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**Analysis of Tools for Revitalization and
Rehabilitation of Brownfields**

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Analysis of Tools for Revitalization and Rehabilitation of Brownfields

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Abstract

This work focuses on answering the difficult question of how we can work with brownfields and it deals with tools that enable the revitalization and rehabilitation projects in the area. The aim of this work is to identify, classify and analyze these instruments. It studies instruments from several countries with long-term experience with this issue (eg. France, Great Britain, Germany, Denmark, Czech Republic) and analyze their contribution and the feasibility of their implementation in other countries. The conclusion is that the tools can be divided into several categories from different perspectives: Strategic tools, Legislative tools, Spatial planning tools, Economic tools, Construction tools, Organizational tools, Information tools, Education tools, Contractual tools, Heritage tools and Rating tools. This leads to situation where the issue of brownfields is often handled by numerous institutions and instruments which could complicate the process. Some of the tools (especially the Economic and Legislative ones) are country-specific and cannot be that easily implemented, however some effective tools (for example Organization, Information and Education tools) don't require any legislative background and can be therefore easily used by any country to help their brownfield revitalization and rehabilitation process.

Keywords: Brownfields, Planning, Rehabilitation, Revitalization, Tools.

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Introduction

Revitalization of brownfields is an important alternative to building on greenfields (land that has never been used). It has many advantages from the point of view of the state and the municipalities, for example minimizing the occupation of valuable agricultural land (which is a finite resource), utilizing the existing connection to the transport and technical infrastructure of the site, using the very often significant position within the city, sealing the "wound" in the urban structure and suppressing the barrier effect and the negative effects of desolate brownfield itself, enriching the image of the city and its genius loci, remediation of contaminated soils and thus improving the environment and so on.

Typology and specific opportunities of brownfield revitalization are already largely described in many books and many projects. Challenges and opportunities that brownfields represent have been adequately studied and presented, as well as specific ways in which these areas can be used or how they are used in various countries. In other words, the questions why (revitalize brownfields) and what (we should do with them) are rather satisfactorily answered, but the question how (we can work with them) is not. This work focuses on answering this question and it deals with tools that enable the revitalization and rehabilitation projects in the area.

The aim of this work is to identify, classify and analyze these tools. Through a research of literature, strategic documents and projects it studies tools from several countries with long-term experience with this issue (e.g. France, Great Britain, Germany, Denmark, Czech Republic). The main result is a structured categorized overview of tools from various countries with brief analysis of their contribution and the feasibility of their implementation in other countries.

Tools

We can look at the tools from many points of view, for example from the point of view of spatial planning and urbanism, environment, protection of cultural heritage or new investment opportunities. As a result, the issue of brownfields (or unused areas in general) is addressed by a number of institutions and tools. It is necessary to point out that the best results are always achieved by the combination of tools since many of them work best when they support each other. Some are even downright necessary for the other ones to work (typically Legislative tools).

At this point, it is important to emphasize the need for an active approach of the state and municipalities to the whole revitalization and rehabilitation process. Most of the tools work only as part of a long-term plan and without the active and conscious approach of the competent bodies they can rather easily cease to function properly. The often-repeated mistake is the city's delayed response to the development in the area. Cities sometimes have a rather passive attitude in this matter and they lack a long-term vision and any plans to guarantee its fulfillment, which they would then offer to investors. Instead they are waiting for the investor/developer to

submit a plan, and on its basis they try to assert their needs and goals - which is often met with some resistance and for investors it unnecessarily makes the situation more complicated, unstable, unclear and non transparent. Development areas are also often the subject of political struggle and the replacement of politicians or mayors that might have different opinions and visions can cause a complete change of a plan. All of this leads to the uncertainty of developers when and how they can use the land, which logically discourages them in ever trying.

The timely creation of a long-term firm concept of the revitalization of an area, the vision's transfer to concrete manifestations - for example in a spatial or regulatory planning - and the subsequent economic support of the project, are important prerequisites for the quality of development of the site or elements in the landscape. The complex use of proper tools leads not only to a better and more desirable outcome, but it is also attractive for investors/developers because of the clear setting of the limits which translates to a simpler and faster process of approving their project.

These tools can be divided into the following categories:

- Strategic tools
- Legislative tools
- Spatial planning tools
- Economic tools
- Construction tools
- Organization tools
- Information tools
- Education tools
- Contractual tools
- Heritage tools
- Rating tools

Strategic Tools

Those could also be called political. Their main aim is to set a clear vision, decide on a policy and to coordinate on a general level all the different point of views.

They are further divided into the European (apply to the EU), the national and then the regional ones (for individual regions, municipalities or cities in the form of for example local strategic plans).

European

Within the European Union, the issue of sustainable development and brownfields is for example handled by the "European Regional Development Fund (ERDF), specifically designed to tackle regional disparities. Some regions are then supported in their revitalization or rehabilitation projects through various special programs. Similarly, a number of specific Community Initiatives programs serve the same purpose, even though they are primarily focused on industry. For the general regeneration of cities and the promotion of sustainable urban development exists the URBAN program, which was

adopted by the European Union in 1994 and is aimed at wider revitalization projects. Annex I of the Communication from the Commission of 28 April 2000 specifies measures to be supported - such as the environmentally sound redevelopment of mixed-use brownfields (e.g. reclamation of contaminated soil, green rehabilitation or renovation of buildings for the placement of new activities). Providing support from the URBAN programs of course has its exact rules. In addition, loans from the European Investment Bank can be a source of funding for these purposes. Another strategic document is Sustainable Urban Development in the European Union, which sets out a number of strategic objectives and a comprehensive integrated approach to urban issues including lagging areas."¹

National

Every nation has its own several basic strategic and planning documents which also deal with brownfield regeneration. As far as brownfields are concerned, the aim of these documents is to eliminate environmental burdens, to minimize building upon greenfield (agriculture) land and to prioritize and support sustainable development of brownfield or greyfield land (which can either take shape of building projects or restoration of the landscape). „They are formulated in such a way as to reduce the imbalances in the mutual relations between the economic, environmental and social pillars of sustainability aiming to ensure the highest possible quality of life for the present generation and to create prerequisites for the high quality of life of future generations.”² „They formulate the state's approach to support of regional development, provides the necessary bases and set out the development goals, priorities and principles for the regional development programs. They are tools for implementing regional policies and for coordinating the impact of other public policies on regional development.”³

There are usually at least some nation-wide strategic documents that are brownfield-specific. They usually aim to provide a suitable environment for the rapid and effective implementation of projects and to prevent the emergence of new brownfields. The vision is the overall improvement of the area, improving situation for the entrepreneurs, the improvement of the environment in all its components and the effective use of previously neglected territory with regard to the creation of a good structure of settlement and landscape, while respecting the cultural-historical, economic, ecological and social aspects. They also support the preparation of projects so that the maximum available EU funds can be used and they aim for targeted and effective use of public funds to support regeneration of brownfields where public intervention is necessary and justifiable.⁴

¹ Kyselka, I. et al. 2006. Revitalizace nevyužívaných neprůmyslových ploch v Olomouckém kraji, Případová studie zahraničních zkušeností k problematice brownfields.

² Rada vlády pro udržitelný rozvoj ve spolupráci s Ministerstvem životního prostředí. 2010. Strategický rámec udržitelného rozvoje České republiky. 1. vydání. Praha: Ministerstvo životního prostředí se sídlem Vršovická 1442/65, 2010.

³ Ministerstvo pro místní rozvoj ČR. 2013. Strategie regionálního rozvoje ČR 2014-2020.

⁴ Ministerstvo průmyslu a obchodu. 2008. Národní strategie regenerace brownfieldů.

The example of a successful outcome could be the English strategic document *Planning for the Communities of the Future*, which committed itself to achieving that at least 60% of new dwellings will be built on previously used land. That was achieved and in London it was even greatly surpassed (also thanks to documents like the London Plan). A strong example which shows that a clearly formulated pressure for city densification and brownfield redevelopment can be successful and bring about a considerable change.

Regional

„Their goal is to contribute to reducing the socio-economic disparities between regions, to strive for regional economic and social development and to improve the social, economic and natural environment of the regions and preserve their cultural heritage. They often select economically weak and structurally affected areas which they then prioritize in their support. They define areas or corridors of overriding importance, set out the requirements for their use and set criteria for deciding on possible alternatives and changes.”⁵

One example is *Zásady územního rozvoje hl. m. Prahy* in Czech Republic which define transformation areas and set both specific and general principles for the further development and transformation of these territories with regard to their spatial arrangement, transport accessibility and existing values in the territory. Those strategic principles are then incorporated in the city spatial planning documents.⁶

Analysis

They are one of the two cornerstones (with the Legislative ones) of all the other tools. They are fairly general in their nature, however, they are the first necessary step on the way to concrete actions. It is not possible to omit them, because then the whole process becomes uncoordinated, non-conceptual, somewhat random and, moreover, badly presentable to the public and all the competent bodies. The clearer the vision, the better the end result. Setting quantifiable goals has its distinct strength since it not only puts the bodies under pressure to achieve them, but it also makes it clearer what is the desirable outcome and what should they do to achieve it. That is the difference between saying: „we will concentrate on brownfield redevelopment” and „60% of all new dwellings will be built on previously used land (case of London).” One is quantifiable, the other is not. In one case it is possible to verify if the goal was achieved, in the other one it is rather debatable and it could get easily muddled.

Implementation of those tools in different countries is not very problematic and can be done fairly fast (especially on a regional level, national level gets more complicated), but it has to be tailor-made for their specific challenges and conditions. They need to be introduced by a body with a sufficient authority

⁵ Mansfeldová, A. 2006. Problematika brownfields v rozvojových programech sídel a regionů. In *Člověk, stavba a územní plánování*. 1st ed. Prague:CTU in Prague, 2006. 50-57.

⁶ Hořícká, J. 2010. Brownfields v územním plánování. In *Člověk, stavba a územní plánování 4*. 1st ed. Prague:CTU in Prague, 2010.

and if possible, their goals should be quantifiable and therefore controllable, otherwise it is almost impossible to evaluate if they were achieved.

Legislative Tools

The aim of the legislative tools is to properly name and define at the state level the issue of unused areas and then to enforce and allow the operation of other tools by their proper and sophisticated anchoring in the state legislation. An example is the possibility of applying and registering pre-emption rights for brownfields that cities or municipalities could take advantage of. Very important is also to define the concept of brownfields (or unused lands, contaminated sites etc.) and implement it in the legislation. Brownfield is a term that is not used in all countries (and sometimes it has no legal meaning) and it is also defined differently – for example regarding the contamination, previous function, size and so on. That makes it hard to compare data between countries.

Analysis

Legislative tools give the necessary legislative frame to all the other tools which simply can't function unless they are anchored in the corresponding laws. Implementation in different countries is very difficult since their legal systems vary and changes within it tend to be complex. 1:1 implementation between countries is therefore almost impossible, but the transfer of general ideas (and definitions) and way of thinking can be done. It should be noted that this process is very time consuming, but in long-term it is also crucial.

Spatial Planning Tools

“Every country and sometimes even regions within those countries have unique planning systems that are made up by different actors, different planning perspectives and a particular institutional framework. Perspectives, actors and institutions change over time, influencing both the form and the impact of spatial planning.”⁷ Although those tools vary from country to country, they usually take some form of spatial/city/urban/landscape/land-use/zoning/regulatory plans and studies and the corresponding analytical documents that contain findings and evaluation of the state and development of the territory, its values, the limits of the use of the territory, the plans for changes in the territory and the analysis of the sustainable development of the territory. In those documents it is sometimes possible to trace the brownfield areas even when they are not legally defined in that particular country.

In the course of dealing with the transformation problems of neglected brownfield areas, the requirement for a use of the site that is different from the one given by the land-use plans may arise. In many cases, this change is

⁷ Gunder, M., Hillier, J. 2009. Planning in ten words or less: A Lacanian entanglement with spatial planning. Ashgate Publishing, Ltd.

acceptable and beneficial to the territory, but it must undergo a standard procedure for a change in the land-use plan, which may take even several years. Therefore, it is good to have an option to identify areas with the possibility of a simplified process of land-use planning change. Another approach to the same issue is to designate transformation areas, which by their freer regulation would allow investors and owners to cope more easily with the terms of planning documentation. The use of these areas will be conditioned by the preparation of an urban or a regulatory plan, which also specifies future functions. It is advantageous to combine such general land-use or city plans with a well-prepared smaller-scaled regulatory plans which are built on the market reality and set up in the area clearer and stronger rules and limits (which can be advantageous both for the city and the investor).

For example in Germany it is not possible to apply for a building permit in an unregulated area without an approved *Bebauungsplan*. The regulatory plan is seen as the most important tool for territorial development control.⁸ An example of the broader spatial planning capability is the French ZAC (*Zone d'aménagement concertée*), which translates as an Urban development zone. This is a specific French project planning tool – it manifests as white spaces in the land-use plan, for which more detailed planning documentation is prepared when the land is in the hands of a public administration or development company and the future use of the territory is determined. ZAC's operation is based around preparing the land acquired by the municipality (by building corresponding technical and transport infrastructure) and its subsequent sale. The result is that the land sold is equipped with roads, networks, greenery, civic amenities and other things defining the future building. Clients pay the so-called land fee, which includes the cost of building plots and the operation cost of the project, and acquire the so-called Specification book (*Cahier des charges*), where they can find the permissible level of land used for buildings, the number of floors, the shape of the roof, and other details that are determined.^{9,10} Within the framework of this paper, this is a combination of Spatial planning tools, Construction and Contractual tools. Other possible (and often inadequately used) Spatial planning tools include the simplification of procedures needed for acquiring building permit or declaration of specific areas that cannot be build upon (for the time being). The extreme option is to declare that new development cannot happen outside the existing city borders on greenfields, but a much more preferred (and much more easily agreeable) option is to set up the system by other tools so that this is done without the need for a strict building ban.

⁸ Pokorný, F. 2012. Management postindustriálního vývoje - Zkrácená verze disertační práce. Brno: VUT v Brně, 2012.

⁹ Larsson, G. 2006. Spatial Planning Systems in Western Europe. Delft University Press, 2006.

¹⁰ Institut plánování a rozvoje hlavního města Prahy. 2016, Koncept Územního plánu hl.m. Prahy. (May 2016). DOI= <http://wgp.urm.cz/kup/>.

Analysis

Spatial Planning Tools are very effective tools that shape the specific form of cities and landscapes. Each country has different planning backgrounds and procedures, so they are not easily transferable and often they must be preceded by the use of Legislative tools. However, it is often the case that the country already has enough effective Spatial planning tools, but it doesn't utilize them to their full extent. Sometimes knowingly (under the idea of not limiting the options for developers), sometimes possibly because of lack of effort or even insufficient financial background or lack of experts that could manage it.

Generally two streams of thinking can be found – regulatory and deregulatory. The regulatory stream thinks that it is better to use land-use plans and regulatory plans to shape the form of the area according to their vision. It gives a set of clear rules and limits for a developer to follow so the city is changing in accordance with the municipality's plans. The deregulatory stream on the contrary believes that it is optimal to let those areas be open to new investment ideas and be flexible so they can accommodate them quickly and easily. The basic idea is not to scare away the developers with overregulation. Both streams have their pros and cons, but it should be noted that the danger of deregulated development that ignores the city's vision is very real (lacking public-spaces, inappropriate functions and so on) and the fear of developers moving away because of restrictions doesn't always seem warranted since the heavy regulation – if handled correctly – can promise developers easy and fast process of getting building permits.

Economic

Their aim is generally to protect green areas and support the brownfield redevelopment using the finance angle. This category can be further divided into Incentive (subsidies, tax relief, etc.) and Penalization tools (e.g. land tax).

Incentive

Redevelopment of brownfields can be funded by several key sources:

- European funds - Aid from the European Union's funds usually does not exceed 50%, but may in certain cases reach up to 80% (exceptionally 100%). Local and public institutions are getting priority. Land owners must meet all legal conditions. Subsidies may also be awarded to a private firm under certain conditions corresponding to economic support for business.¹¹
- state subsidies – usually particular Ministry's programmes (strongly tied to the Strategic tools)
- private sources - developer investments, public private partnerships
- debt financing - international or national financial institutions

¹¹ Kyselka, I. et al. 2006. Revitalizace nevyužívaných neprůmyslových ploch v Olomouckém kraji, Případová studie zahraničních zkušeností k problematice brownfields.

Some of the brownfield redevelopment projects are economically feasible and attractive to private developers, therefore there is no need to support them from public sources. These projects should only be included in the brownfield public database where they will be offered to potential investors (see Information tools).¹²

One of the major challenges of brownfield redevelopment is the need to remediate contamination and remove damaged buildings from the land and the financial (and time) complexity of the process. One solution is that the state (or municipality) takes over this risk and the cost - optimally with the use of European subsidies. From a legal point of view, it is necessary to lay down the rules for granting subsidies within the whole brownfield redevelopment solution and to designate the body responsible for their allocation. Practice in some countries (for example in France or the USA) is that the cost of removing the contamination is paid by the company that polluted the site in the first place: the polluter-pays principle. However, problems arise when the original enterprise no longer exists or when pollution comes from the various activities of several businesses. It is also difficult to determine the extent of the pollution removal which is to be achieved.¹³

The *Land Fund Facility* is also very interesting for the regeneration of the territory and especially the brownfields. This instrument was first used in the 1980s in the Ruhr in Germany and it has been used ever since. Today, however, it has a much more sophisticated form. The purpose of this fund is to prepare brownfield areas for redevelopment. The fund here plays a role of a developer. Acquires land, resolves the (sometimes rather complicated) property rights, decontaminates the area and prepares it for sale to a private investor. The proceeds from the sale finance the purchase and preparation of new plots.^{14,15}

Another Incentive tools are the tax cuts/tax reliefs supporting brownfield redevelopment or contamination remediation. This of course has to be anchored in the Tax Act using the Legislative tools.

Different possibility is also to provide or create a system of advantageous low-interest loans for projects dealing with these problematic areas.

Important tool that has the potential to revitalize the business environment is the support of projects in public-private partnerships. The so-called PPP projects are an instrument for cooperation between the two sectors, which should benefit both parties. The public sector uses private experience and doesn't have to invest a large amount of money and the private sector makes a profitable investment guaranteed by the public sector. PPP projects have been proved to be rather successful, yet in some

¹² Ministerstvo průmyslu a obchodu. 2008. Národní strategie regenerace brownfieldů.

¹³ Kyselka, I. et al. 2006. Revitalizace nevyužívaných neprůmyslových ploch v Olomouckém kraji, Případová studie zahraničních zkušeností k problematice brownfields.

¹⁴ Pokorný, F. 2012. Management postindustriálního vývoje - Zkrácená verze disertační práce. Brno: VUT v Brně, 2012.

¹⁵ Grimski, D. Ferber, U. 2001. Urban brownfields in Europe. In *Land Contamination & Reclamation / Volume 9 / Number 1 / 2001*.

countries they are still not widely implemented (for example Czech Republic is lacking in this regard) – usually in countries lacking specific support, know-how (at the level of specific actors in the whole process) and access to the knowledge base and examples of good practice.

Penalization

One of the desirable results of sustainable development is the limitation of new development on greenfield land (either for industrial or residential use). A tool mitigating this is an increase in land tax. The principle is that the one that develops on a greenfield is obliged to pay a financial compensation. The funds obtained from these taxes are then used for environmental protection and contamination remediation.

Another possibility is a purposeful increase of the real estate tax on some types of brownfields, where the goal is to force its passive owners to act. In essence, it is a certain special tax punishing the unsatisfactory state of property combined with the owner's passivity. The desirable result is the beginning of the site revitalization by the owner or transfer to another entity.¹⁶ Variation is compulsory insurance for contamination intended to cover third party damage and decontamination costs in the case of old pollution of unknown origin.¹⁷

In Germany in Hessen they use a tool called the *Eco account*. Its principle is the financial assessment of the ecological value of the building plot before and after construction. If the ecological value of the plot is reduced, the builder is obliged to compensate the government for this reduction in ecological value, as regulated by the *Ecological Assessment Act*. Funds are then used to regenerate another polluted land within the region.¹⁸

Analysis

Many countries use Incentive tools, but they are not always sufficient - example being Czech Republic. Penalization tools are not used in the Czech Republic (perhaps because of the communist past and the aversion to penalizations in general), which also leads to an unfavorable situation compared for example to neighboring Germany. Generally it is difficult to significantly strengthen the incentive tool in different countries due to their financial limitations, but it is possible to introduce and strengthen the Penalization tools (such as those forcing passive owners to act and those disadvantaging the greenfields development) following the example of

¹⁶ Mansfeldová, A. a Šílová, K. 2010. Regenerace brownfields – významný faktor v procesu udržitelného rozvoje. In *STAVEBNÍ OBZOR 4*. 1st ed. Prague:CTU in Prague, VUT v Brně, VŠB TU v Ostravě, Česká komora autorizovaných inženýrů a techniků činných ve výstavbě a techniků činných ve výstavbě, 2010.

¹⁷ Kyselka, I. et al. 2006. Revitalizace nevyužívaných neprůmyslových ploch v Olomouckém kraji, Případová studie zahraničních zkušeností k problematice brownfields.

¹⁸ Pokorný, F. 2012. Management postindustriálního vývoje - Zkrácená verze disertační práce. Brno:VUT v Brně, 2012.

countries like Germany. Implementing these Penalization tools is done using the Legislative tools and therefore takes a long time, but they can really be a very powerful instrument. In the case of Incentive tools, they could be introduced much easier, as it can be done (in the most basic form) at any time only by redirecting the financial support (tools like tax reliefs are more complicated and again need to be introduced through Legislative tools). In any case, these tools have to be strongly linked to Strategic tools to clearly define what and how is supported and penalized. Official state support and emphasis on PPP projects is a necessity, of course, and should be a standard.

Construction

These tools ensure that the demands of the municipality or the state are met using construction of transport and technical infrastructure as an instrument. In general, ownership of the site will be acquired first (which can be a very long process, therefore, it is necessary to have a long-term concrete vision and plan for the area), then it will be divided into parcels (eventually decontamination process will precede) and then the roads and all other infrastructure will be built. The resulting plots with finished infrastructure are then usually sold to prospective investors or developers who carry out their projects. The advantage of this approach is the firm control over the resulting form of the area (since the street and, to a certain extent, the urban structure is already set, as well as the key public spaces) and, ideally, the financial gain. The form of development can be further influenced by the preparation of the regulatory plan (see Spatial planning tools) or the contract on the form of the territory (see the Contractual tools). The disadvantage is the need for relatively large initial investment and long-term collection and purchase of land or property.

This approach was used in larger scale for example in Denmark in Copenhagen for the ongoing construction of the new Nordhavn district or in Germany in Hamburg in HafenCity. It is also part of the French ZAC.¹⁹

Analysis

They are effective tools that can be very easily utilized in different countries (and cities). They require a certain level of expertise, ability, knowledge and even courage of the people involved - but it leads to a firm control over the outcome. Construction tools often require a fairly large investments and usually long-term commitment (in the case of brownfields it is often the case that the whole site has more than one owner, which makes the process of land and building acquisition significantly slower). For those reasons these tools are still somewhat rarely used in countries like Czech Republic. The advantage of these tools, however, is their ability to be used immediately (using Legislative tools is not necessary) and the fact that they can generate income. With increasing official support for PPP projects,

¹⁹ Hořická, J. 2010. Brownfields v územním plánování. In *Človek, stavba a územní plánování 4*. 1st ed. Prague:CTU in Prague, 2010.

it can be expected that the share of these tools in the successful revitalization and rehabilitation of brownfields is going to be substantially increased in every country.

Organization Tools

These tools coordinate the partial views of different bodies, bring together experts in the given field, act as an advisor to both public and private sector, aim to achieve changes in the legislation helping brownfield redevelopment projects and ensure the feasibility of projects and sufficient sources of funding, including EU funds.

Due to the number of brownfields and the specific conditions in the regions of specific countries, cooperation at regional and local level is very important. “Those tools usually take a form of a network of development agencies and, at the same time, a network of regeneration units of brownfields affiliated or unrelated to regional authorities. But each of these agencies works slightly differently in their support of the regeneration of brownfields. One of the obstacles to the effective system of regeneration support is sometimes insufficient institutional support, especially at the government level. In some countries (for example Czech Republic) there is no unifying instrument, policy, or institution that would coordinate and that would be responsible for the overall regeneration of the area. Liability and, together with it, the related support programs are fragmented between several bodies, and consequently many other actors, which these bodies are setting up or shielding.”²⁰

A good model for resolving this situation is the English institutional model, which acts as a unified and interconnected unit. In the UK, this is the *Homes and Communities Agency*. It deals with the development of the areas on a general level, but also coordinates the concepts and policies of development. In addition, it is also able to secure financing of action plans to promote regeneration. For local authorities, it coordinates key support programs, and is an advisory body for them. Last but not least, it also provides advice to the private sector. The *Homes and Communities Agency* is also a library of good examples of regeneration from practice. An important power that the agency possesses is the right to expropriate real estate.^{21,22} Similarly, we can take an example from the English *Regional Development Agencies*, where only one and the same unit is represented in each region to support the development of the region and regeneration of brownfields.

In 2003, the *Development Agency* was established by the government at Kaiserslautern Technical University in the Rhineland-Palatinate region, geared to the methodical assistance and support of regional and municipal projects, in which conversion (especially military and railway) has an important role. It helps municipalities and regions to choose optimal

²⁰ Pokorný, F. 2012. Management postindustriálního vývoje - Zkrácená verze disertační práce. Brno:VUT v Brně, 2012.

²¹ Roberts, P. Sykes, H. Granger, R. 2017. Urban regeneration. 2nd. ed. London: SAGE Publications, 2017.

²² Pokorný, F. 2012. Management postindustriálního vývoje - Zkrácená verze disertační práce. Brno:VUT v Brně, 2012.

strategies and steps to raise funds and achieve mutually attractive goals for the municipality and the partner investor.

One of the problems is also the small towns whose offices are not sufficiently staffed to handle the difficult process of revitalization and rehabilitation of the brownfields. The solution is to significantly simplify the process or use the nationwide agencies, which will take care of everything even at their local level only in coordination with the relevant authority.

Analysis

Time and effort consuming tools that worth the investment in the long run. Necessary to utilize because the fragmentation of the problem can be easily proven deadly. Those tools can be used by different countries very well, they just require building up fairly large knowledge and skill base in competent personal. All those information are transferable though and in the ideal situation it is good practice to invite experts and professionals from other countries that have experience dealing with brownfield revitalization and rehabilitation, which could offer help of a tremendous value.

Information Tools

Mostly take form of a unified nationwide brownfield database which is crucial for enabling the easy search for land, either for the investment businesses, or for the municipality projects. This database should be regularly updated to help process a comprehensive analysis of the situation, work out strategies, and then monitor them. It is essential that this database is up-to-date and that it contains the maximum known relevant data. Quite usually there are several types of brownfield databases - national, regional and local, which might not be information or format unified. This creates an unnecessarily confusing situation (for example in Czech Republic). The solution is to unify the databases into a single nationwide one and make the site owners input the information to it on a mandatory basis.

The example may be the English National Land Use Database, which has been in operation since 1998 and contains a high level of data detail of registered brownfields and previously used land. Data entered into it is based on an obligation and is therefore highly relevant.²³

Analysis

Essential tools for convenient function of many other tools. Without a good database it is very hard not only to look for new investment opportunities, but also to plan, evaluate and analyze the data and then act accordingly to the findings. The lack of information of the state of brownfields means it can't be easily assessed what is the situation and if other tools were effective. Those tools are fairly easily implemented (with the exception of mandatory data updates which would have to go through Legislative tools) but it should be

²³ Pokorný, F. 2012. Management postindustriálního vývoje - Zkrácená verze disertační práce. Brno: VUT v Brně, 2012.

noted that countries and cities usually already have some databases, the aim is then to unite and unify them. The ideal situation would be at least EU-wide database unification so the data can be compared between countries, which would mean that their current state and then their effectiveness of revitalization and rehabilitation of brownfields could be studied and further analyzed.

Education Tools

One of the basic conditions of solving the brownfield issue is the need to significantly increase the level of knowledge and skills in competent bodies and raise public awareness of the issues. These tools can take form of for example comprehensive educational system of lectures, conferences, courses and seminars in cooperation with experts and specialized educational institutions. They include training projects and training within public administration institutions. They also involve universities that organize special study courses and workshops, or educational events where students and the public participate for example in the cleaning and repairing of various significant buildings or brownfield sites (like the French "Living on the Site" for young people).²⁴ Sharing of information between the participants of the regeneration process also plays an important role.

This tool also includes the participatory process of the public involving residents from affected and surrounding areas, starting preferably from the earliest phases of a project. It can take the form of various forums, workshops or planning weekends. Investor is getting feedback from the public about the acceptance of their intentions. On the contrary, the inhabitants are through their participation invested in the final form of the project, they form some bond with it and are therefore not indifferent to the vandalism, but also to various property machinations and changes in use.

Analysis

Strong tools with big influence, especially over the public. Using them has a lot of advantages which stem from the already mentioned creation of a relationship between the public and the project. The public feels like they are more in control of what happens in their city, in their neighborhood. This protects the project in more than one way, for example it ensures the continuity of the project – if it has been already published somewhere, explained and people learnt about it and took part in it, then the public will not as easily accept big changes in the project, for example like when new politician arrives and wants to scrap it or when developer speculates and makes the development denser, higher and with less public spaces than promised. The informed public serves then as some sort of an insurance that can be surprisingly influential. The big advantage of those tools that they can be used anywhere instantly, even by the smallest entities (like towns) and with relatively negligible costs.

²⁴ Kyselka, I. et al. 2006. Revitalizace nevyužívaných neprůmyslových ploch v Olomouckém kraji, Případová studie zahraničních zkušeností k problematice brownfields.

Contractual Tools

Generally “a good land-use planning agreement between the local planning authority and the investor, which includes transparent ownership and possible repurchases and land exchanges, unambiguous terms, rights and the obligations of all the partners involved, such as the level of decontamination of the site and the solution in the event that another unrecognized burden arises during the construction.”²⁵

Inspiration can be a well-functioning program of Leipzig city in Germany for the temporary use of private property for public spaces. This program operates on the basis of a contract between the city and the private owner, where private land is used as a public space. The rent is for 10 years. The owner pays the costs of demolition and cleaning of the land. But it is also exempt from any property taxes. It is necessary to add that there is a high real estate tax rate in Germany for property that is in poor technical condition or falls into the brownfield category.²⁶ An example of this approach is also the French ZAC (see the Spatial planning tools) and the so-called Specification books, where the permissible rate of land used for building, the number of floors, the shape of the roof and other details are determined.²⁷

Analysis

As the example of Germany shows, these tools make it possible to be rather creative in tackling the issue of brownfield revitalization and rehabilitation. They are relatively flexible and can therefore be quite easily used in any country (although in their more complex forms they may need to be supported by other tools like Legislative, Economic and Spatial planning ones).

Heritage Tools

One of the possibilities is to declare particular building or site a cultural monument. Monument protection can have many forms like preservation, restoration, reconstruction, conservation. It can encompass some sort of financial support (ranging from subsidies to tax cuts), but it may also take form of protection measures. Cultural heritage programs operate both nationally and internationally. Besides these, independent associations and public clubs also operate. The advantage is the protection against insensitive interventions or demolition, the disadvantage is a certain limitation (but certainly not prohibition) of subsequent conversion and reuse.

²⁵ Kyselka, I. et al. 2006. Revitalizace nevyužívaných neprůmyslových ploch v Olomouckém kraji, Případová studie zahraničních zkušeností k problematice brownfields.

²⁶ Pokorný, F. 2012. Management postindustriálního vývoje - Zkrácená verze disertační práce. Brno:VUT v Brně, 2012.

²⁷ Hořická, J. 2010. Brownfields v územním plánování. In *Člověk, stavba a územní plánování 4*. 1st ed. Prague:CTU in Prague, 2010.

Analysis

Various countries have their own ways of cultural heritage protection and support, so those tools can be used fairly easily everywhere, the downside is that Heritage tools have more of a protecting character and they typically don't lead to creating, motivating redevelopment. Additionally it is necessary to fight a certain stigma amongst developers of declaring building or site a cultural monument where the developers sometimes have a rather negative attitude towards this (although not very warranted). Moreover, the cultural heritage protection of brownfields is in some countries still relatively underdeveloped as the industrial heritage is only slowly being recognized as a valuable and worth protecting.

Rating Tools

Rating tools used in evaluation and decision-making can be an important control criterion in terms of sustainable development when assessing the location of investments in certain locations and also a powerful tool for supporting the brownfield redevelopment instead of greenfield one. However, there is a need for further development of these rating systems as well as for their legislative anchoring in spatial planning and in process of granting building permits.

One of the options is "certification through the assessment of the sustainable development indicator, which allows objective comparison of different buildings, different urban environments within individual countries. International comparisons will always be against the different backgrounds of the countries. Objective comparison of developments can help to increase the efficiency of spatial planning, as well as to increase the efficiency of investment in promoting regeneration. Appropriate setting of evaluation parameters can help to regenerate the brownfield area instead of building on the greenfields. In this regard, the path may be similar to the example of the *Eco-Accounts*"²⁸ (see the Economic tools). Certain dangers stem from the fact that the promotion of certification development is at the hands of the private sector and is thus dependent on demand from developers. In particular, they see the possibility of marketing in certification tools. In the future, these tools could become meaningless marketing instruments. It is therefore necessary for the state administration to cooperate more closely with the development of these instruments.

Regarding the regeneration of the area, urban environment certification instruments are most important. Quantifiable assessment of urban environments could be a good guide for decision-making on land regeneration support at both national and regional or even city level. Similar certification could be an appropriate tool for tracking planning in accordance with sustainable development.

"In Australia, such rating tool is using a comparative method that demonstrates significant economic losses due to under-utilization of

²⁸ Pokorný, F. 2012. Management postindustriálního vývoje - Zkrácená verze disertační práce. Brno: VUT v Brně, 2012.

brownfield areas. Its essence is based on the preferential index (representing the quality of the site's value from a complex point of view of the individual components of the environment and the social environment) that the real value of the land in the landscape outweighs the final value of its required investment utilization. The system of land assessment is based on the point of view of the municipality, the investor's interest and also from the point of view of the whole society. While the municipality and the investor are pursuing economic and market use, the society pursues public interest in terms of environmental and environmental quality.”²⁹

Analysis

Those tools play mainly the supporting role. They are fairly easy to use and implement in different countries, but they can be ultimately rather weak unless some support of penalization is connected to them (then the process will be complicated and will have to use Legislative and also Economic tools). The downside is the danger of private certification systems which can be used as a marketing tool and have no real value for brownfield redevelopment whatsoever. In this respect it makes more sense to support and use systems created by a country (or by the EU) which will be more in tune with the vision of sustainable development.

Conclusions

The conclusion is that the tools can be divided into several categories from different perspectives: Strategic tools, Legislative tools, Spatial planning tools, Economic tools, Construction tools, Organization tools, Information tools, Education tools, Contractual tools, Heritage tools and Rating tools. Some of the tools (especially the Economic and Legislative ones) are country-specific and cannot be that easily implemented, however some effective tools (for example Strategic, Organization, Education and especially Information tools) don't require any legislative background or big financial investment and can be therefore easily used by any country to help their brownfield revitalization and rehabilitation process. It should be noted that many of the tools have to be used together where one precedes the other and enables its function (mostly Strategic and Legislative serve as such cornerstones for the others). It is also important to emphasize the need for an active approach of the state and the municipalities because without a conscious effort and long-term vision those tools can't be fully utilized. Generally speaking the tools work best when thoughtfully combined and when they form a self-supporting complex system that is then capable of dealing very effectively with brownfield revitalization and rehabilitation.

²⁹ Mansfeldová, A. a Šílová, K. 2010. Regenerace brownfields – významný faktor v procesu udržitelného rozvoje. In *STAVEBNÍ OBZOR 4*. 1st ed. Prague:CTU in Prague, VUT v Brně, VŠB TU v Ostravě, Česká komora autorizovaných inženýrů a techniků činných ve výstavbě a techniků činných ve výstavbě, 2010.

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