

**PUBLIC PRIVATE PARTNERSHIP AS A TOOL TO REDUCE  
SOCIAL COSTS OF RESIDENTIAL URBAN SPRAWL \***  
居住地スプロールの社会的費用削減のための官民パートナーシップによる取り組み

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## 1. Introduction

The phenomenon of urban sprawl, including their driving forces and possible solution has been scientifically analysed and politically discussed in developed countries already since several decades. However, recently this problem has been reinforced by the socio-economic mega-trends of population decline and economic recession in parts of Germany, as well as in Japan. Focussing on the economic sphere of sustainability, it becomes more and more difficult to bear the costs for investment, maintenance and service of the growing demand of network and social infrastructure within sprawling urban regions. Population decline leads additionally to local underutilisation of infrastructure, which boosts the maintenance costs additionally. These costs are partly borne by the user by one-time or regular fees, but partly they remain for the municipality as public costs.

To tackle the problem of rising municipal costs, many municipalities apply land use instruments (e.g., land readjustment projects) next to the nationwide existing fiscal instruments (e.g. property tax, recoupment charges of local public infrastructure) in case of housing developments.

Based on the hypothesis, that all these instruments have a major influence on the social residential urban sprawl costs and based on current approaches of calculating costs of urban development, this paper aims to develop an estimation model of social costs of residential urban sprawl. Moreover, picking one important element within this cost estimation concept, it aims to analyse the role of public private partnership as a solution to reduce the social sprawl costs. Finally, it will give some strategical ideas of the usage of land use instruments in public private partnership.

## 2. The Sprawl Costs Problem - Current approaches

### (1) “Costs of Sprawl” by Transportation Research Board

The new edition of the often cited study „Costs of Sprawl“ (1974) showed for the USA, that a disperse land use development will lead to extra costs in the dimension of a triple-digit billions of dollars within 25 years (TCRP<sup>1</sup>, RERC<sup>2</sup>). This estimation is based on analyses of two growth scenarios, which are different in terms of the spatial distribution of households and employment in fifteen example Economic Areas (BAU, compact development). Based on the „Rutgers University land conversion model“, cost estimation had been done for real estate development, water supply and sewage, road construction, provision of public institutions and the construction of housing and industrial buildings. Additionally private costs, resulting from higher transport demand, have been taken into consideration. Regarded spatial units are urban, suburban and rural counties, therefore the focus is the large scale distribution of land use development.

### (2) European Studies on Infrastructure Follow up Costs

European researches mainly focus on the relationship between urban development and infrastructure costs, partly including fiscal impact analyses for the public sector. The Austrian Conference for Spatial Planning estimated for the period from 1991 to 2011 (scenario approach) a public cost difference for provision of technical infrastructure in suburban municipalities two to four times higher compact to compact municipalities, depending on the dynamic of development (ÖROK<sup>3</sup>). A swiss study in order of

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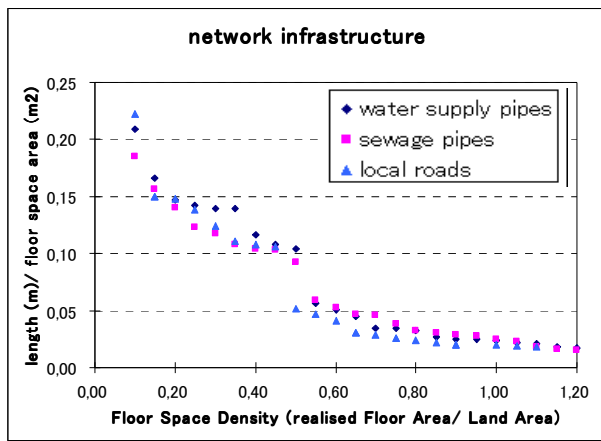


Figure 1 Relationship between network length and building density (Siedentop<sup>5)</sup>)

the relation between housing policy, municipal budget and trip generation. Public revenues as well as housing related costs had been analysed and forecasted for the next 25 years, based on a geographical analysis of residential locations based on meshes of the size of 1 ha. The bottom line is that the current German fiscal system supports housing development at locations with high transport demand. However, although this study very detailed in terms of revenues and costs related to housing, the study neglected the specific effect land use instruments in public private partnership, e.g. land readjustment projects.

### 3. A Comprehensive Estimation Model of Social Costs of Residential Urban Sprawl

#### (1) Elements of *Social* Residential Sprawl Costs

The previous chapter showed, that a gap in of costs of sprawl can be stated in a straight, society oriented approach, which focuses not only on public budget, but takes also external effects of land use and resulting change of transport pattern into account. Our ongoing research is based on a calculation model, which includes all kinds of social costs, and takes their sponsorship by fiscal and land use instruments into account. It considers costs at the level of neighbourhoods and breaks them down to the private households as the causer. This allows an internalisation of those costs according to the causer-pays-principle.

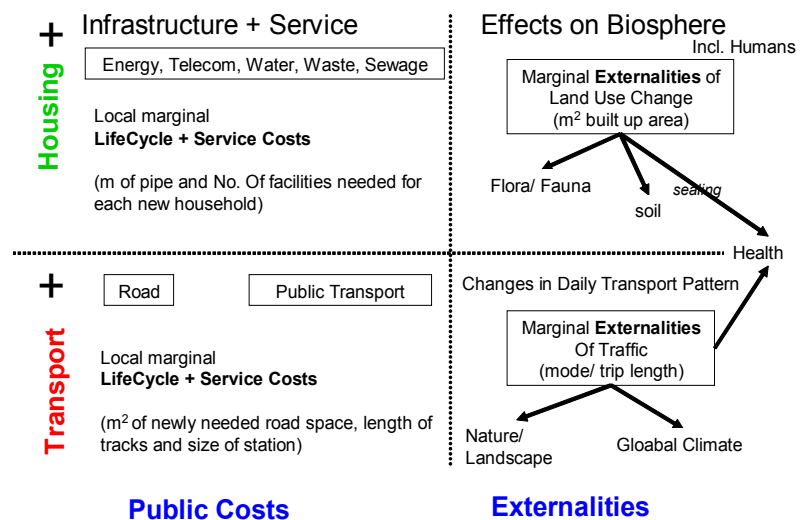


Figure 2 Social Location Costs

#### (2) Framework of the Model

##### a) Choice of housing area

The choice of the area is being done mainly by this four criteria, indicating a strong functional integration of the investigated areas with the metropolitan centre and ensure that the chosen *reference area*, which will be taken as a benchmark for land use related costs, is an alternative housing area and therefore an potential aim of migration for suburban population – also in terms of expected transport demand.

the Federal Office of Spatial development, calculated three times higher costs per capita for disperse compared to compact urban development. However, it included only infrastructure for water supply, sewage, electricity and transport (ARE<sup>4</sup>).

These previous and ongoing research shows that public expenses for technical and social infrastructure depend on building density as well as land use structure (cf. Fig.1). In the other hand they showed the intransparency and often less causer orientation of funding systems of infrastructure. Therefore, most recent German studies, partly sponsored by the Federal Ministry of Education and Research, focussed on cost-benefit-analysis for public budget. Within a doctoral dissertation of Hamburg University, Gutsche<sup>6</sup>) showed the

b) Calculation of marginal location costs

According to the model shown in fig.2, the marginal location costs basically consist of two cost groups: local costs for additional infrastructure and additional service, as well as marginal externalities, triggered by both the change in land use pattern and in daily transport pattern (fig. 2). These costs need to be calculated for each location and summed up.

c) Financial Contributions

After that, the calculated values need to be reduced by the private sponsorship with spatial effect, i.e. for housing and transportation, which can be done in two ways: Firstly by taxes and fees, charged for private transportation and housing (e.g. property tax, development fees, inhabitant tax, petrol tax, car ownership tax). Secondly by the application of land use instruments in public private partnership with the land owner or developer respectively.

d) Determination of Residential Urban Sprawl Costs

Finally the Residential Urban Sprawl Costs can be determined by generating the social costs difference between the reference area and the most costly suburban area.

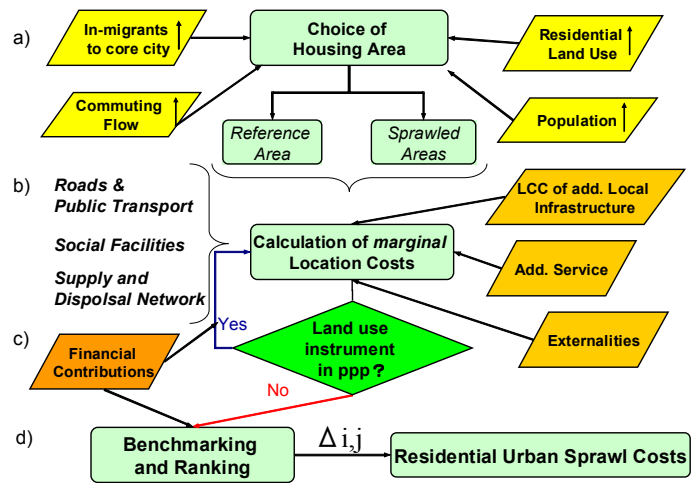


Figure 3 Residential Urban Sprawl Costs – Research Flowchart

#### 4. Current Strategy - Land Use Instrument in public private partnership

(1) Land Readjustment in Germany and Japan

a) Basics

An historically important instrument in both countries is Land Readjustment, which aims at converting raw land to buildable urban land by a minimal public investment. Avoiding its purchase the land is replotted by means of amalgamation, subdivision, relocation, exchange, and modification of size and shape of land parcel according to the new layout plan, and each landowner is benefiting the increase of land value through improvement of newly developed infrastructure and facilities (Hayashi<sup>6</sup>). Offsetting the expected increase in land value, land owners are sharing the project costs by contribution of land. The details are regulated in Japans City Planning Act and Germanys Federal Building Code (section 45-79).

b) Role for Urban Development

Land Readjustment Projects are a further development of the agricultural land consolidation and plays a major role in many Japanese cities since the redevelopment after the 2<sup>nd</sup> world war. Implementable by both private and public initiatives, many urban development in the Metropolitan region of Nagoya is done by land readjustment (in Nagoya city approximately 68% of built up area). As an exchange procedure in building plots it often applied in case of fragmented land ownership due to former agricultural use of the land.

c) Effect on Sprawl Costs

The construction costs of infrastructure as one factor of costs of residential urban sprawl is paid completely by the private side within the project. However, Land Readjustment Projects often have a size of around 50 ha, which means that the developments done by this instruments can hardly called urban sprawl, even when they are done in suburban municipalities. Real sprawling development happens rather on a microscopic level, due to the sum of exemptions in Urban Control Areas.

(2) New instruments in public private partnership applied in Germany

As a consequence of the reunification, the Investment Facilitation and Housing Development Act 1993 allowed to shift social costs and encumbrances of land use development partly to the private sector with other instruments than land readjustment. The most important cooperative land use instruments will be introduced in the following.

a) Urban Development Measure (“Städtebauliche Entwicklungsmaßnahme”)

During this procedure according to section 165 to 171 Federal Building Code, the municipality purchases or expropriates the necessary plots, if the development is for qualified public benefit. The increase in value due to the development accrues to the municipality and is earmarked for financing the necessary infrastructure, similar to land readjustment projects.

c) Urban development contracts (“Städtebaulicher Vertrag”)

Because of the rising problem of shortage of public revenues, urban development contracts are often applied to make the benefited land owner contributing to the public costs. The municipality uses his right to enact a legally binding land use plan (“Bebauungsplan, B-Plan”) in order to trade some trade-offs from the land owners. However, it is not legal to skim the land development profit by this instrument entirely. Often measures will be only enforced, if the private sector agrees to cover all costs. A successful land development instrument in the city of Munich is called “socially fair land use” (Sozialgerechte Bodennutzung – SoBoN), introduced in 1994. Formally based on the regulations for land readjustment an urban development contract contains additionally regulations, and is therefore called amicable land readjustment project (“Einvernehmliches Umlegungsverfahren”). On an area of 482 ha 13,800 dwellings could be constructed within 58 B-plans by this procedure, limited to inhabitants fulfilling certain social criterias. By 2003 public thoroughfares, public greens, elementary schools and kindergardens had been privately funded or supported with 141 million Euros.

b) Plan for Building Projects and Local Public Infrastructure (“Vorhaben- und Erschließungsplan” - VEP)

This instrument can be characterised as the combination of a simplified B-Plan and an urban development contract. The impulse of planning and enforcement of those projects is usually done by private developers. However, municipalities can use it for accelerate the planning process, if they found a development society in private organisation (GmbH).

## 5. Conclusion and Outlook

Looking at law and practise in German urban development, many instruments can be found, which can be used to privatise the infrastructure costs as part of social costs of residential urban sprawl. All the major instruments have in common, that only certain cost elemnts can be legally binding privatised. However, as shown in fig.3, the social residential sprawl costs comprises much more than initial costs of constructing the necessary infrastructure. Therefore, after estimating the full social costs (including the marginal externalities), the existing instruments need to be further developed and applied in both countries, considering each national framework. Moreover, in the individual application of land use insrtruments in public private partnership, it is necessary to take the location and density dependent differences in social costs into account, as illustrated in fig.1. However, the consequent requires a strong local policy, as well as deep insight and understanding of the rising social cost problem by the private sector.

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