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The challenges of municipal solid waste management systems provided by public-private partnerships in mature tourist destinations: The case of Mallorca

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ABSTRACT

This article analyzes the influence of tourism on the municipal solid waste management (MSWM) system taking as reference the case study of Mallorca, an internationally renowned destination. The characteristics of tourism such as seasonality and land scarcity, set interesting challenges to public-private partnerships related to MSWM system. The analysis of Mallorca's experience shows that land endowment strongly influences the choice of treatment technologies in tourism destinations. Furthermore, tourism seasonality significantly affects management costs which should be considered on PPP contracts. Finally, the tariff system in this kind of environmental PPPs in tourist destinations still need to improve to promote waste minimization and recycling.

1. Introduction

Population and economic growth have increased the rate of municipal solid waste (MSW) generation over the last decades (Sakai et al., 1996). This has increased pressure on public authorities to develop accurate municipal solid waste management (MSWM) policies and systems to deal with the impacts on ecosystem services related to MSW generation (Bartone, 1990; Foo, 1997; Marchand, 1998; Rodríguez, 2002; Magrinho et al., 2006; Mor et al., 2006; Manga et al., 2008; Shekdar, 2009; Al-Khatib et al., 2010).

Nowadays, concern about inappropriate management has led to global efforts in order to reorient MSWM systems towards sustainability given the limited resources for its funding and the need for social acceptability aligning the incentives of the main stakeholders (Rodríguez, 2002; Rotich et al., 2006; Shekdar, 2009).

MSWM services have traditionally been under public procurement provision, unfortunately, there are many experiences in which public provision failed to achieve acceptable results (Bartone et al., 1991; Kassim and Ali, 2006; Bessonova, 2012). However, it is not necessarily that only the public sector provides MSWM services since there are many experiences public-private partnerships (PPP) in this sector worldwide (Chang et al., 2003). PPPs are long-term contracts between the public and private sector in which the private sector has responsibility for significant aspects of the building and operation of an infrastructure for the delivery of public services that the public sector should provide while both sectors share risks, costs and benefits (Iossa et al., 2013).

The analysis of experiences regarding to PPPs performance suggest that there is no a 'one-size-fits-all' principle to design PPP contracts for a given objective or sector (Chong et al., 2006; Iossa et al., 2013). There are many factors that can influence in the likelihood of success or failure in a PPP agreement. Therefore, the analysis of the contract design in PPPs, such as risk allocation or payment mechanism, are significantly relevant to understand PPP outcomes (Iossa et al., 2013).

Previous case studies in the academic literature have attempted to assess PPP performances in MSWM systems in different regions around the world (Bessonova, 2012); however, few of them analyze the particular characteristics of MSWM in tourism destinations (Berkun et al., 2005; Mateu-Sbert et al., 2013; Arbulú et al., 2013). This is, in our opinion, an important shortcoming since tourism is a growing sector worldwide that is intensive in MSW generation, and, as we try to show in this paper, specific challenges for MSWM are encountered in those regions specialized in tourism (Arbulú et al., 2015).

This paper analyzes the main characteristics, problems and challenges of PPPs related to MSWM services in mature tourist

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destinations with special focus in Mallorca (Balearic Islands), which is considered as a typical example of a second-generation mass tourist resort in the academic literature (Knowles and Curtis, 1999; Aguiló et al., 2005). Mallorca's tourism development lead to a considerable level of tourist arrivals equivalent to approximately 10 tourists per resident[1] per year.

The remainder of this paper is organized as follows. Section 2 describes the main factors to take into account for an integrated MSWM system and sets the structure under which the analysis of PPPs should be carried out. In Section 3, explains the main characteristics of an environmental PPP regarding to MSWM systems in which the experience of Mallorca is explained. Section 4 describes the relationship between tourism specialization and MSWM systems and how these impact on the PPP performance. Finally, Section 5 shows the central conclusions of the article.

2. The goal of an integrated approach for sustainable municipal solid waste management

Nowadays, the existence of a wide variety of processes and technologies for MSW treatment has generated alternative structures and solutions for MSW disposal. However, even with such broad technological options, the optimal solution for MSW treatment has not yet been fully established (Magrinho et al., 2006).

Nevertheless, there is consensus about the basic principles of waste management established by the European Commission: (i) source reduction, (ii) reuse/recycling, (iii) recovery and (iv) disposal (Bartone, 1990; Shekdar, 2009; Lee and Sun Paik, 2011). As it is possible to note, an efficient MSWM system should aim to reduce the amount of MSW generation as its main objective, with ensuring the most efficient reuse of resources (once MSW has been generated) as a secondary goal (Karam et al., 1990).

In many countries, MSWM has become a complex task for public authorities not only because of the growing volume of waste and its variety (Sakai et al., 1996; Sawell et al., 1996; Tınmaz and Demir, 2006) but also because of the increasing resources needed to operate the system (Omuta, 1987) and growing public concern about environmental impacts.

Over recent years, many researchers have realized that in order to achieve efficient MSWM, it is necessary to design an integrated system rather than selecting individual component subsystems that may not work well together (Bovea et al., 2010; Fobila et al., 2008; Henry et al., 2006; Joos et al., 1999; Rotich et al., 2006; Shekdar et al., 1991; Tinmaz, 2002; Wilson et al., 2006; Zhang et al., 2010). This integrated system requests from public authorities a rational planning approach that involves an integrated analysis of generation, collection, transportation, processing and disposal in order to achieve sustainability in this system (Dennison et al., 1996; Rotich et al., 2006; Shekdar, 2009).

The goal of a sustainable MSWM system is not only related to the choice of an appropriate technology to handle MSW treatment and disposal (Henry et al., 2006). A sustainable MSWM system may deal with other factors such as socio-economic conditions, environmental impacts and social support (Shekdar, 2009; Bovea et al., 2010). The interrelationships among these factors are usually complex (Al-Khatib et al., 2010).

Given these characteristics, there is no unique parameter with which to assess the effectiveness of the system; therefore, the performance of the MSWM system and PPP contracts should consider different measures and incentives in each part of the process (collection, transportation, processing and disposal) in order to assess its performance and sustainability.

3. Public-private partnership in municipal solid waste management systems

Traditionally in academic research regarding to MSWM, it was argued that the responsibility and management of MSWM facilities should exclusively rest with the public authorities (Sawell et al., 1996; Shekdar, 2009). However, in recent years several authors have suggested that in order to get efficient results, it was important to promote cooperation between the public and private sectors by allowing the former to participate in the operation[2] of the MSWM system (Bartone, 1990; Bartone et al., 1991; Rotich et al., 2006).

In 1990 the Balearic Government published the Urban Solid Waste Management Master Plan (PDRSU) by Decree 87/1990. Its approval meant the adoption of a different approach to MSWM in which minimization of MSW generation, reuse and recycling was enhanced. Furthermore, PDRSU established a Waste-to-Energy (WTE) system as the main technological solution and its implementation would be reached by means of a PPP. Through this PPP, the private sector takes charge of the design, investment, planning, management and supervision of all the technical operations of MSWM facilities, while the public authority keeps the responsibilities of planning and supervising the whole MSWM system.

Public-Private partnerships can be found in many countries all over the world and are based on the idea that extra value can be obtained by combining knowledge and co-production; therefore, a PPP implies cooperation between public and private actors to develop products or services sharing risks, costs and benefits (Osborne, 2000; Sullivan and Skelcher, 2002; Klijn et al., 2008). Most of these projects are related to urban reconstruction or renewal of public infrastructure (Iossa et al., 2013). This gives them a special character to PPP related to MSWM systems since most of these environmental or spatial projects tend to be rather complicated) given that its main objective the improvement of environmental quality (Bessonova, 2012).

Furthermore, as Iossa et al. (2013) noted, problems in PPPs may arise when output specifications are not clearly defined or are not consistent with the infrastructure needs that the PPP intends to satisfy. Output specifications is the basis of the contract; these should be identified previously by means of a careful economic assessment. Mistakes in the contract can be very costly for the public authority given the long-term nature of the PPP contract.

Under a PPP related to MSWM, the public authority should play a major role as a regulator that sets the environmental goals, while private sector brings financial resources, technical capability, and entrepreneurship to provide the public service. Many PPPs in economic analysis attempt to promote self-supported financial schemes. In MSWM systems, this would imply that waste generators should pay to the provider a cost-covering user fee; however, due to the nature of these services as public goods with bulky investments, it is usual that the governments provide payments to the private sector (Chang et al., 2003; Iossa et al., 2013).

For a successful PPP implementation there is the need for a strategic vision of public authorities. Institution building and the possibility to set clear and stable environmental macro would reduce risks from the public side. This would encourage PPPs by reducing possible negative impacts on the financial stability of the PPP (Chang et al., 2003; Iossa et al., 2013). Furthermore, PPPs related to MSWM system not only requires of a legal framework and policies that set goals, but also need to set responsibilities between many multi-level public authorities involved in the system (Shekdar, 2009; Al-Khatib et al., 2010). The legal framework

[1] *Source:* IBESTAT & CAIB (Balearic Islands Autonomous Community).

[2] Planning and control activities should remain with the public authorities.

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