



## NEW EXTERNALITIES IN DEVELOPMENT OF CREATIVE AND INTELLIGENT CITY – THEORETICAL CONCEPT

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**Abstract:** The paper is an attempt at reviewing the classical theory of externalities and club goods in the new context of flow economy and network relations, as well as the role of human capital connected with high quality surroundings (urban environment), which is a catalysing factor, and allows the formation of new resources and new competitive advantages for cities and busiessses.

**Keywords:** Club goods, creative cities, externalities.

**JEL codes:** R30

### 1. Creative city, intelligent city, innovative city

Such concepts as: *creative city*, *intelligent city*, *innovative city*, which have been accepted by the public and adopted in scientific deliberations, are key words signifying that we are facing new phenomena and challenges with respect to quality. Municipal problems and development processes of a city are acquiring an increasing importance in economic, social and environmental policies of particular countries. To a certain extent this is obvious, because approximately 54% of global population live on municipal areas (data of the world bank). On the other hand, approximately 40% of global population are executing agricultural activity. It seems that in highly developed countries those percentage values are even further diversified. In the EU urbanised areas are inhabited by 50 to 86% of the population. On the other hand, only from 1.1 to 5.0% of the population are working in agriculture. In Poland the index of population working in agriculture amounted to 11.2% in 2016. Polish statistical data

distort the picture of the urbanisation level by registering the inhabitants by status of the commune: municipality – rural commune. According to this faulty method the index of inhabitants residing in cities amounts to 61%. *De facto* the index of the number of inhabitants connected with urbanised areas reaches 80% in Poland. And so to orient intervention activities at social and economic processes in a focused and mass way, they should be addressed at municipal areas, and more broadly at municipal functional areas offering non-agricultural forms of activity.

It should be borne in mind that agricultural activity implemented in urban functional areas fulfils other functions, which are not less important, but at times remain underestimated, *e.g.* by supplying the ecological municipal system. This impact is frequently of a bigger importance for the functioning of the municipal system than production of foodstuffs as such. It can and should be categorised to positive external effects of a public nature.

Another cause of seeking new functions fulfilled by modern cities, which is just as obvious, is the contemporary development trajectory oriented at informative and network society. This development trajectory generates a new demand and supply impulse to specific resources which are generated in urbanised and highly complex territorial systems. Such specific new generation driving resources include territorial capital. *Territorial capital comprises specific external advantages generated and available as a result of multifunctional interaction between users of relatively delimited territory. In other words territorial capital has the nature of “complex club goods”, dynamic in time and space, which are available to users (club) acting under a functional area”. In this perspective the essence of building up lasting competitive advantage for the commercial activities being executed in the functional area is the creation of complex “interactive resources” arising from intense relations (activities) between people organised in various institutions (characterised by high entrepreneurship, innovation and trust), who generate a specific added value that enables the obtaining of high productivity of the manufacturing sector. Those particular resources give companies the competitive advantage on increasingly competitive global markets. The territorial capital may be generated by a skilful combination of natural resources with the quality of physical (spatial) development and intellectual resources of people. It is strictly correlated with the ability to cooperation in functional areas and with a high level of social trust (Markowski 2016).*

Territorial capital is inseparably related with the urban system. It is this particular capital that forms a basis for the generation of products with the use of human creativity and human intelligence with assistance by intelligent IT technologies. This ongoing radical change of the management method was frequently described in literature of the subject: Azkuna (2012), Laundry (2000), Florida (2005), Howkins (2001), Komninos (2008), Mitchell (2007). In Poland these issues have been taken up among others by Domański (2000), Domański and Marciniak (2003), Klasik (2012), Makięła, Szromnik (2012) *etc.*

New developmental paradigms impose the necessity of working out contemporary location factors and referring in development policies to the potential role of complex resources (megaresources) as specific products of evolving civilisation. If we were to assume as per Dembowski (1989) that “resources” are an economic category and a function of human knowledge, then in the process of progressing dematerialisation

of the generation sphere – which is so characteristic for the IT community – we have to presume that in the megaresources the importance of material factors decreases, while the role of intellectual factors grows, *i.e.* knowledge, skills and creativity. Consequently knowledge, skills and creativity connected with a specific location have a decisive influence on the economic growth and development. If appropriately handled, those resources not only generate high profits, but also contribute in a significant way to the transfer of financial benefits to places that generate this megaresource – at the cost of countries and places based on simple resources.

Such model of contemporary development means a greater disproportion in affluence between countries with raw minerals and countries basing on territorial capital. The driving forces of an increasingly polarised world are consequently cities capable of generating the new specific complex resource, and namely the territorial capital.

The currently used phrase *flow economy* emphasises a leap increase in the dynamics and the scale of flows that modify the functioning of the economy also in the qualitative way, especially in the system of accumulation and distribution of resources, products and information. Metaphorically speaking we can talk of new economic metabolism. This metabolism requires further in-depth identification. Its features include an increasing recirculation of products, waste and *just in time* operation. New generation logistics are beginning to play an increasingly important function in the new “economic metabolism”, and municipal logistics in particular. Concurrently we are facing increasing disparities between flow stream and spatial and social structure, which are generally of an inert nature. Another phenomenon with a significant impact on contemporary urban areas is the trend of decreasing importance of costs of overcoming the spatial resistance in the use of natural resources and semi-products. Owing to this process, the spatial range of the economic region based on marginal demand costs is for many activities of a *de facto* global nature. In literature of the subject we call such industries territorially unrooted. However, if a monopolist situation does not occur on such a market, in a paradox way globalisation of demand for products and services leads to an increase in the importance of factors connected with the location for companies, yet on the side of supply of non-material resources. Consequently it should be borne in mind that with globalisation of demand for products and services, **sources of competitive advantages of companies become shifted onto other, less mobile resource-related location factors**, *e.g.* connected with top quality labour force, the so-called human capital, creative class *etc.* The quality of those resources depends on complex culture and social relations and features of spatial development that guarantee high living quality, diversification of the manufacturing and service sphere, capacity of the territorial system to reconstruct the territorial capital. This thesis is confirmed by studies of new geography indicating that the development is of a focused nature in metropolises and in urbanised areas (the concept of *spike development*, Florida R. (2005a) and not evenly arranged over space (Kudłacz and Markowski 2017).

In conditions of contemporary economy (*i.e.* rapid decrease in internal competitive advantages of companies – achieved as a result of technical and organisational progress – in favour of competitors) maintaining lasting competitive advantage of

companies and territories is to an increasing extent determined by the quality of surroundings and regional (local) externalities cumulated in them. It should be emphasised that transactions in complex network relations are currently becoming an increasingly important source of externalities generated in the form of so-called club goods (Cornes and Sandler 1986). They determine among others competitive advantages of competitive territorial cluster unions. As a result the territorial balance of external effects would decide whether factors of the surroundings (functional area) have a positive or adverse impact on the operational volume of companies. They will consequently affect location behaviour of companies seeking lasting external sources of competitive advantages (Kudłacz and Markowski 2017).

## 2. Specific nature of defective markets and externalities – classical approach

*Externalities* comprise material and non-material products, which are obtained by the distinguished entity (recipient) from its surroundings, without any compensation on its part of costs of their generation, on the assumption that the recipient is unable to control or affect the magnitude of activity of entities forming those surroundings.

External effects are a result of:

- Generation of diverse side products in processes of production and consumption;
- Divergence of prices from social production costs as a result of impact of market laws;
- Intentional activities of the authorities and public institutions in the event of supplying public goods;
- Intentional replacement of the market mechanism functioning by methods of administrative determination of prices of goods and production factors, as well as distribution conditions for the establishment for given entities of more or less favourable operating conditions (political externalities).

External effects have a positive or adverse impact on the function of the usefulness of consumption or production of the given recipient. Hence frequently we speak of external advantages or disadvantages, which express the character of the impact exerted by the surroundings in a more unequivocal way (Markowski 1999: 71).

The basis for the delimitation of external effects in urban systems comprises different forms of externalities being a derivative of a synthetic category, such as effects of the agglomeration, *i.e.* advantages and disadvantages arising from the proximity of mutual situation of various activities within the geographical space. We may assume that agglomeration effects are a complex synthetic category or in other words primary advantages and/or conditions necessary for the generation of other generic external effects generated as a result of further evolution of urban systems. Consequently we may distinguish the following:

- **Urbanisation advantages** arising from the accumulation of people and infrastructure creating municipal systems.

- **Industrial advantages** arising from the accumulation of production and service companies (suppliers and recipients)
- **Location advantages** arising from the accumulation of the remaining activities.

At present increasingly frequently we tend to speak of advantages, and *de facto* of externalities of metropolisation, *i.e.* effects that arise from the execution of activity of a global importance in metropolitan areas. In extreme cases these may be adverse consequences of space metropolisation (amorphous nature of spatial structures, urbanisation sprawl *etc.*) as an effect of executing activity and manufacturing of products by global companies situated in completely different places. This is not a new phenomenon, nevertheless we are currently faced with a disproportionately high percentage of this type of adverse global effects. Modern technologies and the accumulated capital of global companies allow optimising the growth of companies by assigning decision-making, production and consumptive functions to discount location advantages on a global scale and encumbering by new external effects of recipients also in a global scale.

Agglomeration systems of manufacturers and consumers consequently pass from seeking simple savings, arising from the proximity and number of entities that guarantee obtaining advantages of scale and scope, to the phase of generating additional productive resources, including those of a nature of external effects, which have a private and *quasi*-public character, and in the first place a club. This process is consistent with the definition of development understood as passing from simple systems to complex ones.

Consequently we may speak of three phases in which advantages of an agglomeration are generated: first phase of advantages arising from the proximity of mutual situation, then phase 2 advantages of growing number and diversity and phase 3 – ability to producing diverse club goods. The ability of systems to creating club goods: it is one of the reasons for shifting the growth border of an agglomeration. It should be borne in mind that for many years the economics of a city has been oriented at seeking the optimum and size of the city in an attempt at indicating in this respect directions of actions aimed at limiting the sizes of cities and stimulating the development of smaller ones. In practice all those actions have ended in a bigger or smaller “disaster”. It would be worthwhile to have those actions analysed once again taking into account new knowledge about contemporary urbanisation processes, because political milieus are once again making attempts as artificial regulation of the size of cities.

Complex products in the form of club goods offered by urbanised regions (metropolises) can be generated thanks to new methods and technologies of public governance. This is due to the fact that public administration (Osborne and Geabler 1992) is a factor favourable for the generation of club goods of a territorial nature and to extending possibilities of further creation of the economies of scale and scope for business entities operating within the metropolitan area. An effectively managed metropolitan set, with a large number of users, gives an additional competitive advantage to companies which have to be flexible and quickly change their products and service on the basis of specific and highly diversified resources accumulated in the metropolis. Hence effects of the metropolis may comprise the quality of

spatial development, culture environment, accumulation of creative people, who are tolerant, enterprising etc. Only in such a case it becomes possible to obtain general advantages by all the accumulated companies and consumers, *e.g.* from the allowance for novelty or for example from lowering the level of diversion competition by jointly generated resources (club goods).

Consequently we may seek specific types of new external effects in combination with ways of governing metropolises and with the use of new IT tools characteristics for intelligent applications, *e.g.* computerised systems and the interactive Internet of things. At the same time it is worth emphasising that new IT technologies are also a source of numerous new externalities coming to light, such as for example in the form of an increase in the sensitivity of municipal systems to the disturbances in the functioning of those sophisticated technologies. These are new serious challenges faced by contemporary communities.

The accumulation of new externalities and a growing complexity of municipal systems and development processes require introducing a change in the approach to governance of cities and metropolitan areas. Certainly required is an integrated approach to governance and focusing intervention on external sources of competitive advantages that lie in strategic public goods and club goods. Concurrently one should bear in mind that thanks to new technologies and the development of markets, which are presently being supplied by public authorities, many external effects from the political sphere may pass onto the market sector assisted by computer IT systems without any constraints.

### 3. Club goods

Club goods may be defined with reference to the concept of public goods of Samuelson (1954) who defines them on the side of consumption, and not the supplier. Those goods are characterised by two properties: the magnitude of their supply forms an argument for the utility function of each citizen; their consumption by one consumer does not limit those goods available for the remaining persons. Those properties are being met by free goods and those manufactured in the operating process of man, which meet properties of non-competitiveness and non-exclusivity (the so-called purely public goods and mixed goods) defines as public goods.

Private goods are characterised by the fact that one unit of that good may satisfy only one consumer. It is for example impossible to occupy the same person in the same time by two persons.

Public goods represent the polar inversion as regards the first one. Fully public goods are goods the unit of which can satisfy more than one consumer, and an additional consumer does not reduce the amount available for the others.

*Club goods* may be defined as being *quasi* public (Markowski 1999). They differ from public goods in that they are a product of a (group) of a club and their consumption takes place within the club. Consequently costs of their generation have to be borne. Yet those costs are not transmitted directly for these goods. The relation between material cost and the generated good does not have a direct nature. It is addressed at

a group, and is not identifiable with the given product. Club goods are a pro-market product of an activity having a character of an externality, which nevertheless has a significant feature that distinguishes it from typical externalities. In the process of its generation it becomes possible to control mutually the magnitude of operation by club members. There is no possibility of excluding an entity being a member of the club fully from usage of club goods, and within the club there is no competition. The differentiated satisfaction level from consumption of club goods may on the other hand arise from differences in individual internationalisation costs.

According to the above formulated definition, public club goods include social capital. Its growth is determined among others by the territorial system of institutions and organisations. An important activity of public authorities is enhancing the quality and level of social capital. Over a longer period the establishment of high social trust serves as basis to guarantee the durability of the network. Such an activity is of a horizontal nature, and may hence serve all participants of the market play, including the currently developing production and service clusters.

The concept of club goods allows better clarification of the essence of territorial capital as a new qualitative development factor. “New generation club goods” produced on functional areas are a manifestation and a measure of the quality of territorial capital. The concept of club goods also allows clarifying the nature of gaining competitive advantages by production and service clusters. In a global chase for economic growth, regional and local policy of stimulating the competitiveness of the regions and localities is becoming increasingly widespread, and the concept of network economy and supporting the development of clusters by public authorities is becoming public practice within a globalised economy.

#### **4. Effects and goods with location relations (spillovers) and of global nature**

The useful classification of externalities is not easy owing to the complexity of features and belonging to different sets. Consequently external goods belong to fuzzy sets. Criteria for their classification are consequently to be used not only to cognitive purposes, but also conform to needs of the decision making process and the determined development objectives. As the growth is phase-based and each territorial unit has its own specific nature and its own spiral of development changes, the appropriate identification of weight, sequence and scope of the intervention with external effects assures a better likelihood of success and giving rise to desired changes in the system being controlled. There is no need of emphasised that in this case there is a need of packet (concentrated) sequential activity *i.e.* once arising from the strategic approach.

## Globalisation of externalities and public goods

A closer analysis of the so-called public goods and negative public goods with a global nature allows drawing a conclusion that this type of zeroes and ones classification, *i.e.* local and global goods, is an overly simplified approach. *De facto* in the process of globalisation of externalities of a public nature we are faced with effects of a “mixed nature”, *i.e.* with different involvement level of manufacturers and recipients, both global and local. This feature is particularly important because it determines real possibilities of interventions in defective market relations and the activity of agencies aimed at generation or elimination of externalities. Institutions which would be capable of intervene in those effects at a global level may do so via specific mechanisms of soft coordination; agreements, treaties, covenants. This problem is particularly visible in the case of external technological environmental effects. There are known problems connected with national commitments undertaken during global summits for example with respect to reducing CO<sub>2</sub> emission. Similar crucial problems ensue during attempts at coordinating actions with countries operating under more formalised international structures, such as the EU. Theoretically it could be assumed that global public effects may be defined although in practical terms we would not be able to find an example of such public goods which would be fully public.

In the globalisation process of externalities attention should be drawn to the fact that a part of them is undergoing the stage of internationalisation, *i.e.* their creation by specific international clubs. This concerns financial systems, and *de facto* the guarantee of its stability, international legal systems, health security, Internet security, *etc.* Institutional systems – local and global – are certainly unable to catch up with globalisation processes of public goods (Public Goods ... 2008, UNIDO).

Making a more in-depth analysis of the so-called public goods and negative public goods of a global nature allows the presumption that such zeroes and ones classification is merely a simplified approach. In the globalisation process of external effects of a public nature the involvement level of global and local manufacturers and consignors differs. *De facto*, we are faced with externalities combining the global and local dimensions, *i.e.* “glocal” effects.

Taking into account the fact that glocal effects as a rule entail a certain level of exclusion and competitiveness arising from private or public costs of their internalisation (price based and/or cost based) those acquisition costs are one of the causes of a diversion game, *i.e.* falling into a social trap like “travelling without a ticket”; be it in usage or in supply of public goods). Interventions of nation-states in the provision and consumption of public goods of a global character are also of a diversion nature. They acquire for example the character of creating alternative political external advantages to the generated public goods or legal acceptance of negative external effects that allow achieving competitive advantages at the cost of the environment.

## 5. Network externalities

Worthy of attention is the discussion among economists started in 1980s with respect to the so-called network externalities. This concept is related to specific market of suppliers and recipients of products and services connected with the specific relation system, be it a computer, or telephone one, but also certain determined agreements and contracts (loyalty system). The development of this concept and its application in practice may be of importance for the new paradigm of development policy that is becoming adapted to new features of contemporary economy, *i.e.* network nature and dynamisation of flows. The economists have assumed that if any externalities do appear they would have to be a result of market being defective for network products. However, Katz and Shapiro (1985) and Lebowitz and Margolis (1995) have proven that within the network many pecuniary externalities remain within the category of operation of a market mechanism and over a long time period externalities of a pecuniary nature are subject to automatic internalisation mechanisms under the impact of the market, and so they do not require public intervention. The situation becomes slightly different when the leading participant in a network is the public authority. In such circumstances we may agree with intervention on a contractual basis (public entity exercises control within the network), particularly if we consider those relations with respect to the essence of club goods. This shows that externalities generated under the network, either positive or negative, are subject to specific control of members of the club (network). This specific feature shows that a mechanism exists in the network that allows both price and cost internalisation of appearing externalities on a contractual basis. Consequently such cases require a specific approach to network structures. Certainly intervention may not be analysed in the form of correcting the regulatory market, however, it can on the other hand be streamlined, to achieve among others hastening of the process during which competitive advantages are built of such a system in relation to the competition. Naturally such intervention would be justified in the event of a functional and territorial system, in which the major part of participants in the relation system perceived a relation between the generated effects and location within the functional area, and to each usefulness function of production and consumption we may ascribe an external effect with the territorial address of network participant.

The concept of network products and network externalities may be of importance for contemporary development policy. We may draw attention to several issues, which arise from this concept for the development of functional zones, including naturally urbanised areas. The possibility of interventions in such a network would be dependent on the globalisation level of producers and clients. The producer may be local, and the client global. It is possible that geographical clusters of producers may appear, and that spatial concentration may occur of clients under global markets, *etc.* There are a lot of combinations and the dynamics of changes also within the spatial range is very high. Execution of the development politics requires good identification of modern and anticipated processes, high flexibility of operation and quick adaptive response to the new situation. Unfortunately in practice of this policy growing inconsistencies may be observed between features of contemporary development

processes and the increasingly intensified bureaucratisation and over-regulation of intervention methods. This reduces the effectiveness of the policy. In many cases the intervention becomes washed out with real needs generating immeasurable secondary political effects and deepening the dysfunction of markets. As a result an increasing challenger of modern times is the frailty of public institutions that require new operation (effective one) in the network system of globalised institutions<sup>1</sup>. Currently this system is in a phase of deep “crisis”.

## 6. New types of public goods and club goods as factors of modern competitive advantages (strategic club goods)

Sources of competitive advantages may be divided into three groups.

- The first group are sources arising from internal effects, *i.e.* the applied technology, management methods, reputation and brand, *etc.*
- The second group arises from the external market situation, *i.e.* the impact of specific prices of material and non-material resources.
- The third group – externalities (positive and negative non-market impacts) obtained based on costs and without costs from the surroundings, including effects of accessibility (agglomeration), *i.e.* proximity to resources, clients, suppliers, recipients, information *etc.*

In group 3 of the factors an increase is taking place of the role of club goods in cities which have entered the growth path (metropolises, intelligent cities, creative cities *etc.*). They may be called new wave cities of the 4<sup>th</sup> Kondratiev’s wave.

In the light of these considerations an attempt was made at making a listing of externalities according to various criteria. This attempt was to a large extent means to present the complexity of the problem and to start further scientific discourse than recommending a single “practical” classification, *e.g.* for needs of local policy oriented at the development of a “creative” city.

New driving forces of development, *i.e.* new sources of effects and competitive advantages of companies include traditional externalities taking into account new conditions and technologies, as well as fully new effects. Examples of sources of effects and location factors of the modern economy comprise among others the following:

- Municipal logistics. It may affect the organisation of supply chains between companies (give rise to new qualitative agglomeration effects).
- Social and technical infrastructure that affects resources of qualified employees<sup>2</sup>.

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<sup>1</sup> We are still looking for a name depicting the new type of relational network economy, in which the main role is played by high quality human capital developed in an interactive high quality spatial and social surroundings.

<sup>2</sup> Processes of practical control of development underestimate the driving force of externalities generated by public authorities and various entities executing investment operation in a city. Especially in the case of implementation of large infrastructure facilities, which entail the common risk of considerable delays in their implementation process. A delayed investment in many cases loses its

- Business and research infrastructure built for manufacturing operation, technological parks, exhibition centres, congress facilities, fair buildings
- Effective public governance, including also management of information in the city in combination with intelligent IT systems, allows energy savings and acts as catalyst and generates new externalities and public goods of a global nature<sup>3</sup>.
- Externalities from human capital. These are public and private investments in knowledge and skills, a well organised education system, quickly responding to changes, anticipating needs, cooperating with innovative policy. Tolerance and talents are a product of specific municipal agglomerations of people and effects generated by nonmaterial culture, material culture and work culture. They are new types of advantages from urbanisation, and *de facto* bring about new specifics connected with processes of spatial metropolisation. They are a type of metropolitan externalities.
- Social capital; trust and its forms *e.g.* bonding capital and bridging capital (also the latter one is acquiring global features). Capital of joint values, group solidarity, propensity to cooperating in the sector of enterprises of the territorial system. Ability of private enterprises to investing in the growth of highly mobile manpower. All those factors allow a considerable reduction of supervision costs and labour control.
- Flexible labour market; it is an externality especially for many innovative companies; it is also a derivative of other cumulated externalities, *e.g.* high daily spatial mobility of the population, arising from the development of private and public transport.
- Self-organisation abilities of local communities.
- System of social security.
- Climate of entrepreneurship.
- Resilience of a city (ability of getting out of the crisis).
- Propensity and ability of cooperating local self-government entities – partnership.
- Effects connected with the functioning of political systems, including political stability and foreseeability,
- Legal stability.
- Low inflation cost.

For each municipal system it is possible and necessary to seek for a specific hierarchy, order and combination of location factors, including generated attractors of externalities. Generic classification of externalities should be supplemented by their specific economic features. An example of classification by economic criteria is presented in Table 1. A cross analysis of features of externalities allows better

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anticipated advantages and significantly changes the interdependencies with other competitive cities, and consequently changes the initially anticipated growth trajectories.

<sup>3</sup> One of the challenges is opening the lever of the rate of technological changes with social and political changes. The latter ones may turn out to be more hazardous if there is a negative selection mechanism of political activists and administrative staff. The latter ones are much slower. It may be presumed that this gap is smaller in larger metropolises and in the functional areas with a high potential of human capital. This gives such cities a competitive advantage as compared to smaller cities even despite less socially polarised ones with average higher living quality.

determination of fields of effective intervention in the system of indirect pro-market impact on the economic development of a creative city and selection of an appropriate set of tools with respect to integrated development policy.

Table 1. Classification of externalities according to economic features

Criterion	Types of externalities
• Taking into account usability (satisfaction) in production and consumption	• Negative effects, positive effects, public goods, negative products ( <i>public bads</i> )
• Taking into account individual and/or collective consumption form	• Public and private effects (purely public), <i>quasi-public</i> , club goods
• Taking into account the generation method	• Public and private effects, (group) club goods, <i>quasi-public</i> , free goods
• Taking into account the ownership form	• Private effects, national effects, group effects (club goods), free goods
• Taking into account spatial range	• Universal effects (nonspatial, global), effects interrelated by localisation (spillovers), <i>quasi-global</i> (glocal), club goods – territorial effects, club goods – functional
• Taking into account source and form in which externality is manifested	• Technological effects, pecuniary effects, political effects, interactive costs (congestion), social costs (non-identifiable perpetrator) • Transfers and services and products free of charge and partly at a charge (public services – public goods)
• Side effects of the generation and consumption process	• Technological effects, pecuniary effects, political effects, congestion costs, social costs
• Taking into account the necessity of absorption (consumption)	• Optional effects, obligatory effects

Source: Own study.

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