Compatibility of municipal services based on service similarity

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ABSTRACT

The aim of this article is to propose and examine a quantitative method of determining the degree of compatibility between municipal services. Provision of services and facilities maintenance are usually two biggest expenditures of local governments. Traditionally, facilities host only one service, whereas the challenge and opportunity lies in combining various, compatible services and offering them together under one roof. Such a combination decreases municipal expenditure and has a strong positive impact on the general service quality. For this purpose, we take advantage of the City-block distance formula to calculate the degree of compatibility between municipal services. The method is examined and discussed on a sample of 30 real municipal services. This allows us to find possible combinations of strongly compatible services that should be offered together in Multi-Service Facilities and, at the same time, avoid an unwanted combination of services that are incompatible.

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1. Introduction

The delivery of public services and facilities maintenance is a critical function of local governments (Zolnik, Minde, Gupta, & Turner, 2010). It is a key aspect of city management due to its direct influence on city competitiveness and citizens' quality of life (Lee & Lee, 2014). Consequently, it is also usually the most important expenditure of public administration due to its social function. Despite this, recent studies suggest that public services and facilities are in many cases poorly managed (Gonzalez, Llopis, & Gasco, 2013; Kwok & Warren, 2005). This is because for many years innovation research has been focused on the industrial sector, whereas public services have received little attention (Gonzalez et al., 2013). In addition Tan, Koray, and Baum (2008) report that all urban activities are unsustainable by definition because they consume resources. To that end, Cosgrave, Tryfonas, and Crick (2014) suggest that the solution to this problem should be in seeking to improve the quality of services at lower resource costs. Therefore, we theorize that in an economic downturn a reduction of resources used for the provision of public services should be the fundamental element of the municipal optimization strategy.

van den Dobbelsteen and de Wilde (2004) remark that optimization should start from a reduction in the demand for space. At the city level significant savings may be achieved through a more efficient adjustment of the surfaces used for public services provision. According to

Neirotti, De Marco, Cagliano, Mangano, and Scorrano (2014) Information and Communication Technologies play an important role in this issue. Specifically, the emergent practice of service virtualization that forms a part of e-government initiatives contributes to, inter alia, efficient management and cost reduction (World Bank, 2015). Services available online enable citizens to communicate and interact with city representatives without the need of visiting the appropriate facility personally. This, in a direct way, releases the space occupied especially by services, where citizen attention zones are significant. Moreover, virtual services decrease the number of workplaces due to automatization processes. However, in spite of this not all services can be virtualized. Sport, social or cultural are types of services that require in person participation. Others can be virtualized only partially, for example a basic health care consultation can be provided online; more specific treatment requires a specialized facility. Furthermore, even in so-called highly developed countries the problem of a Digital Divide exists, and prevents services from being fully virtualized. For these reasons service virtualization, however advantageous, does not solve the issue of conserving physical space completely, other simultaneous actions are necessary.

Marsal-Llacuna, Leung, and Ren (2011) suggest that Multi-Service Facilities (MSF) can be a response to this problem since they reduce the amount of urban land necessary for public services provision and decrease their cost. Consequently, we are convinced that the essential step for public resource saving is a rewarding combination of compatible services in the facility building. Such a solution permits more than one activity to take place at the same time and location (Batty, Besussi, Maat, & Harts, 2004). Furthermore, efficient use of already available resources makes this approach economically sustainable

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because it increases the occupation rate implying that more people use the same area, or the same number of users uses a smaller area (van den Dobbelsteen & de Wilde, 2004).

These considerations lead us to formulate the following hypothesis: Is it possible to establish the degree of compatibility between public services for their advantageous combination in MSF?

1.1. Municipal services

Public services are essential for a city to properly function. In general terms they are services provided by administrations of different levels (state, regional, municipal) in exchange for taxes. Thacker (2009) defines more precisely that public service is a piece of work performed by the public administration on behalf of the citizens. A general term of public service is sometimes substituted by others, corresponding to administrations of different levels: local, municipal or urban service. Here we are exclusively focused on services that are a municipal responsibility. Moreover, we consider only these services that require a physical space to be offered - a facility.

1.2. Facilities

A public facility in this frame of reference is a building intended for the provision of public services. Bennett and Iossa (2006) define two stages of the public facilities development process: building and management. Building a new facility is an easier way to respond to current social needs because the number of constraints is relatively low. Such an approach allows services to be very carefully planned and eventually obtain a good quality results. However, it is also expensive and difficult to execute, especially in an economic downturn. Hence, we mainly focus on the facility management stage and postulate that the challenge is to intentionally repurpose existing facilities by retrofitting them with other, compatible services.

1.3. Service-facility relationship

Service and facility are two concepts that are often confused. It is probably a consequence of mental shortcuts commonly used in everyday language. For instance, it is common to hear people speaking of a school. In fact, a school is a mental shortcut encompassing two concepts: a building (container) and a service of education (content) (Marsal-Llacuna et al., 2011). It is of crucial importance to distinguish these two components, as summarized in Table 1.

To sum it up: a service is an intangible process or activity that constitutes the content of a physical container – a building. A service is primordial, while a facility is secondary – it exists only to provide appropriate conditions for service offering.

Based on a research encompassing scientific papers, organization charts and different city administrations we discovered three types of relationships between services and facilities. The most common is a one-to-one relationship where a service is offered in one facility and a facility hosts only one service. In such cases a service is usually identified with a facility and mental shortcuts are created, e.g. a school refers to the building as well as the service of education. Another case occurs when a service requires more than one facility, e.g. a waste management service takes place in a waste treatment facility and recycling plant. The last variant takes place when more than one service is offered

Table 1
Comparison of two concepts: a service and a facility.

Service	Facility
• Activity/process	• Building
• Content	• Container
• Intangible	• Physical
• Primordial	• Secondary

in one facility (MSF), for example, social youth service, multimedia library service and gym service are offered together in a community centre facility.

1.4. Compatibility

The Oxford Dictionary provides a general definition of compatibility, which is: "a state in which two things are able to exist or occur together without problems or conflict" (Compatibility, 2015). The fundamental question that emerges is, when are some "things" compatible and when are they not? Depending on the discipline, the approach for compatibility differs. In some cases compatibility can be explicitly verified; for instance, blood compatibility, compatibility of substances in chemistry or compatibility of web services. However, there are also objects whose compatibility cannot be clearly measured. Such a situation occurs in social science where compatibility is usually identified with similarity. We take the same approach for the issue of service compatibility and consider that the more similar the services, the more compatible they are. In this context compatibility of services is crucial because the value is generated only when compatible elements are consumed together, otherwise the utility of the totality is greatly reduced (Desruelle, Gaudet, & Richelle, 1996).

2. Material and methods

In this section we present a method for determining the degree of service compatibility. However, before going into detail, it is important to discuss circumstances that make some services more amenable for compatibility assessment than others.

First of all, services are provided by various administrative bodies within distinct governmental levels. In Catalonia, Spain, public services are programmed by different entities at the State, Autonomous community, Province and Municipal level. Unfortunately, there is little cooperation between these bodies in terms of public services and facilities. Consequently, a facility building is usually a property of the entity that delivers the service. This imposes a separate approach for services and facilities provided by each governmental level, and dramatically reduces possible benefits resulting from shared use of space. Due to these circumstances theoretically compatible services that are administered by different authorities, in the real world, are not likely to be combined. For this reason, to make this research more realistic, we restrict application of the method to services that are exclusively a municipal responsibility.

Another limitation concerns sensitive services such as religious, safety or funeral services. These are services which, due to their character, should not be combined with others for safety or ethical purposes. For this reason all sensitive services have been excluded from our considerations.

Having applied the abovementioned restrictions, in the following sections we present the method of service description and a calculation of compatibility.

2.1. Service features

A profound research on the system of municipal services provision has been conducted to find a universal way of service description and comparison. As a result, we propose a set of seven features that in our opinion characterize services in the best way and make them comparable. The features are as follows: Affiliation, Delivery, Nature, Presence, Scope, Stakeholder and User. Each of these features consists of attributes. Every attribute has a percentage value. The value can be either binary (in this case 0% or 100% because for legibility purposes, we present the results on a percentage scale) or relative (each attribute may have a different value from 0% to 100%). It is important to stress that these values are compositional data - they always have to sum 1 (in this