individuals with the appropriate expertise and authority, leading to more informed and effective outcomes. Proper delegation of decision-making responsibilities also promotes efficiency by avoiding unnecessary bottlenecks and empowering employees at various levels to contribute to the decision-making process. The concept of "job design decisions" is also frequently used in the context of organizing. Job design decisions involve structuring tasks and responsibilities to optimize employee performance, job satisfaction, and overall organizational effectiveness. Researchers have explored various approaches to job design, such as job enlargement, job enrichment, and job rotation, with the aim of creating meaningful and motivating work experiences. Well-designed jobs that align with employees' abilities and aspirations have been shown to enhance job performance, reduce turnover, and increase organizational commitment [12, 13].

In order to develop attributes related to organizational management behavior, various qualitative methods were employed initially. These methods included focus group studies (FGSs). FGSs are recognized as an effective approach for examining specific behaviors or beliefs, exploring the contextual factors influencing them, and capturing diverse experiences and perspectives on particular issues [14]. To begin with, FGSs were conducted with key participants to identify attributes related to planning behavior. Every Focus Group Studies session included five participants who were professionals actively employed in road usage management units (Table 1). During this stage, the identified attributes, initially derived from an extensive review of existing literature, were further honed and refined.

The discussions and interviews followed a semi-structured format, comprising several sequential components such as introduction, opening questions, preliminary questions, transition questions, and closing questions [14]. Supplementary questions were integrated as necessary, and the introduction of pertinent literature on organizational behaviors aimed to enhance the participants' and interviewees'

Table 1. Profile of focus group discussions

Group	ID	Experience (year)	Role	Organization
1	Participant 1	11	Officer	Road usage management unit
	Participant 2	10	Manager	Road usage management unit
	Participant 3	12	Manager	Road usage management unit
	Participant 4	15	Manager	Road usage management unit
	Participant 5	8	Officer	Road usage management unit
2	Participant 6	17	Manager	Road usage management unit
	Participant 7	6	Officer	Road usage management unit
	Participant 8	13	Project manager	Road usage management unit
	Participant 9	12	Officer	Road usage management unit
	Participant 10	11	Officer	Road usage management unit
3	Participant 11	13	Officer	Road usage management unit
	Participant 12	12	Manager	Road usage management unit
	Participant 13	14	Senior Officer	Road usage management unit
	Participant 14	18	Officer	Road usage management unit
	Participant 15	13	Senior officer	Road usage management unit
4	Participant 16	15	Project manager	Road usage management unit
	Participant 17	8	Officer	Road usage management unit
	Participant 18	7	Officer	Road usage management unit
	Participant 19	9	Officer	Road usage management unit
	Participant 20	6	Officer	Road usage management unit
5	Participant 21	6	Officer	Road usage management unit
	Participant 22	8	Officer	Road usage management unit
	Participant 23	8	Officer	Road usage management unit
	Participant 24	7	Officer	Road usage management unit
	Participant 25	8	Officer	Road usage management unit

comprehension of the concept of functional attributes. Subsequently, participants were encouraged to engage in more in-depth discussions related to the focus of the study. Below are some of the primary questions that were posed: What is your understanding of organizational management behavior principles? How would you describe organizational management behavior in the context of road usage management? What attributes should be considered when evaluating organizational behaviors? How would you assess performance in road usage management?

In conclusion, a total of six attributes were gathered and proposed for evaluating organizational behavior (Table 2). These six attributes were measured empirically using single-item scales, as they can be defined as specific and singular concepts [15]. Moreover, it is worth noting that Bergkvist and Rossiter [16] have confirmed that single-item scales display similar predictive accuracy when compared to multi-item assessments, a conclusion that is consistent with the results reported by Diamantopoulos et al. [15].

Table 2. Attributes of organizational management

Function	Attributes	Code	Descriptions
Organizing (OR)	- Responsibility fulfillment	OR1	- The state management agencies responsible for revenue collection have fulfilled their responsibilities entirely in organizing the implementation of revenue collection.
	- Progress assurance	OR2	- Ensuring the progress of revenue collection in accordance with the project and plan.
	- Aligned implementation organization	OR3	- Organizing the implementation in line with the objective of revenue collection.
	- Hierarchical and delegated management	OR4	- Clear hierarchical and delegated management of state revenue collection is implemented.
	- Efficient operation system	OR5	- The organization operates an efficient management system for revenue collection.
	- Transparency and accountability assurance	OR6	- Ensuring transparency and accountability in organizing the collection of revenue.

2.2. Management performance

Managerial performance serves as a critical component in the effective functioning of organizations, enabling them to achieve their desired goals and objectives [17, 18]. This performance is characterized by the ability of teams and leaders to allocate and utilize limited resources efficiently, leading to enhanced productivity, employee satisfaction, and overall growth and profitability. Consequently, evaluating and measuring managerial performance becomes essential in assessing the effectiveness of organizational processes and outcomes. [19].

In the specific context of road networks, which involve large-scale infrastructure projects funded by governmental expenditures, performance measurement assumes even greater significance. This is due to the substantial financial investment and public impact associated with such projects. The evaluation of performance in road usage management provides insights into the successful utilization of public funds and adherence to legislative requirements.

To assess performance in road usage management, several criteria are commonly employed, drawing upon the widely acknowledged "iron-triangle" framework proposed in earlier studies [20–26]. The iron-triangle concept emphasizes three key dimensions: quality, time, and cost. These dimensions are regarded as fundamental aspects of performance evaluation in the context of infrastructure projects.

Adapting the iron-triangle measurement approach to road usage charging management, the assessment could involve the comprehensive evaluation of the aforementioned dimensions: (1) the full and timely collection of specified revenues in accordance with the predetermined plan; (2) the prompt collection of designated revenues, ensuring adherence to the predetermined schedule; and (3) the implementation of revenue collection procedures without incurring excessive management costs. Emphasizing these dimensions in performance evaluation can provide valuable insights into the success of road usage management projects and contribute to informed decision-making processes within the context of transportation infrastructure development.

2.3. Hypotheses

It can be argued that organizational behaviors have a potentially positive influence on management performance. Consequently, the subsequent hypotheses are proposed.

Hypothesis 1 (H1) – Responsibilities fulfillment has a positive influence on the management performance of road usage charging management.

Hypothesis 2 (H2) – Progress assurance has a positive influence on the management performance of road usage charging management.

Hypothesis 3 (H3)– Aligned implementation organization has a positive influence on the management performance of road usage charging management.

Hypothesis 4 (H4) – Hierarchical and delegated management has a positive influence on the management performance of road usage charging management.

Hypothesis 5 (H5) – Efficient operation system has a positive influence on the management performance of road usage charging management.

Hypothesis 6 (H6)– Transparency and accountability assurance planning has a positive influence on the management performance of road usage charging management.

3. Methods

3.1. Data collection

Based on insights obtained from the FGSs, data collection in this study focused on professionals directly involved in road usage charge management in Vietnam. The participants consisted of managers from road management units who were selected through random sampling. A total of 210 questionnaires were distributed, targeting individuals with relevant experience in recent activities related to road usage charge management. Out of the contacted individuals, 138 valid responses were received and included in the analysis. These valid samples comprised professionals working in road management units. It is noteworthy that 78% of the respondents had more than ten years of experience in road usage charge management, and all participants held a bachelor's degree.

3.2. Measures

The survey questions were separated into two primary sections. Initially, respondents were prompted to furnish their demographic information and share details about their professional experiences. The second section was concentrated on gathering data pertaining to the organizing function. Participants were instructed to evaluate their involvement in road usage charge management using a five-point Likert scale, where 1 indicated strong disagreement or extreme dissatisfaction, and 5 signified strong agreement or high satisfaction.

To assess the research hypotheses, two principal analytical methods were employed: Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM). CFA was used to evaluate the factor structure of the organizing function for its reliability and appropriateness. In contrast, SEM was applied to investigate the causal relationships among organizing behaviors, management effectiveness, and the direct and indirect impacts of predictors. SEM encompasses two commonly utilized techniques: Covariance-Based SEM (CB-SEM), which employs maximum likelihood estimation to validate established theories, and Partial Least Squares SEM (PLS-SEM), which uses ordinary least squares to forecast dependent variables [27].

In this study, the PLS-SEM approach was deemed appropriate for the research design due to two reasons. Firstly, PLS-SEM does not require large sample sizes as compared to CB-SEM [27]. Secondly, PLS-SEM typically encounters fewer convergence problems [28]. To apply the PLS-SEM approach, the measurement model's reliability and validity were assessed through CFA analysis. Subsequently, the structural model was evaluated in terms of its explanatory power and path coefficients to examine the relationships among the variables.

4. Results and discussions

To examine the influence of organizing behaviors on management performance, Structural Equation Modeling (SEM) was employed. Within the SEM model, the six organizing behaviors served as independent variables. To assess the association between organizing behaviors and management performance, we generated 5,000 bootstrap samples, following the recommendation of Hair et al. [27]. The findings reveal significant and positive correlations between (1) Progress assurance (OR2) and management performance (MP) ($\beta = 0.247$, $p < 0.05$) (Table 3), (2) Hierarchical and delegated management (OR4) and management performance (MP) ($\beta = 0.197$, $p < 0.05$) (Table 3), (3) Transparency and accountability assurance (OR6) and management performance (MP) ($\beta = 0.326$, $p < 0.05$) (Table 3), (4) Responsibilities fulfilment (OR1) and Progress assurance (OR2) ($\beta = 0.427$, $p < 0.000$) (Table 3), (5) Aligned implementation organization (OR3) and Hierarchical and delegated management (OR4) ($\beta = 0.217$, $p < 0.05$) (Table 3), (6) Efficient operation system (OR5) and Hierarchical and delegated management (OR4) ($\beta = 0.42$, $p < 0.000$) (Table 3), (7) Efficient operation system (OR5) and Transparency and accountability assurance (OR6) ($\beta = 0.488$, $p < 0.000$) (Table 3).

The findings offer substantiating evidence for Hypotheses H2, H4, and H6. As depicted in Fig. 1, the model illustrates those three organizing behaviors (i.e., OR2, OR4, and OR6) directly impact management performance (MP), explaining 34.3% of the variance in MP ($p<0.000$). Nevertheless, there are no statistically significant direct relationships between Responsibilities fulfillment (OR1) and management performance (MP) (H1) ($\beta = 0.120$, $p > 0.05$) (Table 4), Aligned implementation organization (OR3) and management performance (MP) (H3) ($\beta = 0.100$, $p > 0.05$) (Table 4), and Efficient operation system (OR5) and management performance (MP) (H5) ($\beta = -0.029$, $p > 0.05$) (Table 4).

Furthermore, a Variance Inflation Factor (VIF) test was conducted to evaluate the presence of multicollinearity among the independent variables in the regression model. The results revealed that all VIF values were below 1.527, significantly lower than the recommended threshold of 10, as proposed by [29]. This indicates the absence of multicollinearity and suggests that the data exhibits small standard errors [30]. Additionally, discriminant validity was assessed by comparing the square root of the Average Variance Extracted (AVE) for each construct with the correlations between latent constructs. It is expected that the square root of each construct's AVE should exceed the correlations with other latent constructs [27]. As shown in Table 4, the results affirm that discriminant validity is maintained, demonstrating that the six organizing behaviors are distinct from one another.

Table 3. The results of hypotheses testing

Hypotheses	Coef.	VIF	R square	R square adjusted	f Square	T values	P Values	Interpretation
OR1 → MP	0.120	1.527	0.372	0.343	0.015	1.031	0.302	Not supported
OR2 → MP	0.247	1.270			0.076	2.213	0.027	Supported
OR3 → MP	0.100	1.359			0.012	1.260	0.208	Not supported
OR4 → MP	0.197	1.471			0.042	2.986	0.003	Supported
OR5 → MP	-0.029	1.710			0.001	0.308	0.758	Not supported
OR6 → MP	0.326	1.430			0.118	3.182	0.001	Supported
OR1 → OR2	0.427	1.000			0.223	5.119	0.000	Supported
OR3 → OR4	0.217	1.153			0.312	2.809	0.005	Supported
OR5 → OR4	0.423	1.153			0.219	5.372	0.000	Supported
OR5 → OR6	0.488	1.000			0.057	6.845	0.000	Supported

Table 4. Comparison of square root of average variance extracted (AVE) and correlation coefficients between constructs

Latent constructs		AVE	Latent constructs					
			OR3	OR5	OR4	OR2	OR1	OR6
Aligned implementation organization	(OR3)	1.000	1.000					
Efficient operation system	(OR5)	1.000	0.364	1.000				
Hierarchical and delegated management	(OR4)	1.000	0.370	0.501	1.000			
Progress assurance	(OR2)	1.000	0.372	0.336	0.344	1.000		
Responsibilities fulfillment	(OR1)	1.000	0.217	0.117	0.056	0.427	1.000	
Transparency and accountability assurance	(OR6)	1.000	0.360	0.350	0.323	0.043	0.313	1.000

Calculation method: Two-stage; Product term generation: Standardized

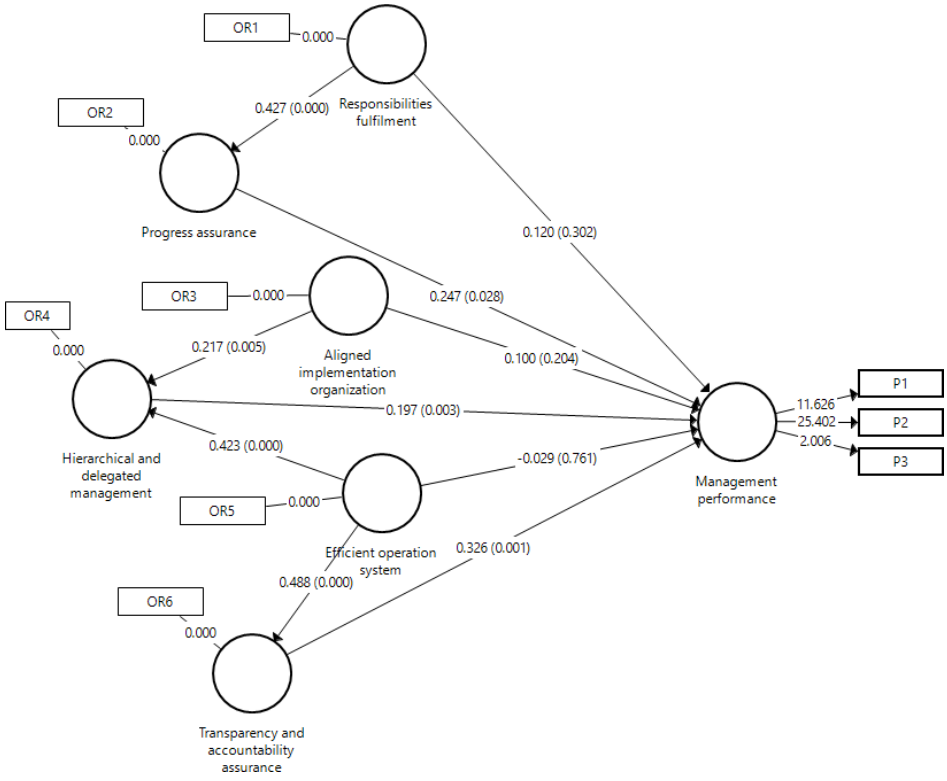

Figure 1. Organizational management behaviors and management performance

In line with Hypotheses H2, H4, and H6, the findings of this study provide further evidence to support the positive impact of organizing function on the management performance (MP) of road usage charge management. Specifically, the results indicate that three organizing behaviors, namely Progress assurance (OR2), Hierarchical and delegated management (OR4), and Transparency and accountability assurance (OR6), have a direct influence on enhancing the overall management performance in this context. These findings align with our expectations and highlight the significance of implementing strategies that promote the aforementioned organizing behaviors. By emphasizing progress assurance, organizations can ensure the effective monitoring and evaluation of road usage charge management initiatives. Furthermore, adopting hierarchical and delegated management structures facilitates efficient decision-making processes and empowers individuals within the organization to contribute meaningfully to the management efforts. Additionally, prioritizing transparency and

accountability assurance cultivates trust and fosters effective communication between stakeholders, ultimately enhancing the overall management performance.

However, it is crucial to acknowledge that the findings did not establish a significant direct relationship between the organizing behaviors of Responsibilities fulfillment (OR1), Aligned implementation organization (OR3), and Efficient operation system (OR5) and the management performance of road usage charge management. Instead, these organizing behaviors appear to have indirect relationships with management performance through the mediating factors of OR2, OR4, and OR6. The absence of a significant direct relationship between these organizing behaviors and management performance highlights the complexity of the relationship between organizational factors and the effectiveness of road usage charge management. It suggests that other factors, either unaccounted for or not examined in this study, may exert a more substantial influence on management performance.

This study constitutes a substantial scholarly contribution to the domain of road usage charge management. Initially, it discerns that the efficacious functioning of organizational attributes exerts a significant influence on management performance. Subsequently, the findings underscore the imperative of prioritizing Progress assurance, Hierarchical and delegated management, and Transparency and accountability assurance among potential influential factors. Thirdly, Responsibilities fulfillment, Aligned implementation organization, and Efficient operation system emerge as pivotal in indirect contributions to the enhancement of road usage charge management performance. These insights offer meaningful advancements towards the refinement of effective and sustainable road usage charge management practices in Vietnam, with potential applicability to analogous challenges faced by other nations.

This study enhances the extant knowledge base pertaining to the focal phenomenon on multiple fronts. Primarily, we developed and substantiated a conceptual framework for the organizing function within the realm of road usage charge management. This framework serves as a supplementary metric for gauging behavioral changes in human resource management. Furthermore, we introduced six requisite behaviors essential for refining scoring protocols in the evaluation of organizational functionality. These contributions hold significance for scholars and practitioners alike, aiding in the comprehensive identification and exploration of latent and deeply entrenched issues, their origins, and potential remedies.

To gain a more comprehensive understanding of the organizational dynamics involved in optimizing road usage charge management, further investigation and exploration are necessary. Future research should aim to identify and examine additional variables and contextual factors that could potentially contribute to management performance. By considering a broader range of factors, researchers can uncover hidden relationships and shed light on the multifaceted nature of effective management in the context of road usage charge systems. Moreover, delving deeper into these unexplored areas can provide valuable insights into the mechanisms and processes that underpin the relationship between organizational behaviors and management performance. By investigating these factors, researchers can identify critical areas for improvement and develop strategies that address the specific challenges faced by road usage charge management systems.

Ultimately, the current study's limitations, particularly the absence of significant relationships between certain organizing behaviors and management performance, necessitate further scholarly inquiry. By expanding the scope of investigation and examining additional variables, researchers can refine existing theoretical models and enhance our understanding of the organizational factors that drive successful road usage charge management.

5. Conclusions

The primary objective of this study was to develop a conceptual framework for the organizing function within the context of road usage charge management. Utilizing a combination of Focus Group Sessions (FGS), extensive literature review, and interviews with industry experts, six distinct attributes of the organizing function were identified. Data gathered in Vietnam underwent analysis employing Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) with Partial Least Squares (PLS) estimation to evaluate the framework's reliability, factor structure, and the significant relationships between functional aspects and management performance. The study effectively operationalized the framework and contributed valuable insights into how the organizing function influences management performance.

The organizing function highlights the importance of Responsibilities fulfillment (OR1), Progress assurance (OR2), Aligned implementation organization (OR3), Hierarchical and delegated management (OR4), Efficient operation system (OR5), and Transparency and accountability assurance (OR6), which are crucial in the context of road usage charge management. Findings from this study indicate that Progress assurance (OR2), Hierarchical and delegated management (OR4), and Transparency and accountability assurance (OR6) significantly contribute to improved management performance in road usage charge management. Furthermore, these behaviors also serve as mediators between Responsibilities fulfillment (OR1), Aligned implementation organization (OR3), and Efficient operation system (OR5). These findings emphasize the importance of the organizing function as a prioritized management tool for achieving success in road usage charge management. Consequently, it is recommended to promote greater effort and involvement among relevant stakeholders to enhance the effectiveness of road usage charge management.

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