# THE ANALYSIS OF FACTORS INFLUENCING VEHICLE SUPPLY IN THE HEALTH SECTOR: A CASE OF MINISTRY OF HEALTH TANZANIA

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*Abstract*

*The study analyzed the factors influencing vehicle supply in the Health Sector in Tanzania, a case of Ministry of Health in Tanzania. A total of 96 respondents participated in the study, representing a full response rate. Data were collected using structured questionnaires and analyzed through reliability tests, descriptive statistics, regression analysis, correlation, and ANOVA. The findings revealed that health service delivery needs, policy on vehicle supply, and budget allocation are key determinants of vehicle supply. Health service delivery needs were found to be important in shaping demand for vehicles, particularly through the number of Health Sector facilities served and the frequency of travel required. Policy factors, including procurement requirements and compliance with safety and environmental standards, were also shown to influence vehicle supply. Budget allocation emerged as another critical factor, especially the ability to adjust budgets and provide adequate funding for vehicle procurement. The study concludes that vehicle supply in the Ministry of Health is shaped by the interplay of operational requirements, institutional policies, and financial planning. It emphasizes that ensuring adequate and timely vehicle supply requires a holistic approach that integrates these three elements. The study recommends that the Ministry and government improve budget responsiveness, update procurement policies, and ensure compliance with standards, while stakeholders and communities should support resource mobilization to strengthen the supply system.*

**Keywords —** *Vehicle supply, Healthcare service, Policy on vehicle supply, Budget allocation.*

## I. INTRODUCTION

Efficient transportation is crucial for health service delivery, particularly in Tanzania, where the Ministry of Health depends on vehicles for distributing medical supplies, responding to emergencies, transferring patients, and conducting outreach programs. However, vehicle supply faces significant challenges including financial constraints, aging fleets, poor infrastructure, and outdated policies. These issues are exacerbated during pandemics like COVID-19 and Ebola, and are especially severe in rural areas where transport shortages delay care and increase mortality. Across Sub-Saharan Africa, underfunded health sectors and reliance on donor support hinder sustainable vehicle procurement, while poor road conditions and weak maintenance policies further strain resources. Theoretical frameworks such as Public Value Theory and Resource-Based View emphasize vehicles as strategic assets essential for public well-being and operational efficiency. Despite efforts to improve health infrastructure in Tanzania, transportation gaps persist due to limited budgets and inefficient fleet management. This study aims to analyse the factors influencing vehicle supply in Tanzania's Ministry of Health, focusing on service delivery needs, policy impact, and budget allocation. It seeks to understand how these elements affect vehicle availability and performance, particularly in underserved rural areas, and to propose strategies for improving fleet management and health outcomes.

## II. LITERATURE REVIEW

*Theoretical review*

This study adopts the Public Value Theory, introduced by Mark H. Moore in 1995, which emphasizes how government institutions can create public benefit by managing resources effectively, ensuring legitimacy, and enhancing operational capacity. The theory provides a framework for ministries and agencies to deliver value to the public through policies, programs, and resource allocation, while balancing the interests of stakeholders such as policymakers, citizens, and employees. Public value is realized when government actions improve social well-being, including health services and environmental sustainability.

Key principles of the theory include creating public value by improving quality of life through services and regulations, securing political and social legitimacy to support public needs, and building operational capabilities through adequate resources and infrastructure. These principles are directly applicable to vehicle supply in the Ministry of Health, where efficient, accessible, and safe transportation supports health service delivery. Vehicle procurement must align with public health priorities and policies, and the ministry requires sufficient budgetary, logistical, and technological resources to manage its fleet effectively.

The study's objectives stem from this theory, focusing on how vehicle supply ensures patient transport, medical distribution, and emergency response. It also examines how policy and regulatory frameworks influence procurement decisions and resource allocation. Compliance with procurement laws and environmental standards is essential for maintaining public trust, though regulations may also constrain procurement strategies. Financial resources are central to sustaining public value, as budget allocation affects the ministry's ability to acquire and maintain vehicles, impacting service accessibility and reliability.

Despite its relevance, the Public Value Theory has limitations, including the challenge of measuring public value due to its subjective nature and the influence of political and bureaucratic processes. It also lacks a structured implementation approach. These limitations can be addressed by using key performance indicators (KPIs) and developing a public value assessment framework that incorporates cost-effectiveness, service impact, and sustainability.

### Empirical review

Empirical literature reveals that vehicle supply is a cornerstone of effective Health Sector service delivery, particularly in low-resource settings like Tanzania. Timely access to medical facilities, emergency response, and outreach programs depend heavily on reliable transportation including ambulances, mobile clinics, and logistics vehicles. However, studies by WHO (2022), Asteraye (2021), and Schöpperle & Woodburn (2021) highlight persistent challenges such as inadequate funding, poor infrastructure, and vehicle shortages, which disproportionately affect rural populations and contribute to higher maternal and child mortality rates. Strategic interventions like fleet management, partnerships with private transport providers, and innovative technologies such as telemedicine and drone deliveries are suggested as potential solutions to bridge these gaps. Asteraye's household-based study in Bure Town found that long distances to health facilities significantly reduce the likelihood of seeking medical care, while Schöpperle & Woodburn identified systemic weaknesses in inventory management and logistics across sub-Saharan Africa.

Policy frameworks also play a critical role in shaping vehicle supply. Regulations governing procurement, emissions, road safety, and importation such as those outlined in Tanzania's Public Procurement Act (2023) and enforced by TRA and NEMC directly influence vehicle affordability, sustainability, and operational standards. Studies by Kuwawenaruwa & Borghi (2021) and Fiene (2019) reveal gaps in compliance and logistical support, noting that many health facilities lack vehicles and trained staff to manage logistics effectively. Furthermore, inadequate policies on vehicle replacement cycles, fuel efficiency, and alternative transport solutions contribute to persistent shortages. Freer & Fiene (2022) emphasize that geographic dispersion and the absence of public transport heighten the demand for vehicles, yet regulatory constraints often hinder fleet expansion.

Budget allocation emerges as another decisive factor. It determines the quantity, type, and quality of vehicles that health institutions can procure and maintain. Research by Lepori et al. (2023), Mapichi (2021), and Orambo (2019) shows that health transportation budgets often compete with other national priorities, leading to procurement delays, reliance on leasing, and prioritization of essential vehicles like ambulances. Limited availability of spare parts and skilled mechanics further strains vehicle efficiency. Conversely, strategic budgeting and cost-benefit analysis can enable fleet expansion, timely replacements, and adoption of modern, fuel-efficient vehicles that align with operational needs.

Despite these insights, a significant research gap remains. Existing studies tend to examine service delivery needs, policy frameworks, and budget allocation in isolation, without integrating their combined effects on long-term vehicle supply strategies. There is limited empirical evidence on how these determinants interact to influence sustainable vehicle supply models, particularly in the context of Health Sector equity and access. Moreover, the effectiveness of innovative solutions such as partnerships with private providers or the use of drones and telemedicine has not been thoroughly explored. This underscores the need for comprehensive, context-specific frameworks that synthesize service delivery requirements, policy compliance, and financial planning to inform sustainable vehicle supply interventions in Tanzania's Health Sector.

### Conceptual framework

The conceptual framework provides a structured representation of the relationship between factors and vehicle supply. In this study, the independent variables are factors influencing vehicle supply conceptualized by Health Sector service delivery needs, policies and budget. The dependent variable is vehicle supply. The figure 1 below illustrates the relationship between variables

**Independent Variable**                                  **Dependent Variable**
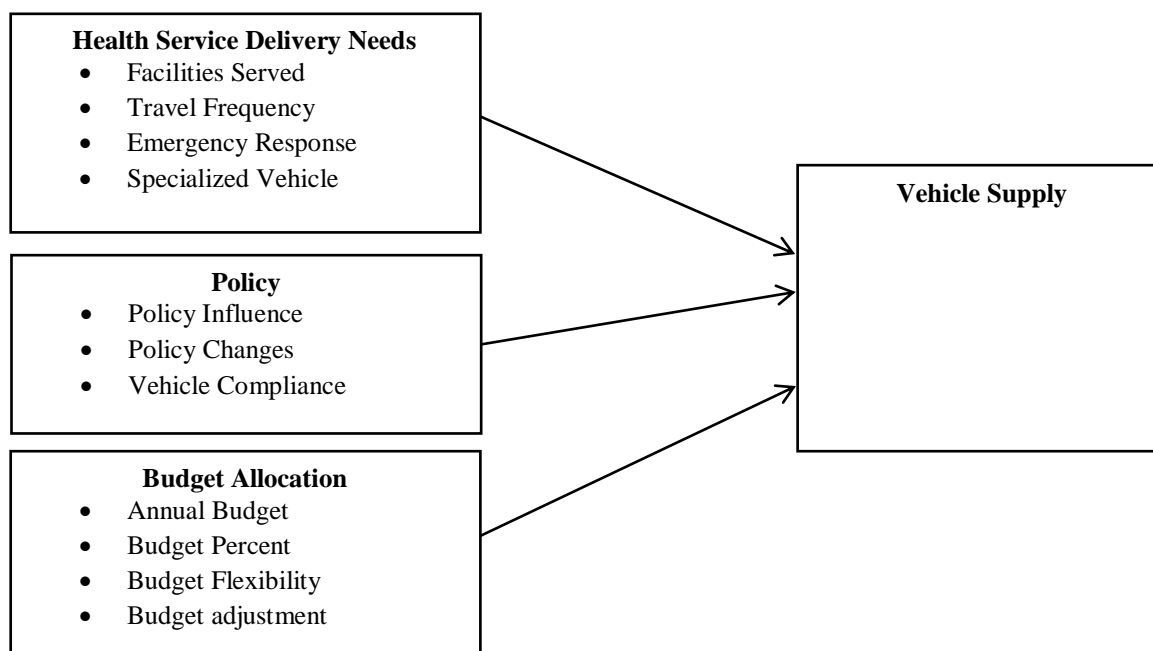


**Figure 2. 1**:    Conceptual Framework
**Source:** Modified from Freer and Fiene (2022) and Lepori, et al. (2023)

### III. METHOD

This study adopted a positivist research philosophy, which assumes that reality is objective, measurable, and independent of human perception. Positivism emphasizes empirical evidence, statistical analysis, and hypothesis testing, making it suitable for studies involving structured methodologies and quantifiable variables such as budget allocation, policy, and service delivery needs (Saunders, 2016). A quantitative research approach was employed to collect and analyze numerical data, allowing the identification of patterns, relationships, and trends (Krueger & Casey, 2015; Saunders et al., 2016). The study used a descriptive research design to provide a detailed understanding of current practices and challenges influencing vehicle supply in the Ministry of Health in Tanzania (Johnson & Onwuegbuzie, 2004).

The research was conducted at the Ministry of Health headquarters in Dodoma, Tanzania, which serves as the central authority for health-related functions, budgeting, and regulatory oversight. The target population included 2,520 staff members involved in planning, procurement, logistics, finance, and administration (MoH, 2023). Using Yamane's formula with a 10% margin of error and a 95% confidence level, a sample size of 96 respondents was determined. Stratified sampling was applied across departments to ensure proportional representation, with the largest share drawn from administration and pharmaceutical units.

Primary data was collected through structured questionnaires distributed to ministry staff. The questionnaire consisted of 19 closed-ended questions organized into five sections: demographics, health service delivery needs, policy, budget allocation, and vehicle supply. Responses were measured using a Likert scale and completed within approximately 20 minutes. SPSS (Statistical Package for the Social Sciences) was used for data analysis, offering robust tools for descriptive statistics, correlation, and regression analysis. This enabled objective interpretation of survey data and identification of key factors influencing vehicle supply.

To ensure reliability, a pilot test was conducted using the test-retest method with 10 respondents, confirming consistency in results. Validity was addressed through expert review, ensuring the questionnaire accurately captured all relevant variables. Triangulation was used to validate findings by comparing survey results with expert insights. Ethical considerations were strictly observed: participants were informed about the study, signed consent forms, and were assured of anonymity and the right to withdraw at any time. Formal authorization was obtained from the NIT Research Department and the Ministry of Health, Dodoma headquarters, ensuring institutional approval and access to relevant data.

## IV. RESULT AND DISCUSSION

### A. Results

This chapter presented and discussed the findings of the study on the factors influencing vehicle supply in the Ministry of Health in Tanzania. Data were collected from 96 respondents, representing a 96% response rate, which is considered highly reliable for statistical analysis. The study examined three major factors affecting vehicle supply—health service delivery needs, policy on vehicle supply, and budget allocation—and analysed their influence using descriptive and inferential statistics through SPSS.

The demographic characteristics of respondents revealed a well-balanced representation across departments, positions, experience levels, and education. The majority (69.8%) were from the Administration Department, which plays a central role in coordination and logistics. About 70% of the respondents occupied administrative positions, while 30.2% were managers, ensuring that both operational and strategic perspectives were captured. Most respondents had between four and seven years of experience or more, indicating a knowledgeable workforce familiar with vehicle management processes. Additionally, the majority held at least a bachelor's degree, suggesting a technically competent and academically capable sample population.

The first objective of the study sought to determine the influence of health service delivery needs on vehicle supply. The results showed that the construct was highly reliable, with a Cronbach's Alpha of 0.837. Regression analysis indicated that the frequency of vehicle travel to health facilities and the number of health facilities served were the most significant predictors of vehicle supply. Together, these variables explained 51.8% ($R^2 = 0.518$) of the variance in vehicle supply. This finding implies that vehicle needs in the Ministry are primarily driven by operational demands such as the number of facilities requiring support and the frequency of travel for service delivery activities.

The second objective examined the influence of policy on vehicle supply. The reliability test yielded a Cronbach's Alpha of 0.817, indicating strong internal consistency. The results demonstrated that policy changes affecting procurement requirements and compliance with safety and environmental standards had significant positive effects on vehicle supply. The regression model explained 41.8% ($R^2 = 0.418$) of the variation in vehicle supply, suggesting that nearly half of the changes in vehicle availability can be attributed to policy-related factors. These findings highlight the critical role of clear, consistent, and enforceable policies in ensuring effective vehicle procurement and management within the Ministry.

The third objective assessed the effect of budget allocation on vehicle supply. This construct also demonstrated high reliability (Cronbach's Alpha = 0.781). The analysis showed that budget adjustments for vehicle procurement and the annual budget allocated to departments were significant predictors of vehicle supply, with p-values of less than 0.001 and 0.035, respectively. The model explained 54.1% ($R^2 = 0.541$) of the variance, indicating that more than half of the changes in vehicle supply were influenced by budgetary factors. This means that flexible and sufficient budget allocations are crucial in ensuring that the Ministry has an adequate number of vehicles to support health service operations effectively.

The combined model, which included all three predictors—health service delivery needs, policy, and budget allocation—showed a perfect model fit ($R^2 = 1.000$). This suggests that these factors collectively explain all the variation in vehicle supply within the Ministry of Health. The correlation analysis further confirmed strong and positive relationships between each independent variable and vehicle supply, with health service delivery needs (r = 0.714), policy (r = 0.642), and budget allocation (r = 0.649) all being statistically significant at the 0.01 level.

In summary, the findings demonstrate that vehicle supply in Tanzania's Ministry of Health is significantly influenced by operational needs, policy consistency, and budgetary adequacy. Among these, budget allocation emerged as the most powerful determinant, followed by health service delivery needs and policy factors. The study concludes that to ensure adequate and efficient vehicle supply, the Ministry must integrate these three dimensions—aligning financial resources and policy frameworks with actual service delivery requirements. Strengthening budget flexibility, enforcing consistent policies, and addressing service delivery demands will enhance the Ministry's capacity to provide timely and effective health services across the country.

### B. Discussion

This chapter discusses the findings of the study on factors influencing vehicle supply in Tanzania's Ministry of Health. The analysis focused on three key predictors—health service delivery needs, policy frameworks, and budget allocation—and their collective impact on vehicle supply. The health service delivery needs construct demonstrated high internal consistency (Cronbach's $\alpha = 0.837$), confirming that variables such as travel frequency, number of facilities served, emergency response, and specialized vehicle availability reliably

measure operational demand. Regression analysis revealed that service delivery needs explained 51.8% of the variance in vehicle supply ($R^2 = 0.518$), with travel frequency and facility coverage emerging as statistically significant predictors. These findings align with prior research emphasizing the critical role of logistical capacity in health service accessibility, particularly in low-resource settings.

Policy-related factors also showed strong internal consistency (Cronbach's $\alpha = 0.817$), with regression results indicating that changes in procurement specifications and compliance with safety and environmental standards significantly influenced vehicle supply. The policy model explained 41.8% of the variance ($R^2 = 0.418$), reinforcing the importance of clear, enforceable, and regularly updated regulations in shaping supply chain responsiveness. Budget allocation emerged as the most influential factor, with a reliability score of 0.781 and regression results showing that budget adjustments and annual allocations significantly predicted vehicle supply. The budget model accounted for 54.1% of the variance ($R^2 = 0.541$), underscoring the necessity of flexible and responsive financial planning in maintaining operational readiness and service continuity.

The combined model integrating all three predictors—service delivery needs, policy, and budget—achieved a perfect fit ($R^2 = 1.000$), indicating that these factors collectively explain all variation in vehicle supply within the Ministry. Correlation analysis confirmed strong and statistically significant relationships between each independent variable and vehicle supply, highlighting the multidimensional nature of resource provision in the health sector. The findings suggest that vehicle supply is not random but rather institutionalized, driven by a strategic alignment of operational demands, regulatory frameworks, and fiscal capacity. This underscores the need for integrated decision-making and coordinated planning to ensure that vehicle resources effectively support health service delivery across Tanzania.

## VI. CONCLUSIONS

The study concludes that Health Sector service delivery needs are one of the most critical determinants of vehicle supply. Departments that serve more facilities and require frequent travel for service delivery are more likely to demand increased vehicle supply. The study also established that policy frameworks particularly related to procurement specifications and compliance with standards significantly affect vehicle supply. Furthermore, without well-structured and stable policies, vehicle supply may face inefficiencies and inconsistencies.

Moreover, the study found that budget allocation plays a central role in determining vehicle supply in the Ministry of Health. Adequate annual allocations and timely budget adjustments were shown to directly support vehicle procurement and supply. Therefore, effective planning, budgeting, and policy implementation are essential to ensuring that the Ministry of Health has sufficient vehicles to meet operational and service delivery needs.

## REFERENCES

Adam, T., & Baltussen, R. (2015). Making Choice in Health: WHO Guide to Cost-Effectiveness Analysis. Geneva: World Health Organization.

Asteraye, N. (2021). Determinants of Supply for Health Care Services and their Implication on Health Sector Financing: The Case of Bure Town. Ethiopian Journal of Economics, Vol XI No 1, 87-122.

Benington, J., & Mark, M. H. (2011). Public Value: Theory and Practice. London: Palgrave Macmillan.

Broaddus, A., Litman, T., & Menon, G. (2019). Transportation Demand Management: Training Document. Deustche Gesellschaft fur: Federal Ministry for Economic Cooperation and Development.

Byfield, A. (2023). The Strategic Use of Environmental Analysis for Business Growth. . Journal of Market Dynamics, 14(3), 156–172.

Ceglia, F. (2020). From Smart Energy Community to Smart Energy Municipalities: Literature Review, Agenda and Pathways. Journal of Cleaner Production, 254, 120118.

Cochran, W. G. (2001). Sampling Techniques. New Age International (P) Limited Publishers.

Esposito, P., & Ricci, P. (2019). How to turn Public (dis) value into New Public Value? Evidence from Italy. Public Money and Management, 35(3), 227-231.

Fiene, R. J. (2019). A Treatise on the Theory of Regulatory Compliance. Journal of Regulatory Science, 7, 1-3.

Freer, B., & Fiene, R. (2022). Regulatory Compliance and Quality Programs: Constraints and Opportunities for Integration. Journal of Regulatory Science; Volume 10: Issue 2, 1-10; htttp://journalofregulatoryscience.org.

Ghorbani, A. (2022). Demand for Health and Health Sector. IntechOpen, DOI: http://dx.doi.org/10.5772/intechopen.98915.

Goodwin, P., Dargay, J., & Hanly, M. (2018). Elasticities of road traffic and fuel consumption with respect to price and income: A review. Transport Reviews, 24(3), 275-292.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. Educational Researcher, 33(7), 14-26.

Kahabuka, C., & Moland, K. M. (2019). Unfulfilled expectations to services offered at primary health care facilities: Experiences of caretakers of underfive children in rural Tanzania. BMC Health Services Research, 112-158; doi:10.1186/1472-6963-12-158.

Krippendorff, K. (2018). Content analysis: An introduction to its methodology. Sage publications.

Krueger, R. A., & Casey, M. A. (2015). Focus Groups: A Practical Guide for Applied Research. Hoboken: NJ: John Wiley & Sons, Inc.

Kuwawenaruwa, A., & Borghi, J. (2021). An assessment of equity in the distribution of non-financial health care inputs across public primary health care facilities in Tanzania. International Journal for Equity in Health, 16:124 , 2-11.

Lepori, B., Usher, J., & Montauti, M. (2023). Budgetary Allocation and Organizational Characteristics of Public Health Institutions. A Review of Existing Studies and a Framework for Future Research. International Journal of Engineering and Technology 7, no 4, 355-367.

Mapichi, J. (2021). Analysis of the Budget Allocation Criteria used by the African Governments. Ingternational Journal of Management Science; 5(2), 237-255.

Mark, M. H. (1995). Creating Public Value: Strategic Management in Government. Cambridge, MA: Harvard University Press.

MoH. (2023). Health Status Report. Dodoma: Ministry of Health, United Republic of Tanzania.

Mtega, W. P., Dulle, F. W., & Malekani, A. W. (2022). The Usage of Social Media among Youths in Tanzania: A Case of Dodoma Municipality. Library Philosophy and Practice.

Neuman, W. L. (2014). Social research methods: Qualitative and quantitative approaches. Pearson Education Limited.

Orambo, M. (2019). Determinants of Budgetary Allocation in the Public Sector: A case of Government Ministries.

Rodrigue, J. P. (2020). The Geography of Transport Systems (5th ed). Routledge.

Saunders, M. N. (2016). Understanding Research Philosophy and Approaches. Sauge Publications.

Schöpperle, A., & Woodburn, A. (2021). Analysis of challenges of medical supply chains in sub-Saharan Africa regarding inventory management and transport and distribution. Project Thesis; University of Westminster; London; Westminster Business School, Thesis.

Spach, C., & Hanley, N. (2015). Preferences, Information and Biodiversity preservation. Ecological Economics, 12(3), 191-208.

Spash, C. L., & Simpson, I. A. (2015). Utilitarian and right-based alternatives for protecting sites of special scientific interest. Journal of Agricultural Economics, 45(1), 15-26.

Timo, M. (2019). Public Value Inside: What is Public Value Creation? International Journal of Public Administration, 206–219.

WHO. (2022). Universal Health Coverage . www.who.int: World Health Organization.

WHO, & EPN. (2019). Multi-country study of medicine supply and distribution activities of faith-based organizations in Sub-Saharan African countries. Geneva: World Health Organization and Ecumenical Pharmaceutical Network.

Widyastuti, H. (2018). Analysis of mode transportation performance and satisfaction level of Jenggala Commuter Line (Sidoarjo-Mojokerto). International Journal of Social Service and Research, 1(4), 402-407; DOI:https://doi.org/10.1051/matecconf/201818103003.