THE MANAGEMENT OF MUNICIPAL SOLID WASTE GENERATED BY BUSINESSES OPERATING IN THE CITY OF TSHWANE, SOUTH AFRICA

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ABSTRACT

The aim of the study was to assess factors that affect efficiency in the management of municipal solid waste in the City of Tshwane. The study focuses on municipal solid waste routinely generated by 1, 034 businesses that operate in Tshwane. Data was collected on 7 categories of solid waste (industrial, commercial, institutional, construction and demolition, municipal services, processing and manufacturing, and agriculture). Efficiency in solid waste management was assessed by using a structural time-based model designed for evaluating efficiency as a function of the length of time required to manage waste. Efficiency was measured as a dichotomous (efficient, inefficient) dependent variable of study at each of the 1, 034 businesses that were selected for the study, and was subsequently regressed on a set of predictor variables that are well known to affect efficiency in solid waste management. Statistical data analysis was performed by using methods such as frequency tables, Pearson's chi-square tests of association, binary logistic regression analysis and multilevel analysis. At each of the 1, 034 businesses selected for the study, the degree of adherence to municipal bylaws and procedures recommended for solid waste management by businesses by the City of Tshwane was graded based on ISO 14000 and ISO 14031 standards and guidelines defined by the Canadian Bureau of Standards. The study found that 857 of the 1, 034 businesses selected for the study (83%) were efficient with regards to the proper collection and disposal of solid waste, whereas 177 of the businesses (17%) were inefficient. Old businesses and businesses operated by owners were found to be more efficient than young businesses and businesses operated by employed managers. Businesses that were efficient in the management of municipal solid waste practiced better personal hygiene, environmental sanitation, source reduction of waste, the provision of waste disposal bins to customers at their business premises, inspection of business premises for sanitation, in comparison with inefficient businesses. The average deviation time (deviation from the regular pick-up time of waste from business premises) of municipal waste collection trucks was equal to 8.89 minutes. Results obtained from binary logistic regression analysis showed that efficiency in solid waste management was adversely affected by 4 predictor variables. These 4 predictor variables were lack of adherence to municipal bylaws and regulations [OR=9.17; 95% C. I. = (6.42, 12.54)], wrong perception on the merits of adhering to municipal bylaws on solid waste management [OR=8.81; 95% C. I. = (6.01, 11.35)], failure to provide customers with enough trash cans [OR=3.15; 95% C. I. = (1.46, 5.87)], and the operation of businesses by employed managers [OR=2.69; 95% C. I. = (1.66, 4.32)], in a decreasing order of importance. Results obtained from multilevel analysis showed that there were significant differences among the 7 categories of waste, and that businesses within the same category of waste and geographical location were equally efficient in the management of solid waste.

Key words: Integrated municipal solid waste management system, Pretoria, Efficiency, Structural time-based model, Odds ratio, Multilevel analysis.