EXPLORING MUNICIPAL INNOVATION: TECHNOLOGICAL AND ORIGINAL INNOVATION IN MUNICIPALITIES

Richard SHEARMUR and Vincent POIRIER

Inédit / *Working paper*, n° 2015-01

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Richard SHEARMUR and Vincent POIRIER

Institut national de la recherche scientifique
Centre - Urbanisation Culture Société
Montreal

Mai 2015

Richard Shearmur* and Vincent Poirier
McGill School of Urban Planning
richard.shearmur@mcgill.ca

*corresponding author

Centre - Urbanisation Culture Société
Institut national de la recherche scientifique
385, Sherbrooke Street East
Montreal (Quebec) H2X 1E3

Phone : (514) 499-4000
Fax : (514) 499-4065

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Abstract

Public sector innovation is often viewed with skepticism by students of private-sector and technological innovation: it is seen as essentially imitative, focused upon policy and organization, and lacking the economic incentives central to entrepreneurship. Conversely, students of public administration and urban affairs look askance at municipal entrepreneurialism, associated with the neoliberalisation of urban politics. Municipalities sit uncomfortably on the cusp of these approaches: whilst they are public administrations, like SMEs they are small, numerous, geographically situated, and are perceived to be in competition. We argue that municipal innovation can be approached from a broadened Schumpeterian perspective, and show that they are original, as well as imitative, innovators and engage in technological innovation. However, we suggest that municipal innovation – our sample is dominated by smaller ones - is not usually driven by competition but by perceived problems or by requests from local businesses and residents: the main difference with innovation in SMEs lies not in the process, but in the motivation for, and evaluation of, innovation.

Key Words:
Municipal innovation; Schumpeter; technological innovation; municipal entrepreneurialism

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Résumé

L'innovation dans le secteur public est souvent perçu avec scepticisme par ceux qui étudient l'innovation dans le secteur privé ou l'innovation technologique : on le perçoit comme imitatif, tourné vers les politiques et la gestion, et sans incitatifs économiques à l'entrepreneurship. Par ailleurs, les chercheurs en études urbaines qui se penchent sur l'administration publique perçoivent souvent l'entrepreneurship municipal comme un vecteur de néolibéralisation de la politique urbaine. Les municipalités sont au confluent de ces approches parfois antagonistes : bien que ce soient des administrations publiques, comme les PME elles sont petites, nombreuses, ancrées territorialement, et sont perçues comme étant en compétition. Nous avançons que l'innovation municipale peut être appréhendée à partir d'une approche Schumpétérienne élargie, et montrons qu'elle peut être originale (aussi bien qu'imitative) et technologique. Nous suggérons toutefois que l'innovation municipale – notre échantillon est dominée par des municipalités petites et moyennes – n'est pas toujours poussée par la compétition mais l'est souvent par les problèmes ou demandes émanant d'entreprises et de résidents locaux : la principale différence entre l'Innovation municipale et celle des PME ne se trouve dans pas dans le processus même d'innovation mais dans ce qui la motive dans son évaluation.

Mots clés :
Innovation municipale; Schumpeter; innovation technologique; entrepreneurship municipal

INTRODUCTION

In the late 1970s, a small body of work emerged that took seriously the idea that municipalities could be innovative, not only in terms of policy and governance, but also in terms of technology (Feller & Menzel, 1978), products and processes (Bowman, 1980; Bingham, 1977). In keeping with then current research on firm-level innovation (Pred, 1973), the focus was on innovation diffusion rather than on its generation.

Over the subsequent four decades, innovation has become almost synonymous with economic and social development. However, attention has shifted away from municipalities, and is mainly focused on factors leading firms to initiate innovation – both technological and organizational. Municipalities (and public administrations) are not considered to be initiators of innovation – particularly not in terms of technology, products or processes (Potts & Kastelle, 2010; Mulgan, 2007) - despite innovation being a central policy concern. Indeed, industrial policy has been superseded by innovation policy (Brewis, 1969; Todtling, 1999; Bibbee, 2012), both at the national and at the local levels (Camagni & Capello, 2013), and local development is today understood as premised upon the innovative capacity of local people and enterprises. As responsibility for local development has shifted from the central state – which has abandoned its redistributive role - to local administrations, municipalities are seen as potential facilitators in the privately driven innovation process (Harvey, 1989; Cooke et al, 2004).

Notwithstanding the literature on public sector innovation (Mulgan, 2007; Potts & Kastelle, 2010; Berry & Berry, 2007; McCann& Ward, 2011) – which focuses upon policy and administrative innovations – the idea that public sector innovation can be approached using conceptual tools developed in the management literature has been downplayed (Potts & Kastelle, 2010). This is partly because public sector innovation is deemed essentially imitative and policy focused (hence not related to products and processes – but similar to private-sector organizational innovation), and partly because the public sector is not evolving in competitive markets (competition is deemed a key driver of innovation). We argue that neither of these assumptions necessarily holds for municipalities, which have more in common with small and medium sized enterprises (SMEs) than many other types of public administration. Conceptualizing municipal innovation as a Schumpeterian process reveals similarities and differences between municipalities and SMEs which increase our understanding of the municipal innovation process.

In this paper we explore, conceptually and empirically, the extent to which municipal innovation resembles innovation in SMEs. A similar question has been addressed in the service innovation literature, which explores whether services and manufacturers innovate in the same way (Drejer, 2004; Gallouj, & Savona, 2010; Doloreux & Shearmur, 2010), and the question has recently been broached for municipalities, but from a different angle, focusing on the way innovation is understood in public administration and service SMEs (Nahlinder, 2013). We start from the

hypothesis that innovation shares similarities across all types of organization, but that there are also differences (Gallouj & Savona's synthetic approach): just as Drejer (2004) extends a Schumpeterian understanding of innovation from manufacturing to services, we propose to extend it (with provisos) to municipalities.

The paper proceeds as follows. In the following section we first provide a conceptualization of innovation, and then discuss whether a comparison between innovation in SMEs and municipalities is tenable. After describing the information and data at our disposal, the empirical part of the paper proceeds in two stages. We first provide examples of innovation introduced by municipalities in Quebec, illustrating its diversity, and highlighting instances of technological innovation. We then perform an exploratory statistical analysis of some environmental (geographic) and internal (socio-economic) determinants of municipal innovation. The study is exploratory because of data limitations, but demonstrates the possibilities of the approach. We conclude by considering the study's limitations, what the results reveal, and further avenues of investigation.

INNOVATION IN MUNICIPALITIES AND SMES: AN ENTREPRENEURIAL APPROACH

Conceptualizing Entrepreneurial Municipal Innovation

A common starting point to understanding innovation is Schumpeter (Malecki, 1997). Schumpeter (1936), an early twentieth century economist, conceptualized innovation as the process of transforming an idea into a product, process or organizational form that finds a market and/or enhances firm productivity (and, by extension, its market). The key actor in this process is the entrepreneur: he/she is a person "who perceives an opportunity heretofore unexpected and exploits it" (Leyden & Link, 2015). The entrepreneur not only has vision, he or she also possesses the skills, fundraising capacity, organizational acumen and risk tolerance to turn a vision into an application.

Much emphasis has been put on the economic finality of Schumpeter's entrepreneur (Potts & Kastelle, 2010): this individual (or small organization) is primarily motivated by ambition to compete in markets. Competition – through the process of creative destruction – leads new technologies and organizational forms to take over from the old. Thus, when local government is labelled 'entrepreneurial' (e.g. Harvey, 1989) it is usually synonymous with 'market-driven' and with 'gaining economic advantage'. Others have argued that public sector entrepreneurs are driven by political gain (Wagner, 1966) – but work on urban regimes, and the continued neoliberalisation of urban politics, suggests the distinction is moot (Gilens, 2012; Hankins, 2015).

Innovation is understood as a primary driver of economic growth (Glaeser, 2003): in an economy driven by consumption, innovation is necessary to fuel demand. Furthermore, innovation – whilst often having unexpected negative side-effects – provides society with useful tools and procedures for improving well-being. However, if the Schumpeterian innovation process is only understood in relation to economic competition, it loses in generality. Until the end of the nineteenth century 'economic' implied 'household management' and 'thrift': the effective management of finite resources – economic activity – can, under this acceptation, accommodate a wide array of motivations, of which profit maximization is just one. Mohr's (1969, p112 – cited in Franzel, 2008) definition of innovation in organizations as "the successful introduction into an applied situation of means or ends that are new to the situation" suggests that an entrepreneur can be a person or organization that identifies an idea's potential to further any number of practical applications, not necessarily with reference to a market.

If innovation is understood in this sense, then entrepreneurial local governments do not necessarily facilitate capital accumulation (Harvey, 1989), nor do they necessarily tailor public services to attract mobile population and capital (Tiebout, 1956; Florida, 2008). They can also be adept at finding and applying practical solutions – innovative in the sense that they have not been applied in the same way before – to problems or aspirations identified in a variety of ways. Gibson-Graham et al's (2013) book, *Taking Back the Economy*, adopts this wider view of innovation and provides a number of practical ideas and examples of ways in which local communities have re-appropriated the economy by formulating and applying innovative – often community oriented – ideas and processes. Innovation is not limited to this: it can also be prosaic and applied, a response to problems identified in local technical, engineering or transport departments (Franzel, 2008). Although creative destruction occurs as the new replaces the old, the selection process – i.e. which ideas are pursued and which ultimately prove successful – can be based on a variety of normative perspectives. If this is accepted, then municipal innovation, far from being a contradiction in terms as some authors suggest (see Kattel et al, 2013, and Mulgan, 2007, for discussions), is a topic that merits attention.

There are two final aspects of innovation that we will raise without discussing them in depth. First, there exists a body of work on municipal innovation that defines it as new organizational structures of – or within – municipal government (e.g. Hansen, 2011; Nelson & Sarva, 2011). Our view of municipal innovation encompasses this but is not restricted to it. Just as studies of SMEs have recently widened their scope to include organizational innovation (OECD, 2005, 47-56), so we argue that studies of municipal innovation should engage with the technological innovation they perform. Second, as already mentioned, municipal innovation is often analyzed as a subset of innovation within public administrations (e.g. Osborne & Brown, 2011; Rosenblatt, 2011): this work has expanded the way innovation is conceptualized, underscoring that it need not be market-driven and exploring processes that lead to, or inhibit, innovation in government agencies

or departments. Whilst some observations apply to municipalities, many are not directly transferable. Municipalities, by virtue of their small size, large number, geographic rootedness, and limited capacity to influence their environment, have as much – if not more - in common with SMEs than with other public administrations (Tiebout, 1956).

We have chosen to couch our discussion of the municipal innovation process in the management and economic geography literature focused on SMEs – service SMEs in particular (Drejer, 2004; Doloreux & Shearmur, 2010) - whilst acknowledging that an alternative approach would have been to rely on public administration literature. One reason is that the management and geographic literature on innovation in SMEs considers its environmental and geographic determinants, determinants that have little bearing on provincial or national administrations coordinated from centralized ministries. Another is that a small number of researchers, such as Bingham (1977) and Franzel (2008), have already drawn parallels between SMEs and municipalities, which we wish to pursue since it builds bridges between different areas of innovation scholarship. However, our approach is not normative – we are not arguing that municipalities *should* be conceptualized as SMEs: rather, we suggest that municipalities *can* usefully be apprehended (at least in terms of some aspects of their innovation process) *as if* they are SMEs.

INNOVATION IN MUNICIPALITIES AND SMES: PARALLELS AND PITFALLS

It is acknowledged today that innovation is an open process (Chesborough, 2003; Huizingh, 2011). Innovation rests upon gathering information and know-how from interlocutors outside the firm: these can be university departments, clients, suppliers, government research institutes and even competitors. Interactions with competitors may be collaborative, may occur if norms and shared platforms are being discussed, or can occur informally in social settings and at conferences and fairs.

This has led to a body of literature – particularly in geography - emphasizing the importance an establishment's immediate environment can have on its innovative capacity (Cooke et al, 2004). For SMEs this environment has primarily been interpreted as the municipal or (small) regional scale: however, the question of scale remains unresolved (Doloreux & Parto, 2005) and is loosely understood as the area within which SMEs' daily operations take place (Shearmur, 2011). The environment plays a role for a variety of reasons, of which four will be mentioned. First, it provides SMEs with a variety of specialized (Porter, 2003) and non-specialized (Jacobs, 1969) interlocutors with whom to exchange information and know-how. In particular, it can lead to enhanced specialization and to concomitant coordination between different but related companies (Piore et Sabel, 1984). Second, an environment conducive to innovation will often house public bodies- such as universities and colleges – which gather and disseminate information and

technological know-how (Florida, 1995). Third, the environment can house formal and informal institutions – such as local government, but also local ways of doing, chambers of commerce, etc… - that facilitate the sharing of information and the testing of new ideas (Cooke et al, 2004). Finally, the environment can also provide the competitive stimulus, the motivation to emulate innovative behavior (Porter, 2003).

However, it is not only the *local* environment that plays a role. It is increasingly acknowledged that interactions important to innovation take place over distance (Torre & Rallet, 2005; Bathelt, 2011). Innovators travel to conferences, and strategically identify interlocutors in related fields to learn and/or to engage in collaboration. A growing number of researchers are investigating how different types of proximity – such as social, cultural, organizational, and geographic – contribute to innovation (Boschma, 2005; Amin & Roberts, 2008). Geographic proximity is often a support for other types of proximity but is not always a factor in explaining innovation-related exchanges between SMEs.

Innovation also depends upon SMEs' internal capacities, which allow them to absorb the information and know-how from outside and apply it (Lichtenthaler and Lichtenthaler 2009; Spithoven, et al, 2011). An SME's internal capacities are often related to its size: the larger the establishment, the more resources it can devote to innovation processes. Beyond size, though, the *nature* of internal resources is important: human capital, in the form of technicians and university graduates, investments in capital equipment and software, and human resource management that emphasizes knowledge sharing and exchange are all associated with an SME's ability to absorb external information and know-how. Another internal capacity is experience: knew knowledge is understood and exploited within the context of existing procedures, processes and acquired knowledge.

Given these factors associated with innovation in SMEs, to what extent are they relevant to municipalities? Most SMEs are single location establishments. Hence, an SME – like a municipality - is generally rooted in one place, and views the outside world from this vantage. Likewise SMEs and municipalities – unlike larger multinational corporations and provincial or federal bodies – have little capacity to influence the environment or to engage in geographic arbitrage: in Canada municipalities are seen as 'creatures of the provinces' (Magnusson, 2005), subject to constraining laws, rules and regulations. Like SMEs, municipalities have a set of internal capacities – population, local resources, employees , the administration itself – and openness to the outside - both by way of localized interactions and collaborations (with neighboring municipalities, for instance) and by way of participation in larger, a-spatial, networks.

The stress put on external information and know-how gathering for SMEs parallels the growing importance of policy transfer between and amongst governments – local governments in particular. McCann and Ward (2011) link external information gathering with municipal policy-making and innovation:

> *'As waves of innovation arrive more frequently, a concordant churning has been identified in urban policy, with new ideas and initiatives replacing old with increasing regularity […] Contemporary policy-making, at all scales, therefore involves the constant scanning […] of the policy landscape, via professional publications and reports, the media, Web sites, blogs, professional contacts and word-of-mouth for ready-made, off-the-shelf policies that can be quickly applied locally' (McCann & Ward, 2011, p xiv)*

Another overlap between SMEs and municipalities is the outcome of innovation processes: it is often assumed that innovation in public administrations will be either organizational, policy-related, or will concern the adoption (rather than the development) of technology (Berry & Berry, 2007; McCann & Ward, 2011; Osborne & Brown, 2011; Hansen, 2011; Brudney & Coleman, 1995). However, municipalities, more so than many other jurisdictions, are closely connected to the material world of construction, waste processing, traffic management, service delivery and so on: there is therefore no reason to suppose that municipalities will not identify and solve technological – i.e. product and process related – and service related problems similarly to SMEs (Bingham, 1977; Feller & Menzel, 1978; Franzen, 2008).

Given these similarities it is not unreasonable to approach municipal innovation using some of the tools and concepts derived from the study of innovation in SMEs (Franzen, 2008). The idea that municipal innovation can be influenced both by internal capacity and by the external environment is worth investigating, and has already been outlined, for policy innovation, at the scale of US states by Berry & Berry (2007):

> *'There are two principal forms of explanation for the adoption of a new program by a state: internal determinants and diffusion models […]. Internal determinants models posit that the factors leading a jurisdiction to innovate are political, economic, or social characteristics internal to the state. In these models, states are not conceived as being influenced by the actions of other states. In contrast, diffusion models are inherently intergovernmental; they view state adoptions of policies as emulations of previous adoptions by other states.' (p. 224)*

Key differences remain between innovation in municipalities and SMEs. First, notwithstanding the policy mobilities literature (which has highlighted the spread of neoliberal policies, Peck & Theodore, 2010), there is no *necessary* connection between policy sharing and neoliberalism. Policy unconnected with markets and marketization can also be transferred and adapted (Graham-Gibson et al, 2013), and whilst it is possible that municipalities' innovation is associated with competition between them (Tiebout, 1956), it can also be driven by internal demands and requirements.

The second, and related, point is that in the realm of municipal policy, imitation *is* a form of innovation. Despite well-documented antecedents – Godin (2008) emphasizes that until the 1960s innovation and imitation were almost synonymous, and Edgerton (2006) shows that everyday minor adaptations are an important type of innovation – it is not commonly recognized today that imitation can be a form of innovation. Today innovation is associated with the radically new. However, for many – if not most - SMEs, radically new innovation is out of reach: for SMEs, just as for municipalities, innovation often corresponds to the adoption of processes or to marginal improvements to products (Edgerton, 2006; Bhaskaran, 2006). Imitation, however, often incorporates elements of radical novelty: local governments adapt and customize policies and products, thereby creating new versions in the process (Berry & Berry, 2007; Peck & Theodore, 2010).

A third area of difference is that public administration has a duty to citizens: the desire to innovate must be tempered by conservatism, since experimentation in areas such as service provision can impact people's lives (Osborne & Brown, 2011). This speaks to the motivation for innovating: whereas it is understood that SMEs innovate in order to maintain or increase market share and profits, municipalities have a complex array of motives (Rosenblatt, 2011; Nahlinder, 2013; Kattel et al, 2013). In democratic institutions – such as municipalities - identifying problems ultimately rests in the hands of residents, for whom filled potholes or pleasant parks (for example) may be important irrespective of market calculation. The nature of municipal goals and motivations differentiates them from SMEs. It should be acknowledged, though, that a pervasive goal of municipal entrepreneurialism *is* economic growth (Evans, 2009) and that there are calls for public administration to mimic the private sector (Potts & Kastelle, 2010; Hansen, 2011; Osborne & Brown, 2011[1]): critiques of municipal entrepreneurialism are levelled at this market-driven driven focus, a contingent focus that is not inherent to it (Gibson-Graham et al, 2013).

Given the similarities between SMEs and municipalities, and whilst acknowledging the differences, we now turn to an empirical analysis of innovation in municipalities in the province of Quebec, Canada. We proceed in two stages. First, and after presenting the data, we present examples of innovation: this shows that municipal innovation is varied, can be technological, and is not limited to policy, organization or imitation. Second, we conduct an exploratory analysis to address two questions: i) what characterizes municipalities that participate in UMQ's (Union des Municipalités du Québec) innovation competition? ii) what characterizes the municipalities that

[1] Hansen and Osborne & Brown critically discuss the New Public Management approach, a move to reinvent the public sector in the private sector's image. Although we argue in this paper that the study of innovation in SMEs can shed light upon municipal innovation we are sympathetic to this critique: at the centre of our discussion is the need to differentiate entrepreneurialism (the process of introducing novelty as a response to perceived need) from neoliberalism (the process of marketising all aspects of social interaction).

win innovation awards? Both of these questions are framed by the idea that innovative behavior will be associated with external (essentially geographic) and internal (size and a variety of socio-economic) factors.

THE UMQ INNOVATION COMPETITION, DATA AND METHODS

Every year since 2005 the UMQ – a membership organization that lobbies for and represents the interests of about 300 of Quebec's medium sized municipalities – holds an innovation competition open to all of the province's municipalities, called MériteOvation. Its purpose is to "reward municipalities which, whatever their size, their population or their geographic location, have distinguished themselves in an original fashion by their accomplishments and efforts to innovate, create or develop an activity, a program or a project in view of improving their citizen's quality of life" (UMQ, 2015). The competition is organized each year in three stages. First, it is announced and the municipalities, boroughs (and, more recently regional bodies and local NGOs – which we do not cover in this study) submit details of their innovative activity: there have typically been 50 to 60 innovations presented each year, and about 40 participating municipalities. Second, finalists – 15 to 20 of them - are shortlisted to present their project at the UMQs' annual meeting and have the opportunity of showcasing their innovations. Finally, prizes are awarded by category of innovation (sustainable planning; public security; economy and leisure; social development; culture; transport and mobility; management and human resources) and to the overall winner.

The projects are shortlisted and judged by a panel of experts composed of five to seven people (depending on the year), including professors in the areas of public administration, management and/or planning, a representative of the Quebec ministry of municipal affairs, and two or three private consultants with experience in municipal government. The criteria are: originality of the undertaking and of results (38%); transfer potential (28%); effects in the locality (17%); and optimization of internal and external resource use (17%). Municipalities can submit multiple projects.

Our analysis is based upon information about participating municipalities and prize winners. The first part of the empirical section consists in providing some examples of municipal innovation. This shows that municipal innovation extends beyond policy and organization to, on the one hand, technology and, on the other, service provision and design.

The second part explores the nature of the 117 participating municipalities relative to the population of 327 municipalities that have been UMQ members at least once since 2005. It does so in two stages. The first question addressed is: what type of municipality participates in the innovation competition? Participation is indicative of belief, by the municipality, that it has introduced an innovation, combined with the municipality's desire (and ability) to enter the

competition. The second question addressed is: amongst the 117 participants, what distinguishes the 49 that have won at least one award? We expect winning an award to indicate innovativeness: without any market or technological criteria to assess innovation, the expert panel's opinion is the best indicator available.

The data used are from two sources. Statistics Canada 2006 census data provides basic size and socio-economic information about the 327 municipalities. Given confidentiality considerations associated with small area statistics, a limited array of indicators is available. Data from the UMQ provides information on the 117 participating municipalities and on prize-winners for the period 2005 to 2014.

Our approach is to perform chi2 tests and correlations between, on the one hand, indicators of participation and of winning an award and, on the other, variables or classifications that describe the municipalities. The underlying idea is that participation (and winning) may be associated with a municipality's internal capacity (size), certain internal determinants (in particular the socio-economic status of its population), or with environmental factors such as proximity to metropolitan areas, often considered hubs where ideas and interactions develop (Jacobs, 1969; Glaeser, 2003). Note that we pool all years together and do not take account of multiple participations, multiple submissions or the winning of multiple prizes. In this way we hope to alleviate the bias towards larger municipalities which have the capacity and variety of activities to participate every year, and to do so in a variety of categories.

One key limitation of these data is that we have no information on administrations themselves – thus we cannot comment on whether particular municipal practices, political orientations, or organizational factors have an impact on participation or winning.

AN OVERVIEW OF MUNICIPAL INNOVATION[2]

It is well documented that municipalities innovate by way of internal reorganization of their structures (Nelson & Svara, 2011) and by adopting and adapting technologies and policies that have already been applied elsewhere (Walker, 2006; Hansen, 2011; Franzel, 2008; Kattel et al, 2013). This type of innovation is present amongst the prize winners. For instance, in 2005, a pilot project for introducing green vehicles was shortlisted, as were the rolling out of high-speed internet and a project to increase accessibility of local youth to cultural activities. More recently social innovations – such as organizing readings in old people's homes – have also been selected, as have a variety of participatory procedures and policies associated with sustainability and

[2] Information in this section has been extracted from the UMQ magazine, URBA. May issues for years 2005 to 2014 (issue 2 of volumes 26 to 35) contain descriptions of each of the prize-winning innovations (www.umq.qc.ca/publications/magazine-urba/)

housing. Whilst these activities are innovative for the municipalities involved, they are essentially imitative and are adapting existing ideas to local circumstances. The equivalent, for SMES, would be organizational, management, and, to some extent, process innovation.

Of more relevance to the argument that municipalities are not always imitators and have points of resemblance with SMEs, are innovations that entail technological development. In 2005, one project involved the development of software to assess the profitability of land development and to point planners towards optimal development choices. More recently, a 2014 project involved the design and implementation of software to optimize the routing and usage of snow clearing vehicles: this is not merely for tracking, but for route and capacity optimization. The jury noted that when the program was used in 2013 efficiency increased by 15% and CO2 emission went down by 18%. This innovation was designed and implemented primarily in response to citizens' discontent with snow clearing operations – the economic benefits are real, but they are a secondary motivation.

Municipalities also undertake R&D activities in view of implementing innovations. For instance, in 2011, a suburb of Montreal systematically tested – using a strict research protocol - organically derived, pre-marked, road paving materials. The underlying motivation was to increase the sustainability of road-related public works: not only did the organic paving material function, it also, by virtue of being pre-marked, did not need repainting after winter (a common and expensive undertaking in many Canadian municipalities). Another example of R&D is a municipality that partnered with a government research institute in order to breed and test new types of vegetation able to both survive harsh Canadian winters in proximity to traffic and provide sound abatement.

Even if adaptive behaviors are often dismissed as being essentially non-innovative, adaptation can require original thinking and technological innovation. For instance, in 2009 a municipality which had purchased some standard fire extinguishing equipment redesigned it – in particular the way in which the fire retardant is stored – to make it compatible with smaller vehicles. The redesign and testing was undertaken by the municipal firefighters themselves. These modifications have been copied by other municipalities using the same equipment.

These examples illustrate that municipal innovation can be similar to innovation taking place in technologically oriented SMEs. But municipalities are also service providers, and some of their innovations concern the imagining – and introduction – of new types of service. An outer suburban municipality found a solution to ensuring library access for its dispersed and motorized constituents by setting up library antennae in certain gas stations. Borrowers can reserve books, CDs and other library items on-line, which are deposited when available and can be returned to the same place. The librarian behind the idea came up with it when reading research papers showing that library use diminishes rapidly as distance to libraries increases.

A quintessentially Canadian service-related innovation is the implementation, in a large, wooded and remote municipality, of GPS (Global Positioning System) markers for seasonally empty chalets and huts. This seemingly minor innovation is important in a context where people can easily get lost (especially in winter), and often make it – in poor shape – to the nearest shelter they can find. The motivation for this innovation is that on a number of occasions contact was made with victims unable to describe where they were: these GPS markers, together with a number of well-marked evacuation points in the remotest places, have accelerated the intervention time of emergency services.

One of the services offered by municipalities is planning. In 2010 an isolated municipality was recognized for its innovative approach to sorting out planning applications associated with wind farms, for which there existed no federal or provincial guidelines. The new regulations that emerged from a consultation process between power companies, the population and the municipality have enabled the construction of wind farms whilst minimizing local tensions.

A final example of service innovation is a taxi-bus service for young people organized in an outer-suburb of Montreal. This service, implemented in consultation with the young people themselves, allows them to travel to leisure and retail destinations within 20km, using a trusted service, and at affordable (municipally subsidized) rates. This innovation reduces the isolation and frustration of young people, and increases their autonomy whilst reassuring their parents.

These examples illustrate the diversity of innovation observed in Quebec's municipalities. Whilst some innovation is, indeed, imitative – and examples of this have not been elaborated upon – some innovation is radical (in the sense that entirely new products or services are introduced). However, imitative innovation should not be dismissed in a municipal context: for the local population it is of little relevance that a particular social service or environmental solution has been implemented elsewhere, provided that it improves service delivery and/or municipal infrastructure locally.

Two main points emerge from this overview. First, municipalities can be radically innovative – although much of their innovation is imitative or adaptive in some respects. The second is that whether an innovation is radical or not may be unimportant bearing in mind the innovation's primary constituents : notwithstanding Tiebout's (1956) theorization of inter-municipal competition by way of a mobile population shopping around for the best bundle of services (a theory that has been difficult to validate, Hoyt, 1990), the primary beneficiaries of municipal innovation are local residents themselves, for whom the radicalness (or not) of municipal innovation is of little concern.

WHAT SORT OF MUNICIPALITIES INNOVATE?

In this section we present a few straightforward analyses describing the characteristics of the 117 participating municipalities (out of the 327 members of UMQ), and of the 49 (out of 117 participants) which have won at least one prize.

The first table (Table 1) presents factors related to participation in the UMQ innovation competition. The choice to participate indicates a combination of two things: 1) the self-perceived introduction and completion of an innovation; and 2) the desire to publicize it, whether for internal reasons (e.g. morale boosting for employees) or external ones (e.g. recognition of achievement within the UMQ). This combination can be interpreted as innovative behavior, even if it does not provide any external validation of the innovation. The second table (Table 2) presents factors related to winning at least one innovation prize. Whilst victory is determined by a jury – i.e. there is external validation of innovativeness – it is also contingent upon who else is participating (the jury is assessing a different pool of innovations each year). It is therefore not clear whether having won at least one prize is indicative of being somehow 'more innovative' than participants who have not won a prize: winning a prize may simply indicate that, in that particular category (there are seven categories), the field was weak. Conversely, not winning a prize may indicate a strong field in the year of submission.

Municipalities located within 50km of the core of a metropolitan area (Montreal, Quebec and Ottawa) are more likely to participate (Table 1), whereas rural municipalities – i.e. those that are not part of a small city (Trois Rivières, Sherbrooke, Rimouski, Saguenay, Rouyn) or close to a large one - are least likely to. It is therefore the more urban municipalities that display innovative behavior, which is commensurate with the idea of emulation and/or inter municipal competition in these more dense locations.

Larger municipalities – those with more internal capacity – are more likely to display innovative behavior. Of the 89 municipalities with fewer than 1000 population, only one has submitted an innovative project for consideration, whereas 73 of the 89 with more than 10000 people have.

Whilst size is an indicator of municipalities' internal capacity (number of municipal employees, absolute budget size, number of departments, availability of staff to prepare UMQ submission), the nature of municipal administrations – and of the demands put upon them – are associated with their populations' socio-economic profile. Since we do not have information on administrations, socio-economic indicators are used as proxies.

Richer municipalities – those where economic (work-derived) and total (all inclusive) incomes are higher, are more innovative: over 50% of municipalities in the top income quartiles are innovative. It is work-derived income that plays the greater role: only 3 of the 80 municipalities in the lowest quartile of work income display innovative behavior, whereas 8 of the 82 in the

lowest quartile of total income do. Whilst neither of these figures is high, they show that low levels of economic development are almost incompatible with innovative behavior, whereas low standards of living are not necessarily so.

Internal inequality (measured as the ratio of mean to median income) and dependency (% of population between the ages of 15 and 65) are not correlated with innovative behavior. However, the connection between innovative behavior and economic dynamism is corroborated by positive correlations between innovation and, on the one hand, occupation rate (% of working age population with a job) and, on the other, population growth between 2006 and 2011.

Finally, the social structure of the population – as measured by professional occupational categories – strongly distinguishes municipalities that participate from those that don't. The proportions of the population in business (management, finance, administration) and scientific occupations are closely associated with participation; arts and health occupations are also significantly associated with participation. Sales occupations, on the other hand, are only weakly associated, whereas high proportions of manual occupations (transport, machine operators, primary sector occupations, transformation, manufacturing and public utilities) are strongly associated with non-participation. Thus, municipalities with higher socio-economic status populations are more likely to display innovative behavior. Since it is not the population, but the municipality, that displays innovative behavior this suggests that higher status socio-economic populations place more demands upon, and have higher expectations from, their municipal administrations. Conversely, local administrations may reflect local population since they draw their leaders – and many of their employees - from it.

Table 2, which presents analogous analyses, reveals that almost nothing – except for size – distinguishes prize winners from other participants. Since larger municipalities tend to submit more projects and submit projects in a larger number of years, the connection between winning a prize and size may merely reflect the higher probability of winning if more innovations are submitted. However, an interesting twist in this result is that whereas the largest municipalities have a higher chance of winning than smaller ones, the smallest ones (those below 5000 people) have a higher probability of winning than medium sized ones (5 to 10000 people): this may reflect efforts by the jury to counteract the bias in favor of larger municipalities which inheres in the prize giving process[3].

DISCUSSION AND CONCLUSION

The purpose of this paper has been to consider municipal innovation in the light of approaches to entrepreneurial SME innovation developed in the management and geographic literatures. The

[3] We were verbally informed of this effort to counteract bias in favor of large municipalities.

rationale is that municipalities, unlike many other public administrations, are numerous, small, relatively independent and anchored in geographic locations. Furthermore, municipalities are often conceived as competing with one another to attract external population and economic activity (Tiebout, 1956). Indeed, it is because municipal entrepreneurship is often directed at economic development and at creating competitive advantage for local economic interests (Evans, 2009) that it has been criticized as contributing to the neoliberalization of local government (Harvey, 1989; Hankins, 2015). From another perspective, the idea of municipal competitiveness has been questioned partly because it is unclear who is defining the terms of competition and what is being competed for (Shearmur, 2008), and partly because there is little empirical evidence that inter-municipal dynamics (migration in particular) conform to the competitive framework described by Tiebout (Hoyt, 1990).

Provided that entrepreneurial innovation is understood in a broad sense – i.e. identification of a problem or a demand; an idea for responding to it; development and testing of the response; implementation of this response – then there is no reason to think that municipalities do not, in some respects at least, behave like SMEs. In their role as territorial managers responsible for dealing with local problems (such as potholes, snow clearing, or bored teenagers) and local demands (such as requests for access to libraries, the need for sustainability), local administrations undertake innovation in an entrepreneurial fashion. However, the problems and/or demands which instigate innovation are not identified through market mechanisms but through local politics, interactions with civil society, and through feedback from departments or employees who are dealing, on a day-to-day basis, with the running of municipal services.

Therefore the key difference between private sector and municipal innovation, one that impacts upon the empirical analysis above, is the way innovation is identified and validated. Whereas private-sector Schumpeterian entrepreneurs will ultimately be sanctioned by markets – innovation will succeed or fail depending upon its impact on the bottom line – there is no straightforward sanction for municipal innovation. Unlike SMEs, municipalities are not competing for market share, and the purpose of innovation is not to ‘take-over’ from other municipalities. Admittedly, many municipalities – particularly larger ones – will resort to this discourse to justify policy decisions and innovations, and the discourse is so widely accepted that it can serve to shield questionable innovations and policies from scrutiny (Evans, 2009; Surborg et al, 2008; Shearmur, 2008). However, most municipalities are small: in this study only 89 of the 327 municipalities are over 10 000 people. The type of innovation introduced in smaller municipalities – whilst not immune from manipulation by economic and other interests – is principally aimed at improving the way services are delivered, solving practical problems associated with material aspects of municipal responsibility, or developing new services to address problems identified by the municipality. Whilst it is difficult to argue that these are not innovations, these innovations are

not turned towards the outside: quite the opposite, the adoption and success of the innovation is judged almost wholly on whether or not the problem is solved and on how the local population receives it.

This means that whereas, for SMES, innovation is outward- looking and ultimately assessed on external criteria, municipal innovation – particularly in smaller municipalities that dominate this study – is assessed on internal criteria. This does not mean that innovating municipalities are judges of their own innovations: by internal it is meant that local population, civil society and businesses, internal to the municipality's territory, but external to the administration, are the judges.

The question has been asked, when the concept of innovation has been applied to the service industry, whether service innovation is identical to, similar to, or different from manufacturing innovation (which, until the 1990s, was what studies of innovation in SMEs looked at –Drejer, 2004; Gallouj & Savona, 2010). To the extent that innovation in municipalities has been studied (Nahlinder, 2013), similar questions have also arisen without any definitive response. In this paper we show that municipal innovation can be approached using concepts similar to those for understanding private-sector innovation. The key difference is not the type of innovation (which can be in technological, organizational, and policy fields), nor the overall process of innovation (it relies on internal capacity – both in terms of size and type -, is associated with location, and – as others have shown – is connected with external information sources and networking, McCann & Ward, 2011): the difference is in the way innovation is evaluated and in who evaluates it.

In our exploratory empirical analysis, we identify some pointers as to which types of municipality engage in innovative behavior: these pointers are consistent with a Schumpeterian understanding of open innovation processes. However, we are unable to usefully distinguish innovators who receive awards from those that do not. Indeed, the fact that a jury is required to evaluate municipal innovations speaks to the difference between private-sector and municipal innovation. Municipal innovation is not usually an outward looking quest by local administrations for markets, for world firsts, or to be attractive to outsiders (this type of innovation can be assessed with market-like indicators, Tiebout, 1956), but is often an inward looking quest for problem solving and service provision that will be judged by local businesses, residents and civil society. Walker (2006), in his analysis of innovation diffusion across English local governments comes to a similar conclusion (though he places more emphasis on competition, probably because he is analyzing large upper-tier authorities):

> *'The most likely explanation for the adoption of innovation […] is to be found in a broad definition of competition that includes not just competitive pressures from outside organizations but embraces user voice.' (p330).*

Future research in the field of municipal innovation – particularly in the neglected area of technological innovation and new service provision - could take as a starting point the similarities between SMEs and municipalities that have been highlighted above, and focus, first, on the way in which problems or demands are identified, and, second, on who evaluates innovation and how this is done. Another area of future study – identified by Potts & Kastelle (2010) – is to focus on the motivations and barriers, within municipal organizations, for innovative behavior by individuals or departments: we plan to conduct detailed case studies of some of the UMQ participants in order to gain insight into these questions.

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Table 1: Participation in UMQ innovation competition, 2005-2014

Chi2 tests between types of municipalities

Location	*Metro area*	*Small city*	*Rural centre*	*Rural periph*	*p(chi2=0)*
no participation	46	18	63	83	<=0001
participation	(56%) 59	(35%) 10	(25%) 21	(25%) 27	
Size	*over 10K*	*5K to 10K*	*1K to 5K*	*below 1K*	
no participation	16	31	75	88	<=0001
participation	(82%) 73	(44%) 24	(20%) 19	(1%) 1	
Median total income (2006)	*over 27.9K*	*23.2 to 27.9K*	*20.4 to 23.2K*	*below 20.4K*	
no participation	40	48	48	74	<=0001
participation	(51%) 42	(43%) 36	(39%) 31	(10%) 8	
Median Work income (2006)	*over 27.8K*	*23.4 to 27.8K*	*19.3 to 23.4K*	*below 19.3K*	
no participation	41	40	52	77	<=0001
participation	(51%) 42	(48%) 41	(40%) 35	(4%) 3	

Correlation of participation (0/1) with various indicators

Various indicators	*IC Inequality*	*Occupation rate*	*% working age*	*growth 06-11*
Correlation	-0.018	0.129	-0.016	0.169
p(t=0)	0.743	0.020	0.778	0.002
Professional occupations (% of workers)	*Business*	*Science*	*Health*	*Arts*
Correlation	0.301	0.235	0.165	0.152
p(t=0)	<=0001	<=0001	0.003	0.006
	Sales	*Manual*		
Correlation	0.096	-0.363		
p(t=0)	0.082	<=0001		

Note: The population analyzed in this table consists of the 327 municipalities that have been members of the UMQ at least once between 2005 and 2014.

Table 2: Winning at least one award, UMQ innovation competition, 2005-2014

Chi2 tests between types of municipalities

Location		*Metro area*	*Small city*	*Rural centre*	*Rural periph*	*p(chi2=0)*
	no award	33	4	13	18	0.494
	at least 1 award	(44%) 26	(60%) 6	(38%) 8	(33%) 9	
Size		*over 10K*	*5K to 10K*	*below 5K*		
	no award	33	21	14		0.001
	at least 1 award	(55%) 40	(13%) 3	(30%) 6		
Median total income (2006)		*over 27.9K*	*23.2 to 27.9K*	*below 23.2K*		
	no award	23	20	25		0.649
	at least 1 award	(45%) 19	(44%) 16	(36%) 14		
Median Work income (2006)		*over 27.8K*	*23.4 to 27.8K*	*below 23.4K*		
	no award	26	22	26		0.290
	at least 1 award	(48%) 20	(46%) 17	(32%) 12		

Correlation of awards (0/1) with various indicators

Various indicators	*IC Inequality*	*Occupation rate*	*% working age*	*growth 06-11*
Correlation	-0.010	-0.034	0.104	0.053
p(t=0)	0.92	0.71	0.27	0.57
Professional occupations (% of workers)	*Business*	*Science*	*Health*	*Arts*
Correlation	0.018	0.067	0.088	-0.061
p(t=0)	0.85	0.47	0.35	0.51
	Sales	*Manual*		
Correlation	0.006	-0.047		
p(t=0)	0.95	0.61		

Note: The population analyzed in this table consists of the 117 municipalities that have participated in the UMQ innovation competition at least once between 2005 and 2014.