

# **Are Reporting Practices Determined by Performance Levels?: Evidences from Quebec's *Municipal Management Indicators System***

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**ABSTRACT** : Performance measurement is credited with fostering improved performance and reporting. In this study, we try to determine if public managers provide context with their indicators to put their performance under favorable light. We test the hypotheses that use of contextualized reporting is more frequent with lower performing public agencies. Using data from Quebec's Municipal Performance Measurement System, we observed that municipalities with lower internally benchmarked performance tend to provide stakeholders with more than just raw numbers significantly more often than other municipalities. Implications are discussed.

As a management tool, Holzer and Yang (2004, 16) define performance measurement as an “opportunity to present evidence that the public sector is a public bargain, to highlight the routine but important services that public servants quietly provide and to answer the public's sometimes angry questions and implicit suggestions on a dispassionate basis.” Performance measurement information can be used for reporting or for internal decision service improvement (Worthington and Dollery 2002, 454; Public Administration Select Committee 2003, 10; Halachmi 2005, 252; Rogers 2006, 221, Aaron 2008, 25). “Perhaps it is axiomatic that performance measurement systems designed strictly for the former (i.e., performance reporting), especially when a premium is placed on ease of data collection, are unlikely to yield much of the latter” (Ammons and Rivenbark 2008, 308). Methodologically, it is difficult to determine the impact of performance measurement on performance because of the absence of control groups. It is not possible to compare the performance of public agencies that practice performance measurement with agencies that do not: aside from a self-selection bias, the agencies without performance

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measurement do not collect information. In an analogous manner, researchers cannot compare performance in an agency before and after the implementation of performance measurement. Performance measurement for reporting has received somewhat more scrutiny than for service improvement. An administrative body uses different ways to communicate with the public and other stakeholders. Press releases, media conferences, studies, reports and combinations thereof are tools regularly used by organizations. Is public agency reporting a medium of accountability? Past researchers answered affirmatively, albeit with reservations. In their study of Australian local government, Ryan *et al.* (2001) interviewed heads of government departments. They perceived that reporting in general, and annual reports in particular, were an important accountability tool for internal stakeholders (Ryan *et al.* 2001, 10). With regard to external stakeholders, such as the public, all interviewees agreed to the necessity of reports as an accountability tool. From a research standpoint, it is also difficult to establish a generalizable assessment about the impact of performance measurement on reporting. In this study, data from Quebec's Municipal Performance Measurement System, called *Management Indicators* in French, will be used. Quebec performance measurement system's main particularity is that a predetermined list of influential factors is provided to municipal managers to offer context for reporting of all nineteen mandatory standardized indicators. After addressing the literature, the relationship between the use of contextualization in reporting and achieved performance will be analyzed.

### **Performance Measurement, Performance Improvement and Reporting**

Typically, performance measurement initiatives in the United States operate in silos. American performance measurement systems are disjointed in comparison to other developed countries. Although there were calls for stronger integration of information and for "(...) more cross-sector, cross-border responses involving many different individual and institutional participants in U.S. society" (US GAO 2004, 30), the lack of institutionalized structures makes it difficult to study performance measurement's effect on performance improvement and reporting beyond single case studies. Aggregated data which offer researchers a sufficient number of comparable observations take the form of performance measurement systems, in which standard practices are shared. States that track the performance of their state agencies constitute the quasi-totality of performance measurement systems in operations in the U.S. Many of the State governments have such performance measurement systems; among the participant states are *Alaska 20/20*, *Results Iowa*, *Maine's Measures of Growth*, *Minnesota Milestones*, *North Carolina 20/20*, *Oregon Benchmarks*, and *Social Well-being of Vermonters*. However, different state agencies perform widely different tasks. As a result, there are few comparisons occurring between agencies in a given performance measurement system. Also, States do not seek to compare themselves by keeping track of indicators used in other states. Consequently, only internal benchmarking goes on at the state level. The same could be said about performance measurement initiatives at the local level, where there are a multitude of initiatives at the regional/county/local levels. Among the multitudes of local performance initiatives are award-winning programs like Baltimore's *Citistat*, *Chicago Metropolis 2020*, *Dallas Indicators*, Jacksonville's *Indicators for Progress* and *Sustainable Seattle*. There are no U.S. equivalent to the British *Comprehensive Performance Assessment*, where municipalities are mandated to report on standardized indicators to the central government (Department for Communities and Local Government 2008), or the Norwegian KOSTRA system that seeks to construct more coherent data collection and allow comparisons between municipalities (Statistic Norway 2008). It is understandable that the highest level of

government in the United States does not interact directly with municipalities, as the U.S. is not a unitary government like the United Kingdom or Norway. However, federalism alone cannot explain why the U.S. does not have some performance measurement systems where all municipalities have to report to their state governments on a list of standardized indicators. In the Canadian confederation, three such systems are running: Ontario's *Municipal Performance Measurement Program*, Quebec's *Municipal Management Indicators* and Nova Scotia's *Municipal Indicators*. To systematically study the effect of performance measurement on performance improvement and reporting in a North American context, we have to turn our attention to municipal performance measurement systems in Canadian provinces. Only there can we find systematic data to assess the main effects of performance measurement.

### **Performance Measurement & Performance Improvement**

The disjointed nature of the state of the practice of performance measurement in the U.S. has far-reaching repercussions for performance improvement and reporting. The inward-looking characteristics of the performance measurement initiatives means that performance targets are set internally and indicators are reported within a strictly internal context<sup>1</sup>.

For performance improvement, the lack of outside context means that target setting is based solely on historical performance. "Unfortunately, such a system produces feedback having very little managerial or policy value to operating officials or government executives beyond merely documenting whether demand for a service is up, down, or relatively stable" (Ammons and Rivenbark 2008, 308). Setting performance measurement in a system is a management tool to identify better practices (Raaum 2007, 49). External comparisons provide a "base line for performance improvement" (McAdams and O'Neil 2002, 454). In OECD countries, an observable trend is "the development of measurement systems which enable comparison of similar activities across a number of areas" (Kouzmin *et al.* 1999, 122). Importing identified best practices requires managers to tap into normalized knowledge on the targeted activity (Triantafillou 2007, 836). Williams (2005, 68-69) described the effect of internal benchmarking on target setting as being limited in *Benchmark Oregon* because assessing the reasonability of targets is undermined by a failure to examine the performance of other states; the targets might be well below achieved targets in other states. Preceding Hinton, Francis and Holloway (2000, 54), and Keehly and MacBride (1997, 77), observed that benchmarking has to get past internal comparisons, otherwise "breakthrough improvement is impossible." Voluntary benchmarking models are not enough to actually produce improvement in the performance of organizations (Barretta 2008, 364).

### **Performance Measurement & Reporting**

In the absence of external context, reporting suffers a similar fate to target setting: the dearth of context undermines the exercise. Outside comparisons enable managers to make more meaningful assessments of an organization's performance, with information about its relative performance (Meszaros and Owen 1997, 22). Reporting from isolated performance measurement initiatives has built-in limits, as it offers little information that makes the indicators tell a pertinent story (Ammons 1997, 14). Performance indicators need to be informative, interesting, relevant, and relative.

Performance measures are virtually valueless if they appear in the form of an isolated, abstract number; but they are most meaningful when considered against

a broader context and compared against previous performance, relevant standards or targets, or results from other local governments (Ammons 1997, 15).

In the absence of outside comparisons, information about the context of the value of performance indicators adds value to reporting. The “most comprehensible presentation of information”, as coined by Fenster (2006, 940), makes possible oversight and allows input from higher levels of government and citizens. Fenster adds (2006, 942) that “government disclosures more readily produce better public understanding and decision-making not merely when they are made available as raw information, but when they are made available in a way that the public can understand.”

When reporting to citizens, the decision to give context for performance measurement levels is related to transparency. A distinction has to be made: openness and transparency are two different concepts. As Birkinshaw put it (2006, 189-191), openness and transparency, although similar in meaning, both convey something wider than access to (government) information. Birkinshaw (2006, 190) defines openness as “concentrating on processes that allow us to see the operations and activities of government at work -- subject (...) to necessary exemptions”. Transparency is a more complex and demanding notion. According to Piotrowski (2003, 16), transparency in government is “the ability of the public to develop an accurate picture of what is going on inside of government.” The concept of transparency goes beyond openness to include simplicity and comprehensibility (Larsson 1998, 40-42). In short, transparency is openness to someone; namely “all those with social, economic and political interests” who want “comprehensive information about the condition, performance, activities and progress” of an agency (Coy and Dixon 2004, 81).

Openness without transparency might be detrimental to citizens, as it difficult for them to extract information that was not formatted with citizens in mind (Roberts 2006, 226), especially given that “(...) the very quantity of information that digital government facilitates can lead to confusion, which reduces transparency” (Margetts 2006, 201). This view that transparency is actionable openness is shared by Heald (2006, 26) and echoed early on in the public administrative literature (Willcox 1896, 384). Transparency, allows an organization to perform its mission, and periodically to release information “relevant to its performance, on which assessment will actually or potentially be based” (Heald 2006, 32). This line of thought falls squarely into line with municipal performance reporting. Reporting is the proactive release of information, one of the five avenues to public sector transparency identified by Piotrowski and Van Ryzin (2007, 308), the others being open meetings, access to records, whistle-blower protections, and leaked information.

In this research, we are interested in the reporting aspect of performance measurement. More precisely, we will try to study the influence of achieved performance on reporting practices. Using data from the *Municipal Management Indicators* of Quebec's municipal performance measurement system, we will try to establish if contextualized reporting is associated with achieved performance.

### ***Municipal Management Indicators Performance Measurement System in Quebec***

In part because of its late introduction and incremental application, Quebec's municipal performance measurement system (PM system) was designed to avoid common pitfalls found in other PM systems: no or little practitioners outreach in the design phase (Davis 1998), impulsiveness in the implementation of the system (Chang and Kelly 1994, 13), absence of comparison subcategories (Foltin, 1999, 44) and lack of shared accounting practices (Coe 1999, 114).

The Quebec Ministry of Municipal Affairs and Regions (*MAMR* in French) implemented the *Municipal Management Indicators* in 2003. The initial efforts for that project started in 1999 when consultations took place with stakeholders associations representing municipalities, CFOs and accountants. The system was tried in pilot projects between May 2001 and May 2002. Data collection for 19 mandatory indicators started for all Quebec municipalities in 2003. Since 2005, it has been mandatory for municipalities to make the data public.

In 2006, the last year for which complete data is available for this research project, the *Municipal Management Indicators* required municipalities to collect information for 19 mandatory indicators. Of those 19 indicators, there are three on street maintenance, two on snow removal, five on water treatment and distribution, two on sewage systems and seven about global financial health. According with Quebec's tradition of deliberation, the *Municipal Management Indicators* performance measurement system is not tied to financial consequences by the provincial government, as is the case for local agencies in the U.K. (Davis 1998; Game 2006). It is stipulated in the provincial guidebook for municipalities that comparisons with other municipalities for voluntary performance improvement and reporting purposes should be pursued (Ministère des Affaires municipales, du Sport et du Loisir 2004, 9). However, to this day, the reporting software, called SESAMM (MAMSL 2004, 8), only acts as a one-way transmission system to MAMR. The *Center for the Promotion of Municipal Management Excellency* (CPEGM in French) produces a report where municipal managers have the opportunity to compare their performance with aggregated data of municipalities of similar population size. The data in these annual reports are presented by quartiles, by population sizes; municipal managers do not have easy real-time access to pooled municipal data. Upon request, municipal managers can access the MAMR dataset. External information to set performance targets or report information is then available, taking full advantage of the performance measurement system to compare their performance with *best practices*. However, the easiest way for municipal managers to offer contextualization in their reporting resides in the specificity of Quebec's PM system – “a set of influential factors”. A list of predetermined influential factors is provided by the government of Quebec to help municipal managers offer context on why their municipality perform the way it did (MAMR 2005).

### ***Influential Factors as a Mean for Contextualization***

The lack of contextualization in reporting is a recurring reproach in other PM systems (Bird *et al.* 2005, 3; Van Sluis, Cachet and Ringeling 2008, 424). Contextualization is a recurrent theme in all official reports on the *Municipal Management Indicators*. It is specified in every official document by the Ministry that “(...) the interpretation of values obtained for the indicators will often be different between municipalities, depending on realities specific to municipalities and the service at hand<sup>iii</sup>” (MAMSL 2004, 4). Contextualization is supposed to offer “(...) reasonable expectations and potential improvements” (CPEGM 2005, 10). The indicators were developed

with two aims in mind: to help elected officials and managers to improve the management of municipal services and report to citizens (Guindon and Bellavance 2004, 3; CPEGM 2005, 8). It is specified in the guide sent to all municipalities at the beginning of the implementation phase that “Any external comparisons make sense only if influential factors are known for each municipality included in the comparison”<sup>iii</sup> (MAMSL 2004, 5).

Municipalities have to report on the mandatory indicators once a year to the provincial government, and have until September 30<sup>th</sup> of each year to transmit the information of the previous year (MAMSL 2004, 4; MAMR 2008). For the present case, it means that municipalities had until September 30<sup>th</sup> of 2007 to report on 2006 data. Reporting on a performance indicator is mandatory; reporting on influential factors is not (MAMR, 2008). In 2006, about forty percent of municipalities did not choose to report influential factors along with their performance data.

When using the SESAMM data transmission software, municipalities can select from a predetermined list of up to three influential factors to contextualize the value of each indicator. For each of the three *municipal roadway system* indicators, municipal managers could choose in 2006<sup>iv</sup> from among 26 influential factors. There were 37 influential factors to choose from for snow removal indicators; 26 for water supply, treatment and distribution; 19 for sewage; and 5 for global financial health (CPEGM 2007, 30-32, 40, 54, 61). Aside from that, municipal managers are invited to add any influential factor that they deem pertinent to their case (Guindon and Bellavance 2004, 3; CPEGM 2005, 10; MAMR, 2008). In Table 1, the most commonly used influential factors are presented by indicators. We did not include the seven financial indicators in the analyses because they were no predetermined influential factors that attain unanimity and few municipalities added their own factors to contextualize their performance on those indicators. This might explain why, in the latest update on influential factors, there are no predetermined influential factors for the financial indicators (MAMROT 2008).

[insert Table 1 around here]

## Hypotheses

As described above, municipal managers have to report performance, but the decision to use influential factors is their own. In this research, we will try to uncover whether contextualization in performance reporting is influenced by performance. Under Quebec's municipal performance measurement system, municipalities can content themselves with reporting to the provincial government and their citizens with raw numbers. Still, more than 60% of the indicators reported were accompanied by influential factors.

Several researchers have argued that providing context makes for superior reporting rather than reporting raw numbers (Ammons 1996; 1997, 14-15; Boyne, Gould-Williams, Law and Walker 2002, 700). “Ideally, individual citizens would be able to ascertain how many resources (...) are required by their governments to provide various services, along with the knowledge of how the use of these resources for the same quality of service compares to other cities” (Moore, Nolan and Segal 2005, 240).

The general hypothesis of this study is that municipal managers in Quebec default to using contextualization in their performance reporting to put it in a favorable light (Try and Radnor 2007, 669). Here are the working hypotheses that will be tested:

- H<sub>1</sub>: Municipalities that have *low relative performance*, that are in the fourth quartile relative to other municipalities, are more prone to use contextualization in their reporting.
- H<sub>2</sub>: Municipalities with declining annual performance are more prone to use contextualization in their reporting.

### **Data and Method**

The CPEGM at HEC Montréal has the mandate to analyze and report on the Quebec's municipal management indicators. The Ministry of Municipal Affairs and Regions sends the data to CPEGM with a two-year delay. The 2006 data are the most recent information available. For the purpose of this study, the data for the 19 mandatory indicators for 2004, 2005 and 2006 were available, along with the data for the influential factors for 2006. The data for this study uses the whole population of municipalities in Quebec. Table 2 summarizes the demographics of these municipalities.

[insert table 2 around here]

Collectively, municipalities in 2006 used some sort of contextualized information to shed light on the performance of 64.1 percent of their indicators. Table 3 presents in more detail the extent to which the three predetermined influential factors and the facultative open-text factor were used by municipalities.

[insert table 3 around here]

### **Contextualization in Reporting**

The presence of contextualization in reporting activities in 2006 is the dependent variable. It is unclear that using all three of the influential factors provides more contextualization than using only one. Similarly, we cannot assume that a manager who made the judgment that the list of predetermined influential factors describes the situation of his/her municipality provided less contextualization for the provincial government and the public than a manager who used the open-text influential factor. However, the reporting of a raw unaccompanied indicator value offers little usable information to stakeholders. Accordingly, we coded the dependent variable in a binary way: *0* for the absence of influential factor and *1* for the presence of at least one.

### **Current Performance**

Performance for the 12 retained performance indicators in 2006 is hypothesized to influence reporting behaviors. Defining what performance is, is a difficult task. Because of our research question regarding the reporting behavior of municipal managers, we defined performance in the way it is defined under the *Municipal Management Indicators*. If we define performance differently, that it is in the context in which municipal managers must make decisions, then it is impossible to argue that our definition of performance is what influenced reporting behaviors. Under Quebec's municipal performance measurement system, performance is assessed in two different ways. First, performance is assessed by the own past performance of a municipality. Second, performance is assessed by an aggregated report of performance by quartile. However, when it comes to the cornerstone of the performance assessment using quartile data, the MAMSL/MAMR guides and the CPEGM reports are of little help. In both cases, the first

objective of Quebec PM system is to “ameliorate the performance of municipal organizations in their service delivery” (MAMSL 2004:4; CPEGM 2008, 12). Nowhere in MAMR’s literature is better performance defined, other than stating that performance usually translates as effectiveness and efficiency (MAMSL 2004, 3). In the CPEGM reports, where the comparative data are offered to municipal managers, the fourth quartile represents the highest values for the number of the indicators. Thus, for example, higher plowing cost and more frequent water boiling notices are categorized as being part of the highest quartile. In the context of this research, using the same example as above, highest (fourth quartile) performance would be higher plowing cost and greater water boiling notices. It is in this light that qualifiers such as “low relative performance” should be understood. Although these assumptions are mundane, they do represent a limitation of the present research.

Many municipalities use the default output format of the SESAMM software to report to citizens. In 2006, this format included the current values for the data, plus values for 2005 and 2004. Performance is also analyzed by organizing values obtained by all municipalities by quartiles. The data in these analyses are aggregated. This makes it possible for public managers to situate the performance of their municipality for each indicator, in comparison to all other municipalities in the province with similar population size. However, the values for the quartiles are available for previous years only at the moment of reporting the data to the ministry.

Performance, as defined by the provincial government, hinders nuances that could have been examined in our model. It means that new available methods of measuring performance, such as adjusted-performance measurement (DesHarnais *et al.* 2000; Rubenstein, Schawartz and Stiefel 2003; Miller, Kerr and Ritter 2008) or data envelopment analysis (Cooper, Seiford and Tone 2007), were put aside.

Performance was operationalized as follows: first, we constructed a variable that compares variations in performance for the indicator from the current year to the previous year. To be able to test hypothesis  $H_2$ , we coded 1 if the performance in 2006 was in decline and 0 if performance was stable or increasing. Second, we created two dummy variables for relative performance. We deemed that municipalities in the first quartile have a relatively good performance and that municipalities in the fourth quartile have relatively low performance compared to the middle 50 percent of the distribution. As a result, we defined an average relative level of performance broadly, as encompassing municipalities in the middle quartiles. It should be noted that the quartiles do not encompass all municipalities together. According to ministerial specifications, municipalities are compared by quartiles according to their population size group (CPEGM 2008, 17): we coded the data accordingly. These two independent variables will enable us to test hypothesis  $H_1$ . Taken separately, these measures are simple. However, taken together, these variables can point to a more complex picture. Municipalities with decreasing performance by their own standards and relative performance in the top 25 percent can be described as having relative “bad performance.” The opposite could be said for municipalities with increasing performance and performance in the bottom 25 percent of the province. Again, these labels should be considered with caution and are designed to facilitate comprehension and not as a definitive diagnostic. Mixed combinations, for example high relative performance with declining historical performance, are more difficult to assess with the measures at hand: adjusted



performance measurement or data envelopment analysis would proved useful to assess these cases.

Other difficulties are not addressed by our operationalization. One of them is that in the assessment of the variation of yearly performance, inflation is not taken into account for cost indicators. This is not as important a threat to validity as it may seem. First, inflation in the province of Quebec between 2005 and 2006 was only on the order of 1 percent (Statistics Canada 2006). Second, we would have to assume that inflation was the same for the price of consumer goods (for which it is calculated) as it was for the price of tar, pipes, plow trucks. Third, and more importantly, we would have to assume that managers have inflation-adjusted information in mind when assessing their performance, but would neglect to adjust for inflation when reporting to the provincial government and their residents. Inflation is not taken into account in the reporting mechanisms in place, other than by the fact that *inflation* was offered as one of the influential factors. From over 7973 cases of performance indicators having to do with cost, inflation was given as an influential factor to explain performance one time as *factor a*, four times as *factor b* and one time as *factor c*: in total, managers pointed to inflation as an influential factor on their performance only 0.07 percent of the time. For these reasons, after careful consideration, inflation was not included in our model.

### **Other Influences**

To foster fair comparisons, we included control variables (the size of the budget in a log form, the population size and area of municipalities) so as to follow the recommendation of the Ministry (Guindon and Bellavance 2004, 5, MAMSL 2004, 9), but also to follow previous research findings (De Lancer-Julnes and Holzer 2001, 695; Askim, Johnsen and Christophersen 2008, 303).

We added the administrative regions as well, as there are regional differences in administrative cultures that could impact reporting behaviors<sup>v</sup>. The administrative regions control variables are a series of dummy variable having the provincial capital region, which is urban, suburban and rural, as a basis of comparison.

Because each municipality could provided up to 12 indicator measures in the analysis of all the data, we took into account the possible correlations among these within municipality measurements by using the generalized estimating equations method (Liang and Zeger 1986) with the logit link and an unstructured working correlation matrix to model the binary dependent variable, contextualization reporting, i.e. presence or not of at least one influential factor. We also used logistic regression analysis to model contextualization reporting for each management indicator separately.

### **Results**

Overall, influential factors were present in 67.9% of the cases where a decline was observed in the management indicator value between 2006 and 2005 compared to 60.6% in the cases where there was no decline (see Table 4). Contextualization reporting was present in 66.6% of the cases falling in the fourth quartile compared to 62.9% in the middle two quartiles and 63.9% in the first quartile.

[insert table 4 around here]

The results of the generalized estimating equations model are presented in Table 5. Performance does impact contextualization in reporting, even when other external factors are taken into account. These results are contrary to Tooley and Guthrie's study of New Zealand schools, where they did not find a correlation between informational value scores in annual reports and deciles ratings (2007, 363). For a municipality that is average on every characteristic, we would see an increase in its odds of reporting contextualized information of 22 percent if its performance has decreased between 2006 and 2005. The findings indicate that we can reject the null hypothesis for  $H_2$ . Our hypothesis that municipalities with low relative performance are more prone to use contextualization in their reporting is confirmed. On the other hand the findings indicate that we cannot reject the null hypothesis for  $H_1$ . Although not statistically significant, it is important to mention that municipalities which performed in what we defined as being in the top 25 percent of all municipalities (fourth quartile) did use slightly more contextualization in their reporting than average performers (Table 4).

[insert table 5 around here]

There is a real possibility that municipal managers were just more inclined to use reporting across the board, no matter the value obtained on a specific indicator. To test for this eventuality, twelve models (one for every indicator) were run separately with all the control variables presented above

[insert table 6 around here]

Table 6 reports the odds ratio of contextualization in reporting for the main independent variables for the twelve models. For clarity purposes, the odds were not reported for all the control variables. The overall tendencies found in the general model still hold. Although hypothesis  $H_1$  was not supported in the overall model, it is telling that it is significant for two indicators: the respect of provincial norms for ebullition notices and the kreaks per km of pipes. As we will discuss in the next section, the difficulty to access timely comparative data might explain why comparative performance is not correlated with reporting behavior. This might be compounded with the fact that many of the indicators reflect cost, where self-assessment is limited. After all, establishing at what point plowing costs are too high is difficult if you do not know how much it costs elsewhere. However, you do not need to know exactly how many breaks and e-coli problems other municipalities have to make sense of the performance data. Most municipalities do not have many water conduct breaks and do not have to issue water boiling notices in a given year. If your municipality does, as a manager, you know immediately that this is low performance.

## **Discussion**

The system in place in Quebec shares some similarities to the municipal PM systems in the United Kingdom and Norway, by imposing a structure where the same indicators will be collected by municipalities in the same way and by making comparisons and even true benchmarking (comparisons with best practices) possible. However, in the utilization of comparisons level, our results hint that internal benchmarking is dominant, just as in the United

States, where independent municipal initiatives dot the country (Poister and Streib 1999, 331). If data collection was more timely and if MAMR would not wait so long to transfer the data to CPEGM, it could be possible to make timely comparisons between municipalities, as they already collect the same indicators. The neighboring province of Ontario already implemented the MIDAS system, where such comparisons can easily be made by municipal managers (Plumridge and Wynnycky 2007). The Quebec model is far cry from the British model, where municipalities are evaluated with a star-system (from zero to four stars) that accompanies their indicators numbers (Department for Communities and Local Government 2008) and is fully accessible to managers and citizens. In the Quebec model, there are in effect little timely comparisons between municipalities, at least if we look at reporting, aside from a report that arrives two years after the fact. They are however planning to implement a web based system in 2009 that would allow easier benchmarking comparisons.

External benchmarking, despite being mentioned in MAMR/MAMSL guides as being a functionality of the system, is not readily available for managers: they have to actively request this information. When confronted with new annual data provided by his/her municipality, a citizen of Quebec has no way to benchmark the performance of the current year of his municipality to another. All he/she has to make sense of the data is how this year's performance compares with last year's. Only the Ministry of Municipal Affairs and Regions, and zealous municipal managers, have the full data set. This is very similar to the case of Ontario, where pooled data are kept away from citizens and researchers. Of the three systematic municipal performance measurement systems in place in North America, only the one in the province of Nova Scotia lets its citizens access comparative data on municipal performance.

Although no consequences from the ministry ensue from non-compliance in delivering data, collaboration is high on the part of municipalities in Quebec. In 2006, the values of 15.6 percent of the 19,133 indicators (if we include the financial indicators that we did not use here) were missing. Most of these missing values came from the indicators of water supply, treatment, distribution and sewage. Moreover, the majority of missing values originated from very small municipalities of less than 2,000 residents. Overall, the occurrence of missing data can be explained by the fact that many small villages in rural Quebec either (i) do not have water treatment facilities and sewage systems, (ii) contract or share water services with other municipalities, and/or (iii) do not have the clerical staff to collect the information that is asked of them.

At this time, the present study does not permit us to assert which are of determinants of reporting practices in the Quebec's *Municipal Performance Measurement System*. Broad initial consultations, incremental implementation of the framework, the lack of formal definition of what is performance, the absence of financial repercussions from the provincial government in the face of subpar municipal performance, combined with very comprehensive reporting mechanisms, make Quebec's municipal performance measurement system non-threatening. This kind of implementation made buy-in easy for municipalities. Further studies would be needed to know how much these factors can be credited for this high participation rate.

## **Conclusion**

In 2006, municipal managers across Quebec were in the third year of the *Municipal Management Indicators* initiative. Every municipality had to report data from 19 mandatory standardized indicators to the provincial government and the residents of their municipality. Municipalities could decide to report raw data only. However, for more than half of the non-financial indicators reported that year, municipal managers took the opportunity given to them to contextualize their data and explain under which circumstances their performance should be understood. The performance achieved by municipalities influenced their reporting. All things being considered, relative good and poor performance of municipalities, as measured by quartiles, did not seem to influence reporting. We hypothesize that the delay granted to municipalities by the provincial government explains the lack of timely relative data. However, as we have seen, municipalities with declining historical performance trends reported with more contextualization.

From the results, it is clear that municipal managers in Quebec modulate their reporting according to their performance. It is telling that internal comparisons have a much bigger impact in determining reporting than what the literature clearly depicts as superior: external benchmarking. The municipal performance measurement system in Quebec does not provide many incentives for the use of external benchmarks. Nevertheless, some municipal managers still relied on them to make sense of their performance indicators and acted accordingly, although for few individual indicators. This research does not permit us to assert that managers consider internal benchmarking more so than external benchmarking as their *true* performance. If further study could confirm this hypothesis, it would mean that municipal managers in other Canadian provinces and in the U.S. could probably take decisions of the basis on external benchmarking standards if it is provided to them in a diligent fashion.

It has been stated that non-financial measures are more timely than financial ones (Medori, and Steeple 2000, 531). In 2006, financial indicators represented seven out of nineteen indicators. Since 2007, they represent two indicators out of fourteen. By reengineering the reporting incentives and obligations of municipalities, the provincial government of Quebec could cut back in the delay of comparative analyses and make comparative performance usable in reporting.

Municipal managers in Quebec, when using internally measured performance, took advantage of influential factors to contextualize their performance, especially when it was declining. Policy makers contemplating the possibility of instituting a municipal performance measurement system in their state or province should take notice of the present results. Including influential factors alongside performance indicators could be a selling point, reassuring currently recalcitrant managers petitioning against the implementation of such a system.

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## Notes

- i. North Carolina 20/20 is a notable exception, as it compares its indicators of well-being with the other states of the Union. However, the indicators are not attributable to any specific agencies, but to the general socio-economic situation in North Carolina.
- ii Translation by the authors
- iii Translation by the authors
- iv Since then, the number of influential factors has been reviewed. For updated influential factors, see MAMR, "Guide to management indicators" 2008, Annexe 1, [http://www.mamrot.gouv.qc.ca/publications/finances/indi\\_guid.pdf](http://www.mamrot.gouv.qc.ca/publications/finances/indi_guid.pdf)
- v For example, Chaudière-Appalaches is renowned to harbor entrepreneurial cultures and Gaspésie—Îles-de-la-Madeleine is better known for relying on provincial social and wealth transfer programs to complete seasonal working patterns.

## References

- Aaron, William. 2008. What Gets Measured Sometimes Gets Managed. *Government Finance Review* 24 (4):24-28.
- Ammons, David N. 1996. *Municipal Benchmarks: Assessing Local Performance and Establishing Community Standards* Thousand Oaks, CA: Sage.
- Ammons, David N. 1997. Raising the Performance Bar...Locally. *Public Management Magazine* 79 (9):10-16.
- Ammons, David N. 1999. A Proper Mentality for Benchmarking. *Public Administration Review* 59 (2):105-109.
- Askim, Jostein, and Gro Sandkjaer Hanssen. 2008. Councillors' Receipt and Use of Citizen Input: Experience from Norwegian Local Government. *Public Administration* 86 (2):387-409.
- Baretta, Antonio Davide. 2008. The Exclusion of Indirect Costs from Efficiency Benchmarking. *Benchmarking* 15 (4):345-365.
- Behn, Robert D. 2003. Why Measure Performance? Different Purposes Require Different Measures. *Public Administration Review* 63 (5): 586-606.
- Bird, Sheila M., David Cox, Vern T. Farewell, Harvey Goldstein, Tim Holt, and Peter C. Smith. 2005. Performance Indicators: Good, Bad, and Ugly. *Journal of the Royal Statistical Society (Series A)* 168 (1):1-27.
- Birkinshaw, Patrick J. 2006. Freedom of Information and Openness: Fundamental Human Rights. *Administrative Law Review* 58 (1): 177-218.
- Boivard, Tony, and Paul Davis. 1999. Learning to Manage within Limited Resources Coping Strategies and Learning Breakthroughs in UK Local Government. *International Journal of Public Sector Management* 12 (3):293-313.

- Boyne, George, Julian Gould-Williams, Jennifer Law, and Richard Walker. 2002. Plans, Performance Information and Accountability: The Case of Best Value. *Public Administration* 80 (4):691-710.
- Centre de promotion de l'excellence en gestion municipale. 2007. *Indicateurs de gestion pour les organismes municipaux: Résultats de l'année 2005* [Management Indicators for Municipal Organizations : Results for the Year 2005]. Montréal, QC: 1-189.
- Centre de promotion de l'excellence en gestion municipale. 2008. *Indicateurs de gestion pour les organismes municipaux: Résultats de l'année 2006* [Management Indicators for Municipal Organizations : Results for the Year 2006]. Montréal, QC: 1-194.
- Chang, Richard Y. and P. Keith Kelly. 1994. *Improving through Benchmarking: A Practical guide to Achieving Peak Process Performance*. Irvine, CA: Richard Chang Associates..
- Coe, Charles. 1999. Local Government Benchmarking: Lessons from Two Major Multigovernment Efforts. *Public Administration Review* 59 (2):110-123.
- Cooper, William W., Lawrence. M. Seiford and Kaoru Tone. 2007. *Data Envelopment Analysis: A Comprehensive Text with Models, Applications, References and DEA-Solver Software*. Second Edition, New York, NY, Springer.
- Davis, Paul. 1998. The Burgeoning of Benchmarking in British Local Government The Value of "Learning by Looking" in the Public Services. *Benchmarking for Quality Management & Technology* 5 (4):260-270.
- De Lancer-Julnes, Patria, and Marc Holzer. 2001. Promoting the Utilization of Performance Measures in Public Organizations: An Empirical Study of Factors Affecting Adoption and Implementation. *Public Administration Review* 61 (6):693-708.
- Department for Communities and Local Government. 2008. *National Indicators for Local Authorities and Local Authority Partnerships: Handbook of Definitions*  
<http://www.communities.gov.uk/documents/localgovernment/pdf/735112.pdf> Website consulted April 6<sup>th</sup>, 2008.
- DesHarnais, Susan I., M. Thane Forthman, Judith M. Homa-Lowry, and L. Dwight Wooster. 2000. Risk-Adjusted Clinical Quality Indicators; Indices for Measuring and Monitoring Rates of Mortality, Complications, and Readmissions. *Quality Management in Health Care* 9 (1):14-22.
- Fenster, Mark. 2006. The Opacity of Transparency. *Iowa Law Review* 91 (3):885-949.
- Foltin, Craig. 1999. State and Local Government Performance: It's Time to Measure Up! *The Government Accountants Journal* 48 (1):40-46.
- Folz, David H. 2004. Service Quality and Benchmarking the Performance of Municipal Services. *Public Administration Review* 64 (2):209-220.
- Game, Chris. 2006. Comprehensive Performance Assessment in English Local Government. *International Journal of Productivity and Performance Management* 55 (6):466-479.
- Guindon, Michel, and François Bellavance. 2004. *Rapport concernant la catégorisation des organismes municipaux et l'utilisation des facteurs d'influence (Phase III)* [Report about the Categorization of Municipal Organizations and the Utilization of Influential Factors (Phase III)]. Montréal, QC, Corporation des officiers municipaux agréés du Québec: 1-26.
- Halachmi, Arie. 2005. Performance Measurement: Test The Water Before You Dive In. *International Review of Administrative Sciences* 71 (2):255-266.
- Heald, David. 2006. Varieties of Transparency. In *Transparency: The Key to Better Governance?*, edited by C. Hood and D. Heald. Oxford, UK: The British Academy by Oxford University Press.

- Hinton, Matthew, Francis, Graham and Jacky Holloway. 2000. Best Practice Benchmarking in the UK. *Benchmarking* 7 (1): 52-61.
- Holzer, Marc and Kaifeng Yang. 2004. Performance Measurement and Improvement: An Assessment of the State of the Art. *International Review of Administrative Sciences* 70 (1):15-31.
- Keehley, Patricia, and Sue A. MacBride. 1997. Can Benchmarking for Best Practices work for Government? *Quality Progress* 30 (3):75-80.
- Kouzmin, Alexander, Elke Loffler, Helmut Klages, and Nada Korac-Kakabadse. 1999. Benchmarking and Performance Measurement in Public Sectors Towards Learning for Agency Effectiveness. *International Journal of Public Sector Management* 12 (2):121-144.
- Laesson, T. 1998. *How Open Can a Government Be? The Swedish Experience*, in Veerle Deckmyn and Ian Thomson (eds), *Openness and Transparency in the European Union*. Maastricht: European Institute of Public Administration: 39-51.
- Liang, Kung Yee and Zeger, Scott L. 1986. Longitudinal Data Analysis Using Generalized Linear Models. *Biometrika* 73(1): 13-22.
- Margetts, Helen. 2006. Transparency and Digital Government. In *Transparency: The Key to Better Governance?*, edited by C. Hood and D. Heald. Oxford, UK: The British Academy by Oxford University Press.
- McAdams, Rodney, and Liam O'Neil. 2002. Evaluating Best Value Through Clustered Benchmarking in UK Local Government: Building Control Services. *International Journal of Public Sector Management* 15 (6/7):438-457.
- Medori, David, and Derek Steeple. 2000. A framework for auditing and enhancing performance measurement systems, *International Journal of Operations & Production Management*, (20) 5: 520-533.
- Meszaros, Greg, and C. James Owen. 1997. Improving Through Benchmarking: A Competitive Assessment of Municipal Utility Services. *Public Works Management & Policy* 2 (1):11-23.
- Miller, Joel, and Robert C. Davis. 2008. Unpacking Public Attitudes to the Police: Contrasting Perceptions of Misconduct with Traditional Measures of Satisfaction. *International Journal of Police Science & Management* 10 (1):9-22.
- Ministère des Affaires municipales, du Sport et du Loisir. 2004. *Les Indicateurs de Gestion Municipaux: Un regard neuf sur notre municipalité* [Municipal Management Indicators: A Second Look on your Municipality]. Gouvernement du Québec, Québec, 1-12.
- Ministère des Affaires municipales et Régions. 2005. *Facteurs d'influence prédéterminés* [Predetermined Influential Factors]  
[http://www.mamr.gouv.qc.ca/finances/fina\\_indi\\_resu\\_fact.htm](http://www.mamr.gouv.qc.ca/finances/fina_indi_resu_fact.htm) Website consulted December 10<sup>th</sup>, 2007.
- Ministère des Affaires municipales et Régions. 2008. *Décret de population* [Population Decree]  
[http://www.mamr.gouv.qc.ca/finances/fina\\_indi\\_tran.asp#transmission](http://www.mamr.gouv.qc.ca/finances/fina_indi_tran.asp#transmission) Website consulted March 29<sup>th</sup>, 2008.
- Ministère des Affaires municipales et Régions. 2008. *Foire aux questions (FAQ)* [Frequently Asked Questions (FAQ)]  
[http://www.mamr.gouv.qc.ca/finances/fina\\_indi\\_faqr.asp](http://www.mamr.gouv.qc.ca/finances/fina_indi_faqr.asp) Website consulted April 25<sup>th</sup>, 2008.
- Ministère des Affaires municipales et Régions. 2008. *Modalités de transmission* [Transmission Modalities]

- [http://www.mamr.gouv.qc.ca/organisation/orga\\_donn\\_popu.asp#](http://www.mamr.gouv.qc.ca/organisation/orga_donn_popu.asp#) Website consulted April 25<sup>th</sup>, 2008.
- Ministère des Affaires municipales, Régions et Occupation du territoire. 2008. Guide des indicateurs de gestion 2008. [Guide to management indicators 2008]
- [http://www.mamrot.gouv.qc.ca/publications/finances/indi\\_guid.pdf](http://www.mamrot.gouv.qc.ca/publications/finances/indi_guid.pdf) Website consulted May 11<sup>th</sup>, 2009.
- Moore, Adrian, James Nolan, and Geoffrey F. Segal. 2005. Putting Out the Trash: Measuring Municipal Service Efficiency in U.S. Cities. *Urban Affairs Review* 41 (2):237-259.
- Palmer, Anna J. 1993. Performance Measurement in Local Government. *Public Money & Management* 13 (4):31-36.
- Piotrowski, Suzanne J. 2003. Governmental Transparency and the National Performance Review: Implementing the Freedom of Information Act, School of Public Affairs, American University, Washington, D.C.
- Piotrowski, Suzanne J., and Gregg G. Van Ryzin. 2007. Citizen Attitudes toward Transparency in Local Government. *American Review of Public Administration* 37 (3):306-323.
- Poister, Theodore H., and Gregory Streib. 1999. Performance measurement in municipal government: Assessing the state of the practice. *Public Administration Review*. 59(4):325-335.
- Plumridgei, Nancy, and Bohdan Wynnycky. 2007. The "Midas" Touch: New System will Bring Powerful Analysis Tools Online for Ontario Municipalities. *Municipal World* 117 (10):27-30.
- Public Administration Select Committee. 2003. *On Target? Government by Measurement*. Fifth Report of Session 2002–03. London, UK, House of Commons: 1-53.
- Raaum, Ronell B. 2007. Applying the Finding Paradigm to Audits of Output and Outcome Performance: A Research Perspective. *Journal of Government Financial Management* 56 (2):44-50.
- Roberts, Alasdair. 2006. *Blacked Out: Government Secrecy in the Information Age*. New York, NY: Cambridge University Press.
- Rogers, Martha Kinney. 2006. Explaining Performance Measurement Utilization and Benefits: An Examination of Performance Measurement Practices in Local Governments, Department of Public Administration, North Carolina State University, Raleigh, NC.
- Ryan, Christine, Keitha Dunstanand and Jenet Brown. 2001. *The Value of Public Sector Annual Reports and the Contribution of Annual Reporting Awards*. Working Paper. Brisbane: 1-18.
- Statistics Canada.(2006. *The Daily: Consumer Price Index*  
<http://www.statcan.ca/Daily/English/061219/d061219a.htm>  
Website consulted April 27<sup>th</sup>, 2008.
- Statistics Norway (2008). *About Kostra*.  
[http://www.ssb.no/english/subjects/00/00/20/kostra\\_en/](http://www.ssb.no/english/subjects/00/00/20/kostra_en/)  
Website consulted April 6<sup>th</sup>, 2008.
- Tooley, Stuart, and James Guthrie. 2007. Reporting Performance by New Zealand Secondary Schools: An Analysis of Disclosures. *Financial Accountability & Management* 23 (4):351-374.
- Triantafillou, Peter. 2007. Benchmarking in the Public Sector: A Critical Conceptual Framework. *Public Administration* 85 (3):829–846.
- Try, David, and Zoe Radnor. 2007. Developing an Understanding of Results-Based Management through Public Value Theory. *International Journal of Public Sector Management* 20 (7):655-673.
- United States Government Accountability Office. 2004. *Informing our Nation: Improving How to Understand and Assess the USA's Position and Progress*. Washington, DC: 1-238.



Van Sluis, Arie, Lexi Cachet, and Arthur Ringeling. 2008. Results-Based Agreements for the Police in The Netherlands. *International Journal of Police Strategies & Management* 31 (3):415-434.

Willcox, Walter F. 1896. Methods of Determining the Economic Productivity of Municipal Enterprises *American Journal of Sociology* 2 (3):378-391.

Williams, Mark Carlson. 2005. Can Local Government Comparative Benchmarking Improve Efficiency?: Leveraging Multiple Analytical Techniques to Provide Definitive Answers and Guide Practical Action, L. Douglas Wilder School of Government and Public Affairs, Virginia Commonwealth University, Richmond, VA.

Worthington, Andrew C., and Brian E. Dollery. 2002. Incorporating Contextual Information in Public Sector Efficiency Analyses: A Comparative Study of NSW Local Government. *Applied Economics* 34 (4):453-464.

Table 1: Modal Frequency of Influential Factors by Indicators, in 2006

Function & Activity	Indicator	CONTEXTUALIZED REPORTING (frequency in parentheses)		
		Factor a	Factor b	Factor c
ROADS Municipal roadway system	State of street infrastructures	Investment (147)	Traffic patterns (76)	Climate (41)
	% of municipal roadway system's cost compared to street infrastructures' cost	Investment (144)	Traffic patterns (71)	Type of pavement (44)
	Cost of routes	Investment (113)	Traffic patterns (47)	Type of pavement (34)
ROADS Snow removal	Cost of plowed routes	Climate (162)	Precipitations types (109)	Type of activity (66)
	Cost of plowed routes by cm of precipitations	Climate (204)	Precipitations types (118)	Precipitations types (42)
PUBLIC HYGIENE Water supply, treatment and distribution	Respect of provincial norms for ebullition notices (whole territory)	State of system (108)	State of system (35)	Other factor (24)
	Breaks per km of pipes	State of system (240)	Obsolescent equipment (64)	Other factor (31)
	Cost of distribution per km of pipes	State of system (160)	State of system (45)	Other factor (30)
	Cost of supply and treatment of water per m <sup>3</sup>	Other factor (111)	Other factor (35)	Other factor (26)
	Cost of water distribution per m <sup>3</sup>	State of system (109)	State of system (46)	Other factor (33)
PUBLIC HYGIENE Used water treatment and sewage systems	Cost of treatment of used water per m <sup>3</sup>	Other factor (92)	Type of system (39)	Type of system (24)
	Cost of sewage system per km of pipes	State of system (126)	Type of system (47)	<i>No explanation repeated</i>

Table 2: Number of Quebec Municipalities<sup>1</sup> by Population Size, in 2008

Population size	Nb. of Municipalities	% of Total Municipalities	% of Total Population
0 - 1,999 without public hygiene services <sup>2</sup>	189	18.8%	2.4%
0 - 1,999	472	46.9%	9.1%
2,000 - 9,999	260	25.8%	20.7%
10,000 - 24,999	50	5.0%	15.1%
25,000+	36	3.5%	52.7%
Total	1007	100%	100%

<sup>1</sup> Five municipalities were excluded from the analyses because they did not submit their management indicators to the ministry.

<sup>2</sup> Many smaller municipalities do not have water supply and sewage systems. These municipalities are distinguished from those who offer public hygiene services.

Table 3: Use of Influential Factors in 2006

Influential factors	Number of indicator values in 2006 <sup>1</sup>	Number of indicator with influential factors	%
Factor a	9363	5031	53.7
Factor b	9363	2987	31.9
Factor c	9363	1902	20.3
Other factor	9363	3803	40.6
Any factor	9363	5999	64.1

<sup>1</sup> for the 12 management indicators considered for the analyses

Table 4: Descriptive Statistics of the Use of Influential Factors according to Performance by Management Indicators

FUNCTION & ACTIVITY	MANAGEMENT INDICATORS	n	INFLUENTIAL FACTOR REPORTING	declining performance between 2006 and 2005		indicator value in 2006		
				Yes	No	first quartile	second and third quartile	fourth quartile
ROADS	State of street infrastructures	989	n	412	577	254	490	245
			% with factors	71.1%	60.1%	70.5%	62.5%	63.3%
Municipal roadway system	% of municipal roadway system's cost compared to street infrastructures' cost	988	n	519	469	253	486	249
			% with factors	59.9%	58.0%	58.9%	58.0%	61.0%
ROADS	Cost of routes	988	n	547	441	255	491	242
			% with factors	62.2%	55.8%	60.0%	60.5%	56.2%
Snow removal	Cost of plowed routes	987	n	591	396	254	485	248
			% with factors	74.5%	72.7%	75.2%	71.6%	76.6%
Snow removal	Cost of plowed routes by cm of precipitations	987	n	707	280	253	489	245
			% with factors	75.5%	61.4%	70.0%	71.2%	73.9%
PUBLIC HYGIENE	Respect of provincial norms for ebullition notices (whole territory)	701	n	62	639	50	522	129
			% with factors	74.2%	51.0%	46.0%	48.1%	76.0%
Water supply, treatment and distribution	Breaks per km of pipes	689	n	180	509	255	263	171
			% with factors	72.2%	60.9%	53.7%	65.4%	76.6%
Water supply, treatment and distribution	Cost of distribution per km of pipes	672	n	334	338	170	332	170
			% with factors	62.6%	61.2%	58.8%	63.9%	61.2%
Water supply, treatment and distribution	Cost of supply and treatment of water per m <sup>3</sup>	548	n	270	278	143	262	143
			% with factors	67.4%	66.6%	73.4%	64.9%	64.3%
Water supply, treatment and distribution	Cost of water distribution per m <sup>3</sup>	645	n	319	326	163	313	169
			% with factors	64.0%	53.4%	54.6%	61.3%	57.4%
PUBLIC HYGIENE	Cost of treatment of used water per m <sup>3</sup>	537	n	200	337	148	255	134
			% with factors	66.0%	73.9%	72.3%	69.4%	72.4%
Used water treatment and sewage systems	Cost of sewage system per km of pipes	632	n	333	299	151	317	164
			% with factors	64.9%	62.2%	60.9%	64.7%	64.0%
Total		9363	n	4474	4889	2349	4705	2309
			% with factors	67.9%	60.6%	63.9%	62.9%	66.6%

Table 5: Results of Generalized Estimating Equations Model with Logit Link for Contextualized Reporting according to Performance and Other Control Variables

Variables	CONTEXTUALIZED REPORTING	
	Regression coefficient (Standard Error)	Odds ratio (95% C.I.)
declining performance between 2006 and 2005	0.2014*** (0.0335)	1.22 (1.15, 1.31)
fourth quartile for indicator value in 2006	0.0595 (0.0428)	1.06 (0.98, 1.15)
first quartile for indicator value in 2006	0.0458 (0.0420)	1.05 (0.96, 1.14)
log budget size - total revenue 2006	0.2496*** (0.0723)	1.28 (1.11, 1.48)
<b>POPULATION SIZE</b>		
0 - 1,999 without public hygiene services	0.2878 (0.4645)	1.33 (0.54, 3.31)
0 - 1,999	0.4007 (0.4312)	1.49 (0.64, 3.48)
2,000 - 9,999	0.2875 (0.3722)	1.33 (0.64, 2.77)
10,000 - 24,999	0.3258 (0.3757)	1.39 (0.66, 2.89)
25,000+	Reference category	
municipality area in km <sup>2</sup> x 10 <sup>-8</sup>	-0.8326*** (0.1097)	0.43 (0.35, 0.54)
<b>REGION</b>		
<i>Bas-Saint-Laurent and Gaspésie Îles-de-la-Madeleine</i>	0.0489 (0.2443)	1.05 (0.65, 1.70)
<i>Saguenay Lac-Saint-Jean</i>	-0.1080 (0.3231)	0.90 (0.48, 1.69)
<i>Mauricie</i>	-0.1779 (0.2974)	0.84 (0.47, 1.50)
<i>Estrie</i>	0.3362 (0.2678)	1.40 (0.83, 2.37)
<i>Montréal and Montérégie</i>	-0.4580* (0.2385)	0.63 (0.40, 1.01)
<i>Outaouais</i>	0.4012 (0.3133)	1.49 (0.81, 2.76)
<i>Abitibi-Témiscamingue</i>	-0.3043 (0.2836)	0.74 (0.42, 1.29)
<i>Côte-Nord and Nord-du-Québec</i>	0.1188 (0.3159)	1.13 (0.61, 2.09)
<i>Chaudière-Appalaches</i>	-0.1054 (0.2457)	0.90 (0.56, 1.46)
<i>Lanaudière</i>	-0.2236 (0.2860)	0.80 (0.46, 1.40)
<i>Laurentides</i>	0.1241 (0.2940)	1.13 (0.64, 2.01)
<i>Centre-du-Québec</i>	-0.0964 (0.2642)	0.91 (0.54, 1.52)
<i>Capitale Nationale</i>	Reference category	
Constant	-3.3994 (1.3808)	
Number of Observations	9363	
Number of Municipalities	1007	

\*\*\* p<.01, \*\* p<.05, \* p<.1

Table 6: Results of Logistical Regression by Management Indicators for Contextualized Reporting according to Performance and other Control Variables<sup>1</sup>

FUNCTION & ACTIVITY	MANAGEMENT INDICATORS	n	Odds ratio (95% C.I.)		
			declining performance between 2006 and 2005	fourth quartile for indicator value in 2006	first quartile for indicator value in 2006
ROADS  Municipal roadway system	State of street infrastructures	989	1.59*** (1.20, 2.12)	1.02 (0.73, 1.42)	1.50** (1.07, 2.12)
	% of municipal roadway system's cost compared to street infrastructures' cost	988	1.09 (0.83, 1.42)	1.11 (0.80, 1.55)	1.07 (0.78, 1.49)
	Cost of routes	988	1.32** (1.00, 1.73)	0.82 (0.59, 1.14)	1.09 (0.78, 1.51)
ROADS  Snow removal	Cost of plowed routes	987	1.06 (0.78, 1.45)	1.18 (0.81, 1.72)	1.32 (0.91, 1.90)
	Cost of plowed routes by cm of precipitations	987	1.74*** (1.25, 2.42)	1.13 (0.77, 1.64)	1.09 (0.75, 1.57)
PUBLIC HYGIENE  Water supply, treatment and distribution	Respect of provincial norms for ebullition notices (whole territory)	701	0.88 (0.39, 2.01)	3.75*** (2.01, 6.99)	1.08 (0.55, 2.12)
	Breaks per km of pipes	689	1.20 (0.79, 1.82)	1.72** (1.09, 2.72)	0.69* (0.47, 1.02)
	Cost of distribution per km of pipes	672	1.03 (0.74, 1.44)	0.89 (0.60, 1.34)	0.88 (0.59, 1.31)
	Cost of supply and treatment of water per m <sup>3</sup>	548	1.11 (0.75, 1.65)	0.96 (0.61, 1.50)	1.46 (0.81, 2.40)
	Cost of water distribution per m <sup>3</sup>	645	1.51** (1.08, 2.11)	0.80 (0.53, 1.19)	0.84 (0.56, 1.27)
PUBLIC HYGIENE  Used water treatment and sewage systems	Cost of treatment of used water per m <sup>3</sup>	537	0.72 (0.48, 1.07)	1.18 (0.72, 1.91)	1.05 (0.66, 1.68)
	Cost of sewage system per km of pipes	632	1.14 (0.81, 1.62)	0.99 (0.65, 1.49)	0.94 (0.62, 1.44)

<sup>1</sup> Odds ratio for the control variables are not reported in the table

\*\*\* p<.01, \*\* p<.05, \* p<.1