

International Sanitation Management and Performance Measurement: Taking Out the Trash

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Internationally, sanitation management has been a critical area of contention, especially in recent years with tightening budgets and resource reductions to public services. Our article reviews the management strategies, actions, and developments that have led to sanitation incidents of piling trash and public health concerns. These incidents will be reviewed from a public management perspective underscoring the role of performance measurement and management. The key influences associated with the varying cases are discussed. Both the negative and positive factors of international cases of sanitation management are reviewed.

Keywords: performance measurement, city services, sanitation, management, international

INTRODUCTION

The following study reviews the similarities and differences of international sanitation incidents. Sanitation management has been a critical area of contention for public service, and may continue to be so as governments face a tightening of public service budgets and resource reductions. A review of the management strategies, actions, and developments that have led to sanitation incidents of trash piling up and public health concerns is presented below. These incidents are discussed from a public administration perspective, highlighting managerial implications, public-private contracts, and the roles of non-profits and the public. In addition, our study also looks at how performance measurement has played a role in government services, specifically sanitation management.

International sanitation incidents vary in the types of problems and solutions. However, organizations such as the International Solid Waste Association (ISWA) are aimed “to promote and develop sustainable and professional waste management worldwide” (ISWA, 2012). A review of the cases of international issues and management of sanitation paints a picture of variance but also of commonality.

Limited public resources and calls for increased efficiency have led government managers to adopt modern strategies.

Following the New York City (NYC) fiscal crisis in the late 1970s to early 1980s, for example, use of performance measurement is credited as an important factor in the turn-around of sanitation services. While use of performance measurement and management is widely regarded as an effective tool for achieving efficiencies in concrete services such as waste disposal, adoption and implementation of modern management techniques has been inconsistent, and their promises thus not fully achieved.

PERFORMANCE MEASUREMENT

Increased costs of services are not unique to waste management, but rather a part of a larger trend affecting many government functions. Given that in the current climate demand for public services outpaces the ability to fund them, a popular response has been to seek greater accountability and efficiency from government institutions (Hatry, 1990; Allen, 1996; Ammons, 1996, 1997; Newcomer & Caudle, 2011).

Calls for more responsive and lean government are framed often as adopting best practices from business to improve performance of public sector agencies and switching the perspective of provider to be more “customer-oriented.” In that vein, governmental reforms have instituted more decentralized governance and increased freedom to choose between alternative provisions of services, including private contracting, in return for greater accountability

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for results. (Hatry, 1997) Performance measurement systems (namely the regular collection of public service indicators, particularly outcome and efficiency measures as opposed to input and outcome measures) are a mainstay of these reforms (Pollit & Bouckaert, 2004), which have been adopted in a number of countries, including the United States and many Organization of Economic Cooperation and Development (OECD) countries, as well as Canada, Australia, and New Zealand (Blair, 2000; Poister & Streib, 2005; Plumridge, 2007; Boyle, 2009).

The impacts of new performance management have been heralded with some notable international case studies, including Compstat in New York City (Smith & Bratton, 2001) and Citistat in Baltimore (Behn, 2007), as well as general reforms in the U.K. (Bovaird, 2000), Australia and New Zealand (Pierce, 1997), Canada (Pollanen, 2005), Italy, and Spain (Padovani, 2005). While adoption of performance measurement systems has been widely embraced, implementation experiences have fallen short of the promises and are viewed as wildly uneven (DeLancer Julnes & Holzer, 2001; van Thiel & Leeuw, 2002; Kelly, 2003; Halachmi, 2005; Melkers & Willoughby, 2005; van Dooren, 2005; Moynihan, 2010).

Inconsistent adoption of performance measures is in part due to the multiple purposes to which they are applied (Behn, 2003). Some of these purposes or goals may be in conflict with each other (Halachmi, 2005), and these monitoring systems necessarily increase bureaucratic overhead. While the costs are real, the benefits are not guaranteed (Halachmi, 2005). Political and contextual culture factors also influence the course of adoption (Radin, 2000; DeLancer Julnes & Holtzer, 2001).

In the literature, there is a wide variety of factors associated with successful implementation of performance measurement systems. Ammons and Rivenbark (2008) cite three factors as being key in determining whether performance indicators are used to improve service delivery:

- (1) collection of higher order measures (i.e., the measurement of outcomes as opposed to outputs)—especially measures of efficiency,
- (2) the comparison of with other governments, departments, or providers, and
- (3) the incorporation of performance measures into management practice.

Padovani (2005) discusses the factors associated with successful implementation of performance management systems with an international comparative perspective of Italy and Spain. Although Italy and Spain are described as relatively late adopters of new public management principles, performance measurement is a central component of broad municipal reforms in Italy. The results of implementation in Italy have been uneven, while in Spain, implementation of performance measurement has been less broad-based,

and not the focus of any specific law, but sometimes as a secondary component of other laws.

The application of new public management principles to developing countries has followed a different path. Wanting to apply the latest thinking and technologies to the governance of emerging markets, many have called for adoption of accountability and performance measures. But cautions have been raised about the appropriateness of such transfers (Shick, 1998; Blair, 2000; Minogue, 2004; Ohemeng, 2010)

SANITATION'S USE OF PERFORMANCE MEASUREMENT

National and contextual factors influence the adoption and implementation of performance measurement, but sectoral differences can also play a role. It is easier to define and collect data in a department that delivers straight-forward services, such as issuing a driving licenses or passports, than for services with multiple goals and indicators, such as education or defense (Pollit, Thiel, & Homburg, 2007). Residential waste management falls into the category of more straight-forward services, as it is easy to define and measure the weight/volume of garbage removed, and the manpower and equipment required to do so. Certain quality standards are relevant, such as whether the service is being provided backdoor, curbside, or self-drop-off. In addition, it is relevant to know what percent of garbage is being collected, whether there is sorting or recycling, whether garbage is being sent to an incinerator, or to a landfill (and whether the latter is a sanitary one). Nevertheless, most of these issues can be sorted out to enable comparisons and benchmarks.

Given that sanitation is a prime target for benchmarks, there have been several documented successful case studies of performance management applied to waste management. Using the NYC sanitation system's rise out of the ashes of the 1970s fiscal crisis as an example, Holzer (1988) outlines how labor-management cooperation, technological innovation, measurement, and management were brought together to dramatically improve refuse collection productivity, enhance street cleanliness, reduce night collections, increase vehicle availability, and advance waste disposal, recycling, and resource recovery. Labor unions were brought into the decision-making process, initiatives to improve productivity were measured through the semi-annual Mayor's Management Report and tracked, technological innovations such as the two-man truck led to savings, and management improved its ability to act.

In another example, Ammons and Rivenbark (2008) review 15 North Carolina cities in a decade-long comparative performance Benchmarking Project. Performance data were put to very good use with efficiency measures for residential waste management. One of the cities noted that their per-unit costs were far higher than other cities. They found that they had less productivity due

to under-utilization of labor and equipment. In response, they discontinued a private contract and expanded their own municipal coverage, saving the city \$400,000 a year. In another case, performance indicators for refuse collection were used to avoid a cost hike, pointing out that productivity was low and complaints were high compared to other municipalities. In a third example, benchmark data were used to spearhead technological changes and the reduction of crews to one-person, cutting costs substantially. Fourth, a city increased its recycling from 14 percent to 24 percent, extending the lifetime of its landfill, and another city privatized its recycling services, and reduced its costs of collecting recyclables by 24 percent.

Moore et al. (2005) use Data Envelopment Analysis to evaluate the delivery of 11 services in 46 large U.S. cities from 1993 to 1998. Solid waste management is one of the services evaluated—measured as the number of citizens served relative to number of FTE staff and solid waste budget. They find wide variation in efficiency of services. Analysis of some exogenous variables show that whether a city is run by a city manager instead of a mayor improves productivity, as does a higher percentage of services provided locally as opposed to at the state or regional level, and lower per capita tax revenue. They find big gaps in data availability, including budget data that are not publicly available and performance measures that are not transparent. They recommend that cities adopt rigorous benchmarking techniques to improve efficiency of municipal services.

Marques and Simoes (2009) examine the model of regulation in Portugal with regards to solid waste management performance. Portuguese regulatory changes called for open and public discussions of performance in services such as waste management, most notably the existence of a regulatory agency over the solid waste sector. The use of benchmarking as a tool of performance measurement, and new regulatory practices, have led to increased performance of Portugal waste management's quality of service (Marques & Simoes, 2009). However, Marques and Simoes (2009) found little economic efficiencies regardless of public or private ownership. Garcia-Sanchez (2008) reviewed street cleaning and waste collection services in Spanish municipalities finding opportunities for service delivery with reduced resources. Their definition of municipal environment through a tourist index was found to be statistically significant in efficiency levels. Garcia-Sanchez (2008) also found little differences in efficiencies between public and private service delivery.

In developing countries, the considerations for solid waste management are substantially different (Kinnaman & Fullerton, 1999). Municipalities generally do not collect the bulk of the garbage (Cointreau-Levine, 1994), with much of the work being done by either households themselves, or collectors taking garbage to transfer stations. Scavenging is a big piece of the recycling taking place in these economies (Beede & Bloom, 1995). Higher wages increase waste

for disposal, and so emerging economies are experiencing greater pressure to better manage their garbage.

METHODOLOGY

The following review of international cases is a qualitative review that aims to cover a diverse example of international sanitation issues. The method for case selection includes an Internet search via Google Scholar utilizing a range of key word indicators. Academic articles and case studies were sought that underscored international sanitation and trash issues. The purpose was to be able to establish a wide range of cases that reflect various issues associated with waste management. The date range was limited to the past two decades in order to highlight the more contemporary issues. In addition, performance and waste management journals were also searched for relevant cases.

A number of international cases were identified and were able to serve as the qualitative review of the literature that allows for an outline of both positive and negative influences in the waste management issues. The next section provides a summary review of the selected cases and is intended as a qualitative review. This research was not intended to be a quantitative representation of all cases, but rather to capture as many contemporary research cases that were published. Additional international cases throughout the world may exist that are not represented in the literature.

SANITATION — INTERNATIONAL MANAGEMENT

The following review of international sanitation cases looks specifically at the critical factors of influence, both negative and positive. The summary review of cases (Table 1) provides an outline of all the factors. Some countries and municipalities face sanitation issues as a result of corruption, politics, and organized crime. Davis (2004) outlined the strength and weakness in strategies towards reducing corruption in sanitation services of South Asia. Davis noted that the corruption with sanitation service delivery in South Asia was at a such a sophisticated and pervasive point that reforms were challenging, but nonetheless there were some encouraging strategies, such as technology, that appeared to be reducing the corruption. Information technology allowed for easier and more effective monitoring of staff activities. Pasotti (2010) underscores the challenges of waste management in Southern Italy—from illegal dumping and organized crime to near capacity landfills. Efforts to improve sanitation management have fallen short as decision makers allow for political aspects to override technical expertise and improvements. Moreover, Fredericks (2008) reviews how the cultural-political developments in waste management in Dakar have been underscored by gender roles. In Mexico,

TABLE 1
International Sanitation Management Overview

<i>Location</i>	<i>Positive Influences</i>	<i>Negative Influences</i>	<i>Misc. Factors</i>	<i>Reference</i>
South Asia	Use of Information Technology	Municipal corruption		Davis (2004)
South Sulawesi	Community involvement	Limited resources		Dilla et al. (2007)
New York	Community involvement	Fiscal; Limited resources		Chung & Marks (2010)
Philippines	Community involvement		Environmental concerns	Macawile & Su (2009)
Nigeria	Private-Public collaboration			Adeniji & Afloabi (2010)
Mexico		Lack of community discourse; politics		Moore (2008)
Malaysia	National collaboration/plan	Limited resources		Sakawi (2011)
Dakar			Cultural-Politics; gender	Fredericks (2008)
Brazil	Community involvement			Nance & Ortolano (2007)
India	Non-profit NGOs and Community involvement			Joardar (2000)
US Native American Nations	Use of Information Technology (GIS)			Jones (2003)
Portugal			Regulatory Policy; Performance Measurement	Marques & Simoes (2009)
Spain	Municipal environment: Tourist Index			Garcia-Sanchez (2008)
Italy		Politics, Organized crime		Pasotti (2010)

Moore (2008) argues that the social and physical marginalization of neighborhoods in the growing city of Oaxaca de Juarez allows for opportunities of political recourse—especially in their position to accessing the city dump. Moore underscores how politics is a common issue amid environmental justice and this Mexican town is not immune to such politics. The challenges in sanitation services brings needed attention to these marginalized communities.

One of the most glaring causes of waste management issues is a lack in resources. The government financial crises have resulted in many state and local municipalities to fiscal cutbacks which directly impacted public services such as sanitation. Chung and Marks (2010) note how in 2010, New Jersey municipalities, Yonkers, New York, and New York City, to name a few, faced fiscal and political waste management problems with trash literally piling up in the city streets. Budgetary cutbacks are now pushing up against services such as trash collection and the impact on citizens leading to political ramifications for elected officials. Della et al. (2007) reviewed how the growing population in Makassar in South Sulawesi requires solid waste management that holds both the city management and the community responsible. To the detriment of waste management the community's views of environmental concerns did not go beyond their own properties, and when compounded with limited resources and unofficial disposal, waste management faced an uphill battle. Sakawi (2011) outlined how Malaysia has approached sanitation concerns amid resource insufficiencies. A sanitation/waste management program called for a national plan that would work towards regional collaboration as well as developed strategic plans for implementation at the large municipalities. Although sanitation privatization

in Malaysia had built up hopes of more effective sanitation management, limited financial resources can only go so far in improving the quality of service (Sakawi, 2011).

Opportunities for addressing issues of sanitation management also come in various forms. As noted above, Davis (2004) found technology as a promising method of performance improvement for the sanitation issues of South Asia. Technology allows for real-time analysis of sanitation routes and improved efficiency in time. Most importantly, technology allows for sanitation management to be better informed about options and needs for a more efficient and effective service delivery. Karadimas and Loumos (2008) call for the integrated use of technology and computerized systems for the optimal solutions to solid waste management throughout the world. Geographic Information Systems (GIS) represent a tool that many countries and municipalities already use as a performance improvement tool for sanitation management. Van der Meulen (2011) underscores the importance of geo-informatics for waste management. In Van der Meulen's review of international cases, numerous examples highlight the benefit of improved waste management in service efficiency and effectiveness through the use of geographic information and positioning systems. Technology's use in sanitation and waste management can also help in management of littering and illegally dumped waste, leading to improved health conditions for municipalities (Van der Meulen, 2011).

However, in Jones' (2003) review of GIS use for sanitation benefits, it is noted that developing countries lag significantly in GIS use. Jones' (2003) study of a Native American Nation suggests that there are many similarities with a developing country, in terms of employment, health,

income, and education. Although there are some direct costs associated with implementing a sanitation GIS, there are numerous direct and indirect benefits for the Native America Nations and Jones concludes that government agencies can develop a basic GIS for purposes of sanitation without significant costs.

In addition to technology, community involvement and partnerships are also a critical factor in addressing sanitation management issues. Macawile and Su (2009) underscore how the inefficient management of waste in the Philippines has led to piling up of trash and more importantly a deterioration in the country's environment while also impacting the public's health. Macawile and Su's study (2009, p. 68) finds that local government officials feel that establishing a sustainable waste management system is a joint responsibility between the community and government.

Case studies in Brazilian cities outlined by Nance and Ortolano (2007) highlight the importance of community involvement in urban sanitation. They categorize community participation into four categories: mobilizing, decision-making, construction, and maintenance. In case of successful service delivery, mobilizing and decision-making participation were found to be positively associated with agency-organized participation. Joardar (2000) outlines the challenges faced by waste management in municipalities and notes that the growing nonprofit NGOs in municipalities could play a critical role in mobilizing community participation in local sanitation. The NGOs in India should be included in municipal planning, programs and capacity building of waste collectors and sorters which could lead to low-profit-margin collection and recycling activities (Joardar, 2000).

Additional approaches in addressing sanitation and waste management issues are through programs such as increased recycling. Although there has been an increase in recycling programs for solid waste throughout the United States, the true cost and overall benefit are debatable (Kinnaman, 2000). As Kinnaman (2000) found, recycling is a costly local service, which produces environmental benefits, but comes up short in producing an economic benefit. Jamelske and Kipperberg (2006) outline the changing approaches towards recycling given tight budgets and high costs. New methods of collection include single-stream recyclable collection with all materials collected at once and sorted at a facility. In addition, automated collections systems are also emerging. They provide alternatives to the multiple-stream of recyclable collection. Jamelske and Kipperberg (2006) found a willingness to pay of approximately \$3 per household per month for single-stream recyclable collection in their case study analysis.

Finally, contracting out and privatization has often been used as a method for trying to improve or address sanitation service to the public. Savas (1977) noted the potential for improved public service delivery through competition. The shift toward private service delivery was introduced as

both a strategy for increased cost savings and optional for improved service delivery overall. However, this shift to a more competitive service delivery community also resulted in tensions between both sectors. Walls (2005) underscores how contracting out waste management services may be straight-forward but when compounded with recycling, various economic challenges arise. Complications arise in structuring public-private contracts, but some US cities have found success in doing so.

Mahalingam et al. (2011) provide an overview of public-private partnerships (PPP) in waste management initiatives in India and find key aspects that can foster a successful partnership and programs. They note, specifically in developing countries, that coordinating agencies should have a solid understanding of PPP-specific issues, such as risks and best practices. Adeniji and Afloabi (2010) noted that further collaboration between the private sanitation services and the public sector can be achieved in Nigeria. Some of the more marginalized areas studied could be better served with the collaborative efforts of the public administrators with the private sector in sanitation delivery. Given the UN declaration of sanitation as a human right, monitoring and practices and policies in Nigeria are critical (Adeniji & Afloabi, 2010).

Overall in Table 1, the findings suggest a tension between the factors that generate crisis in sanitation management and the solutions that could ease these tensions. The very pressures that are leading to crisis in waste management—predominantly corruption, political factors, and lack of resources—also imperil the promising solution of performance management and increase use of technology. Still, where political will can be harnessed and resources invested—setting up benchmarks for waste management and sharing data can be a starting point and enhance other positive factors such as community involvement and use of public/private collaboration (and even contracting), as well as opening the door for higher-quality services and better technology, such as GIS.

DISCUSSION AND CONCLUSION

The preceding review has outlined international sanitation management cases from a performance measurement perspective. The case review of international issues and cases of sanitation have highlighted trends and themes associated with negative and positive factors of sanitation management. However, most notably, performance management lags as a key aspect of these cases. In short, performance management is not a prominent answer to sanitation management problems and issues and rather surfaces as an added tool.

The key factors highlighted that were seen as a positive influence included public and non-profit/private partnerships. Collaborations were viewed with importance. Or in some cases, the lack of collaborations was a detriment and

underscored as a source of eventual problems. Along the same line, community involvement was noted as positive factor of influence in nearly half the cases reviewed.

In addition, information technology was also a critical factor of influence that could lead to positive outcomes in sanitation management. In the noted cases where information technology was discussed, the extent that it was integrated with performance measurement was lacking. Rather, the key aspect of information technology was the integration of GIS into sanitation management. GIS has a direct relationship with performance management but in the international cases reviewed where issues arose, performance management was not further developed as a possible factor or opportunity. On the other hand, negative factors revolved around limited resources and political issues. Lack or misuse of performance management was likewise not discussed as a negative factor. Political problems and limited resources were often discussed, but not in the same case. Therefore, the political issues were predominantly distinct from the economic and resource issues. Finally, corruption and organized crime were noted as negative factors in two different cases.

This research article is not intended to be a survey of all international sanitation issues and the use or non-use of performance measurement. The qualitative review of international cases holds a key limitation in that we only review cases that have been researched and published internationally and the work does not represent a quantitative survey of all international sanitation management cases. In addition, the cases reviewed cover an extended period of time and not any one particular year. Further research in the area of international cases of sanitation management could build on the key factors of this research in a quantitative form.

In closing, the aspects of collaboration, limited resources, political culture, and use of technology are present in various international cases of sanitation issues. Further research on the impact of performance management and how it has or can be integrated in cases of sanitation should be conducted. The outline in this research provides an overview framework for sanitation management research.

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