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Best Practice Enhancers for Security in Urban Regions



D6.2: A Practical Comparative Method for Evaluating BESECURE Case Study Results

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EXECUTIVE SUMMARY

Objectives

Deliverable 6.2 (D6.2) presents 'a practical method for evaluating BESECURE case study results'. The aim of D6.2 is to describe the coding structure and the comparative method underlying the BESECURE platforms. The coding structure is the underlying structure of the case study registry presented in D6.1. The case study registry provides the structure by which the data from the case study research is categorised, enriched, and stored. The underlying coding structure contains all the codes that will be attributed to a piece of information, through which the 'raw' data becomes usable for the features in different BESECURE platforms.

The comparative method makes it possible to compare practices in the case study registry and to provide users with a list of most relevant practices, taking their specific needs into consideration.

Description of the work

The coding structure has been specified by analysing case study files collected in WP5, resulting in a list of attributes, forms and values. The comparative method also builds on the inputs from the case files and uses the coding structure. A prototype of the comparative method has been developed by operationalising desired features such as nearness (distance) and adding weights.

Results and conclusions

The coding structure and the comparative method enable users to search the case study registry by specifying their demands for information and inspiration. The system will respond to these demands by looking for practices with identical attributes and values that nearly correspond and by calculating a resemblance score using weights for the various attributes. With this algorithm BESECURE will be able to recommend comparable practices and to rank results of an advanced search according to their relevance for the user. Moreover the system will allow users to compare a limited number of similar practices by highlighting the differences rather than the similarities.

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Table of Contents

1. Introduction	4
1.1. WP6 and its contribution to the BESECURE toolbox.....	4
1.2. Purpose of this deliverable (D6.2)	6
2. The coding structure.....	7
2.1. Introduction	7
2.2. Case files.....	7
2.3. Coding structure	8
3. The comparative method.....	10
3.1. Introduction	10
3.2. The back-end and the front-end of the comparative system.....	10
3.3. Features of the comparative method.....	12
3.4. Towards a first prototype.....	15
4. Conclusion	20
Appendix A	21
Appendix B	24
Appendix C	31

1. Introduction

1.1. WP6 and its contribution to the BESECURE toolbox

The project BESECURE (Best practice Enhancers SECurity in Urban REGions) is working towards a better understanding of urban security through examination of different European urban areas. By examining eight urban areas throughout Europe, BESECURE is building a comprehensive and pragmatic knowledge base that will support policy making on urban security challenges by sharing best practices that are in use throughout Europe, and by providing visualisation and assessment tools and guidelines that will help local policy makers to assess the impact of their practices, and improve their decision making.

The BESECURE project designs and develops a toolbox comprising a number of different features to support policy makers in the formulation of policies addressing security in urban regions. Figure 1 provides a visual overview of the components of the BESECURE toolbox. The figure shows the distinction between the front-end (what is visible for the users) and the back-end of the toolbox (with the underlying data structures, methods and repository of the content).

At the front-end (that what is visible for the end-user), the BESECURE toolbox contains three main components with several features. First there is the Urban Security eGuide, which can be seen as an 'Inspirational Platform' that enables policy makers to browse through and search for practices implemented in other urban areas. In addition to practices, the eGuide also contains links to literature related to urban security issues such as burglary or anti-social behaviour. The Urban Security eGuide provides the users with relevant practices and other information regarding his/her specified search. The second component of the BESECURE toolbox provides users with a set of Urban Data features that allow them to analyse and visualize data from their own urban area. This 'Urban Data Platform' includes an Urban Security Early Warning System. The user can 'learn more about his/her area, based on statistical data forecasts about relevant indicators. The final component is the Urban Security Policy Platform. This platform guides the user through an intuitive process to support the user in creating an evidence base for urban security policy making. Together, the three platforms that comprise the BESECURE toolbox offer the users a wide variety of different features that support them in many different aspects of urban security policy making.

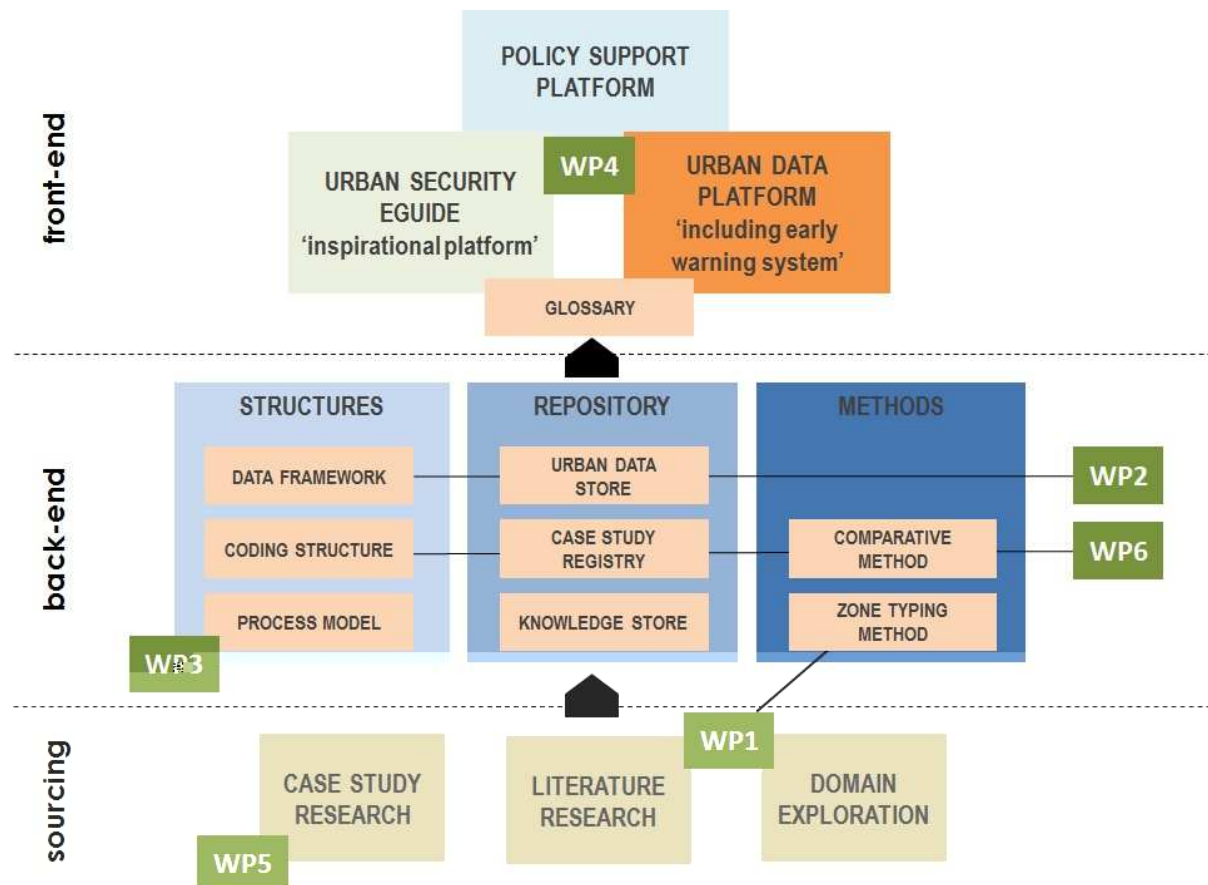


Figure 1: Visualisation of the BESECURE toolbox: front-end, back-end and sourcing

The different platforms at the front-end of the BESECURE toolbox and their features are strongly interrelated and draw from the same underlying structures, repository of content, and methods (back-end), which in turn draw from the same sources. The main sources of input are the results from the case study research (case files about specific practices in all case study areas), the results from the literature research (D1.4) and the domain exploration as performed in WP1 (D1.1). These sources have not only contributed to the formulation of the data structure, the coding structure and the process support model but they also represent the main content of the BESECURE toolbox. All case files, literature files and urban data that has been collected is stored in the BESECURE repository. These pieces of information are enhanced with meta-data (labels, codes, etc.) which makes it possible to search-and-retrieve them as relevant output at the front-end platforms. The comparative method and urban zone typing method make it possible to provide the users with advanced search features and possibilities throughout the platforms to compare and assess relevant practices that fit their needs.

The role of WP6 is to provide the coding structure as part of the underlying structures and a comparative method that makes it possible not only to compare all practices in the repository and provide users with a list of the most relevant practices, but also help users to further review a selection of relevant practices based on their specific needs.

The role of WP6 is visualised by Figure 1 also in relation to other work packages. It becomes clear that WP1 and WP5 focus mainly on the sourcing and zone typing. Their analyses are the basis for the work of WP6. In addition to the coding structure as developed by WP6, WP2 and WP3 build the other underlying structures: the data framework and the process

model. This means that a close understanding is necessary to make sure the structures are aligned. WP4 is responsible for the platforms at the front-end, therefore close cooperation with the work packages responsible for the underlying structures is essential.

1.2. Purpose of this deliverable (D6.2)

In the present deliverable we develop the comparative method as described in the description of work (DoW):

“Based on acquired knowledge regarding urban typologies, Task 6.3 compares the relationships between social, cultural, economic and other factors, to create a methodology that makes it possible to assess and compare the analysis carried out in WP5 and WP6. This comparative method seeks to identify a common basis for evaluation, fine tuning and feedback of outcomes to the case study areas.”
(DOW, p.26)

In D6.1 we introduced the case study registry (as part of the BESECURE repository), which was visualised as a three-dimensional cube with quantitative and qualitative data on practices, issues and context. Further we introduced in D6.1 the aim of a comparative method and its possible envisaged features. In the first place, the comparative method should provide the ability to identify the most relevant practices for a user. The relevancy can be based on the relative position of practices in the coding structure (based on ideas about ‘nearness’ or ‘similarity’ that is determined by some hierarchy in the coding structure and the use of scalable variables whenever possible).

D6.2 further elaborates these ideas and presents the final ideas and components of the comparative method. Particularly relevant for the comparative method is the coding structure that is the underlying structure of the information in the BESECURE repository (and as such an important part of the back-end of the platforms). The coding structure is also the main underlying structure for the case study registry. Therefore, a preliminary version of the coding structure has already been presented in D6.1 (which presented the case study registry). In D6.2 we will present the final version of the coding structure (Chapter 2). After that, D6.2 will explain on a conceptual level how the comparative method contributes to the BESECURE toolbox (Chapter 3).

2. The coding structure

2.1. Introduction

In this chapter we describe the coding structure that is the underlying structure of the case study registry (D6.1) and as such, an important part of the data structure at the back-end of the BESECURE platforms. The case study registry provides the structure by which the data from the case study research is categorised, enriched, and stored. The underlying coding structure contains all the codes that will be attributed to a piece of information, through which the 'raw' data becomes usable for the features in the different BESECURE platforms.

2.2. Case files

In WP5 "case files" were introduced to collect relevant information needed for the case study registry. A case file is a condensed, structured description of a practice that has been carried out in a certain area regarding a specific issue. We asked case study leads (those partners responsible for collecting relevant data in the cities) to collect a range of different case files, using the so-called 'case file template' (see Appendix A for an outline of the template). Each case file identifies a specific *practice* in the area of urban security and provides specific information about this practice. A practice can be a single intervention or a set of (related) interventions. Sometimes this is a clear project or programme, but it may also concern an approach ('way of working') that developed over the years without a specific name attached to it.

In the current set-up, a case study file describes a practice that addresses a certain (set of) issue(s) within a specific urban area (context). As such, each case file contains information on each of the three main categories of information (practice, issue, context). To be concrete, a case file describes:

- **Practice:** A description of the practice including its name, intent, target, objectives, method, timeframe, the focus of the intervention, actors involved, its (intended and unintended) effects, (financial) requirements, evaluation and information about the transferability of the practice to other cities.
- **Issue:** The type of issue an area is confronted with and which is addressed by the practice described in the case file (this can be either a single issue or a combination of issues). The following information is collected concerning an issue: what is the issue that is observed? Where exactly (e.g. specific location(s) or throughout the entire area)? Who are the victims and perpetrators? When do the issues occur (e.g. day or night)? What is the frequency?
- **Context:** A specification of the context (the environment) in which the practice is implemented, for instance in terms of size of the area, density, or administrative entity (e.g. district, ward, neighbourhood). The case file also adopts the urban zone typology that has been developed in WP1 to identify land use types and other relevant descriptors for this type of zone: e.g. history of incidents, security presence, income, unemployment, vacancy rate, fear of crime.

The current set of case files that we received from the various case study areas, along with the literature and other information in the BESECURE repository is input for the eGuide. For

users to be able to retrieve relevant pieces of information from the repository, the eGuide needs to contain specific features for searching and comparing. These features are based on a common data structure at the back-end of the platform. This common data structure consists of the coding structure that has been developed as the underlying structure of the case study registry and the data framework from WP2. In the next paragraph the coding structure will be discussed.

2.3. Coding structure

The coding structure consists of a set of attributes and possible values for these attributes that determine the position of a piece of information (e.g. a practice) vis-à-vis other pieces of information (similarity, difference, proximity). At the back-end of the BESECURE platforms, each case file (the 'raw data' that is stored in the repository) is coded based on the various attributes/values in the coding structure. Within the complete set of attributes, several attributes are defined to be direct input for a standardised output format for practices at the front-end of the BESECURE platforms. This standardised practice format contains descriptions of the issue, context and practice.

2.3.1. Attributes and Values

The coding structure contains multiple attributes. In the first place, there are several attributes that are used to identify a specific case file (e.g. identification number, name, key words). Furthermore, there are attributes related to the practice described in the case file, attributes related to the context where the practice is applied and attributes related to the issue that the practice addresses. The set of attributes in the coding structure are based on the preliminary results from the case study research.

The coding structure defines the form of each value. Some values are represented by a free text (description), others by a geographical location (Geo code), a fixed set of values, or a scale. The complete coding structure is provided in Appendix B.

To be able to define clusters of 'similar' or 'related' values, we distinguish between attributes that represent categories and attributes that represent types. Some values belonging to a specific type, can be applied to multiple categories. For instance *issue_type_robbery* pertains to *issue_category_property crime*, but can also be *issue_category_violent crime*. (see Figure 2 for an example of how categories and (sub)types of issues relate to each other). The distinction between categories, types and subtypes, as used in the coding structure, is mostly relevant for the back-end structure because it helps to define specific clusters that are related (similar). For users at the front-end, the distinction is less relevant. If a user is interested in the issue *robbery* that is the term they will use to search for information. It probably does not really matter if that belongs to the category *violent crime* or the category *property crime*. At the front-end the users can simply type in the word robbery. Similarly, if a user is interested in Anti-Social Behaviour, it should not matter that in our coding structure this is specified as a category, not an issue. For the users this can be treated as an issue. However, it might help the user to see which issue types and subtypes belong to this category as this can be used to further narrow down what information might be relevant.

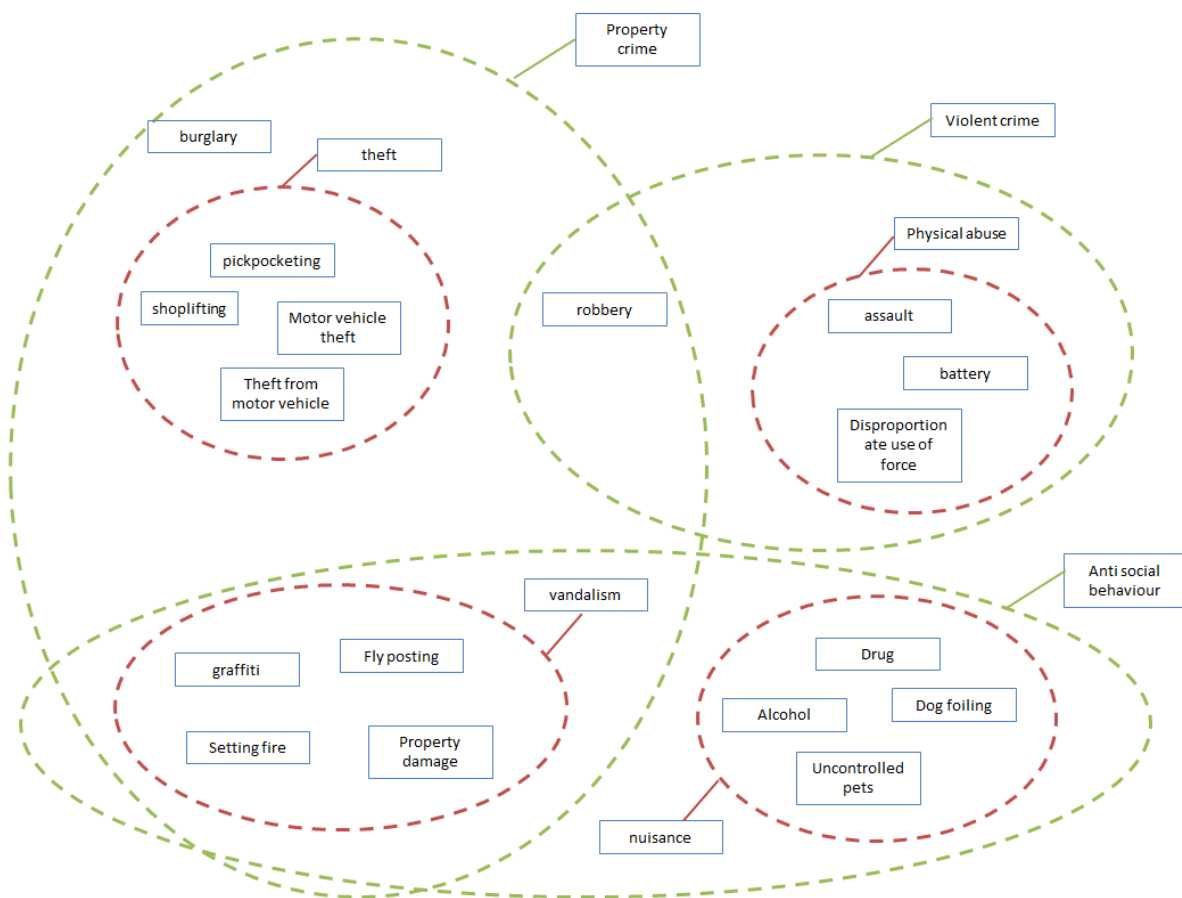


Figure 2: Relations between issue categories, issue types and issue subtypes

2.3.2. Searching and comparing

The coding structure facilitates the possibility for users to search for relevant information from the repository. As part of the eGuide, users are provided with a search engine in which they enter a specific search term, such as the word 'burglary'. The search engine provides the user with all pieces of information that are related to burglary. These search results are listed from the most relevant results (for instance those pieces of information that contain the word burglary in the title) to information that might be less relevant (where the word is used only in the main text of the document). Also, the abovementioned hierarchy between categories, types and subtypes is used to determine the relevancy of specific pieces of information.

Users may specify their queries by combining several search terms or by applying filters to the search results. These filters are based on the coding structure. For instance, when a query turns up a long list of practices related to the search term, the user may specify the context (based on the context attributes), the issue (based on the issue attributes) and/or the practice (based on practice attributes). By selecting or deselecting specific values for some attributes, search results containing those values are in- or excluded. In addition to the advanced search features, the BESECURE platforms will also provide users with a feature to compare several relevant practices. This feature is also based on the coding structure, in combination with the comparative method which will be discussed in the remainder of this Deliverable.

3. The comparative method

3.1. Introduction

In this chapter we describe a method that allow us to make comparisons between practices to enhance security in cities, stored in the case study registry. This “comparative method” builds on the inputs from the case files collected in WP5 and uses the coding structure discussed above. The method may also be used to compare other sources of information, such as literature files and data files. In this chapter, however, we will mainly focus on comparing *practices*.

As visualised in Figure 1, the comparative method is part of the back-end of the BESECURE toolbox. In section 3.2 we explain how it should interact with the front-end of the toolbox. Section 3.3 identifies the “desired features” of a comparative method such as the ability to deal with nearness. These features will be further elaborated in section 3.4 which discusses how the comparative method could be implemented in a first prototype.

3.2. The back-end and the front-end of the comparative system

The comparative method is a function to inspire users of the BESECURE platforms (notably the eGuide and the Urban Security Policy Platform) with similar or different practices tackling similar issues in a similar context. It facilitates access to the case study registry, enabling the user to quickly find practices that are relevant in view of the user’s specific needs and preferences. It provides recommendations, in close interaction with the (advanced) search features described in the previous chapter, and it enables users to compare practices that meet the search criteria they entered. Many of these features can also be found on websites or apps for consumer goods, such as cars, holidays, real estate, books, etc. In this chapter we explain how to include such features in front-end platforms, powered by the back-end comparative method. We emphasise that there is a difference between what the user sees (front-end) and what the comparative method does (back-end). A user-friendly platform may not be fully transparent in how it generates recommendations and comparisons, as long as it meets the needs of the users.

3.2.1. The front-end

At the front-end of the system, users want to be inspired by relevant practices in other cities in order to enhance interventions in their own city. To understand how this works, we need to identify typical demands that can be expected, such as:

- The user is confronted with (a) security-related issue(s) in a particular area of the city and wants to be inspired how to tackle this issues;
- The user has developed a practice and wants to be inspired in what kind of areas in the city could be targeted;
- The user has implemented a practice in a particular area, but with less impact than expected. The user wants to be inspired how to improve the practice and increase the impact.

The examples above show that a user's demand typically involves pieces of information that are available or given, and pieces of information that are not available and hence demanded. Figure 3 gives an example of how the user environment interacts with the case study registry. In this example, the issue(s) and context are known, but the required practice is unknown. The comparative method can be used to identify practices that fit in the context and issues of the user environment.

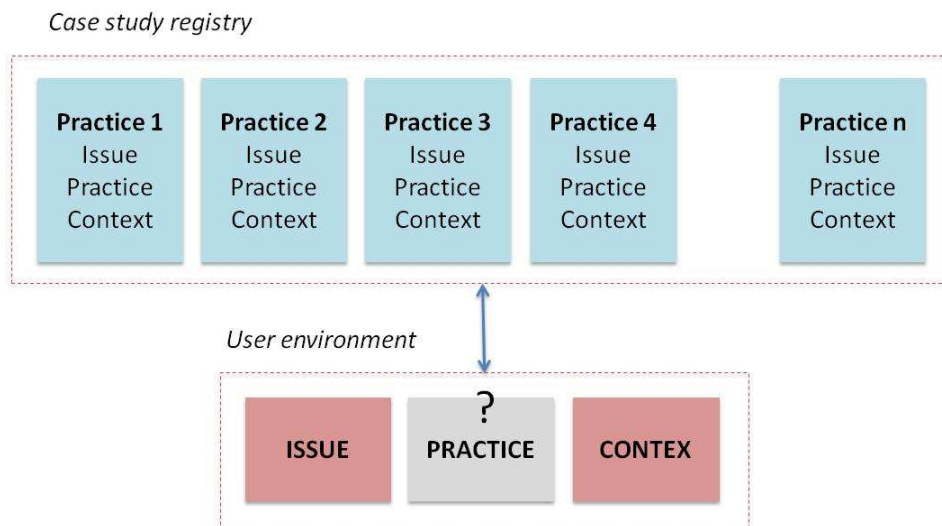


Figure 3: Interaction between user demand and practices supplied by the case study registry

At the front-end of the system, users should be able to express their demand by entering the known variables, presumably by selecting values from various lists of options. Ideally the system is flexible when it comes to entering data: *required* entries should be avoided. Of course, it should be highlighted that the comparative method will generate better recommendations if more data are provided.

At the front-end users should be able to enter information about their practice and/or their issues and context. In view of comparison, the following ways of data entry are preferred:

- 1) *Choosing from a list of options.* These options could represent types (e.g. context, issues, practices), ranges (e.g. density, budget required, time horizon, etc.) or tags/labels;
- 2) *Entering a specific number* (e.g. population density, crime statistics);
- 3) *Entering information that relates to a specific location* (geo-code), allowing the system to retrieve information on issues and context factors in the specific area from other databases.

The second option seems less desirable from a user-friendliness point of view. The third option is preferred above the first option if data is available. For example, it's better to determine the type of context by entering a zip code than asking the user to choose the type of context from a list.

3.2.2. The back-end

At the front-end the user can specify information needs, in terms of relevant practices, context and issues. At the back-end of the BESECURE toolbox, this input can be compared with entries in the repository, including the case study registry. This back-end, not directly visible to the user, should be able to determine what practices are most relevant for the user, considering the input provided. One could think of an algorithm that calculates the relevance of a case study entry by comparing the features of this entry with the data provided by the user. The front-end of the system could then show the top-10 or so of relevant entries, or all entries with a “relevance score” above a certain threshold.

For the system to be developed, we have several features in mind¹. First, it should be able to identify aspects of a practice, an issue or the context that are **identical** ($a=b$). Second, it has to be possible to identify aspects that are **similar** ($a\approx b$), measuring the degree of nearness or distance between two aspects ($|a-b|$). Third, it should allow users to find similar practices with identical and/or similar aspects, adding **weights** to the various aspects. In the following sections we will explain more in detail how these demands can be met.

3.3. Features of the comparative method

In the coding structure we introduced attributes and values to characterise and categorise a practice, looking at its objectives, targets, methods, structure, means, stakeholders, requirements, finance, implementation/evaluation, focus and geographical application. We also specify different types of issues (to be targeted by the practice) and types of context structures (where issues appear and practices are implemented).

A practice can, for example, be coded as

Practice_objective_stimulate reporting of crime/incidents

Practice_target group_victims of organised crime

Practice_target issue_extortion

Practice_method_communication_certificate

Practice_method_communication_advertisement

Practice_structure_organisation_foundation

Practice_structure_organisation_shop

Practice_time frame_implementation_medium term

Below we will use this example (based on a practice in Naples, Italy) to explain how we make comparisons with other practices.

¹ Ideally the system should also be able to learn from the interaction with users. This feature will however not be discussed in this deliverable.

3.3.1. Identical aspects

First, the system should be able to identify aspects of the practice that are identical, also considering the issues it aims to tackle and the context in which it is being applied. It should, for example, be possible to search for other practices with:

Practice_objective_stimulate reporting of crime/incidents

This is easy to implement as long as we are able to specify the objective(s) of practices in our database. For the user (at the front-end) this function is probably not very useful, because the system will generate numerous “hits” in a random (or alphabetical) order. The function is, however, very useful for the back-end of the system.

An important condition for this feature is that aspects can be labelled or categorised. For example, we distinguish different types of methods to improve security:

- ICT
- Communication
- Training/education
- Facilities
- Legislation
- Aid
- Physical improvement
- Organising
- Inspection
- ...

For each practice we can identify which methods have been applied. The system will thus be able to identify practices that use a particular method, for example:

Practice_method_communication

A practice may use only one method or a combination of methods. So, in fact we are not developing a typology of methods in which practices fit into one category, but we attach labels to methods. In the example above, we defined two labels for the method of the practice:

Practice_method_communication_certificate

Practice_method_communication_advertisement

In the development of the system we need to find a balance between defining too many categories (every observation is unique) and too few categories (many observations are considered equal, while they are actually quite different).

3.3.2. Nearness: measuring distance

If aspects are not identical, the system should be able to measure somehow the distance between aspects, if possible. The coding structure enables us to operationalise nearness between values of attributes in two ways: through hierarchy in categorisation and by ordinal variables.

In the practice of our example, one of the methods used is a certificate, which is a sub-type of communication:

Practice_method_communication_certificate

The comparative method can be used to find practices that use exactly the same method (e.g. a certificate), but also practices that use a method that is relatively close to this one (e.g. other methods of communication). This way of operationalising nearness can be applied to several attributes in the coding structure.

An example of an attribute with ordinal values is practice_time frame_implementation.

Practice_time frame_implementation_medium term

For this aspect of a practice, the coding structure allows only three possible values: short term, medium term, long term. It is obvious that short-term practices are closer to medium-term practices than practices for which implementation takes several years. As we will explain in section 3.4, this method of measuring distance is particularly useful for the descriptors of context.

3.3.3. Finding similar practices: adding weights

A practice can be described by various attributes with specific values, as defined in the coding structure. Ultimately the user should be able to find practices that are similar, which essentially means that they share some identical aspects, while for other aspects the distance between values is limited. In the development of the comparative method we need to find answers to two key questions: 1) how to translate input by the user into codes that can be used for comparison? and 2) how to calculate the overall resemblance between two practices?

A relatively simple search engine could do the work. Users only have to specify which labels they consider relevant. For example, a user could search the database for practices that use communication to improve the reporting of crime thus targeting the issue of extortion:

SEARCH: Practice_objective_stimulate reporting of crime/incidents + Practice_target_extortion + Practice_method_communication

In this example, practices that share all three features could get a relevance score of 100%. Practices that share two features score 66% and practices that share only one label 33%. In this example we assume that all features have an equal weight: simple, but effective.

The question is how to develop a front-end platform that doesn't require full knowledge of the coding structure, but which translates input by the user into codes that can be used for comparison.

The first, and most feasible, method is to develop a sophisticated and highly advanced search functionality as we can also find on websites for consumer goods. Users can specify in a very detailed way which criteria they consider relevant, for example by providing lists with options to choose from. Sometimes they can even add weights or make a distinction between hard and soft conditions (must-haves versus nice-to-haves).

Another, more innovative but therefore also more complicated, option is to develop a free-text search engine which recognises key terms. For example, a user could look for:

SEARCH: REDUCE CONTROL OF MAFIA ON SHOPS

This request could be translated by our system (using the coding structure) into:

SEARCH: Issue_category_organised crime + Practice_target_extortion + Context_critical location_busy area_shopping street

Whatever method of user input will be used, the remaining challenge is how to calculate an overall resemblance score. For the sake of simplicity we assumed in the examples above that each attribute has an equal weight, but as we will explain in the next section this might not be realistic. Another possibility is to also allow users to define the weights themselves, although this might not be very user-friendly (it takes time and the user may have no idea on how to define the weights). Therefore, the most sensible option is to develop an algorithm with pre-set weights for attributes of practices. In the next section we will further elaborate this idea.

3.4. Towards a first prototype

In the previous section we discussed some (desired) features of the comparative method. In this section we will sketch the characteristics of a first prototype, by presenting an example. We will also explain how the comparative method interacts with the zone typing method based on the urban typologies defined in WP1 (D1.2). We assume that at the front-end users will be able to specify the characteristics of their zone, which we will refer to as *MyZone*.

The aim of this section is not to provide a full and detailed overview of the system's features, but to explain how the comparative method *could* be implemented in this system. In this example, the user of the system is an advisor to the mayor who is searching for inspiring practices to tackle a security problem in a particular part of the town. In this case: nuisance caused by students in the city centre. The comparative method can assist the user by recommending comparable results; by ranking results of an advanced search (using filters and/or *MyZone*) and finally, by comparing similar results. This will be further explained below.

3.4.1. Recommending comparable results

One application of the comparative method concerns the recommendation of comparable results: if you are interested in practice A, you might also be interested in practices B and C. The challenge is to develop an algorithm for calculating the resemblance between two entries, using the labels defined in the coding structure.

In Appendix C we defined for each attribute if comparison makes sense for identifying similar practices. This seems to depend on the attribute's form (of value), also see Appendix B:

- *Text*: comparison is not feasible. All results are unique.
- *Fixed values*: comparison is feasible. Results can have the same value (being in the same category). Nearness can be operationalised if we use hierarchy in values (categories, subcategories = clusters).
- *Scaled values* (=ordinal): comparison is feasible. Results can have the same value. Nearness can be operationalised by measuring the distance between values (e.g. high is closer to medium than to low).

- *Geographical location*: comparison is feasible. Results can have the same value. Nearness can be operationalised by measuring geographic distance².

Furthermore, we excluded some attributes for comparison because they mainly provide *additional* information about an issue, context or practice. The structure of a practice, the stakeholders, the requirements and the costs may be interesting for analysing similar initiatives (see Appendix C), but are less relevant for distinguishing different types of practices. It is not very likely that a user is interested in all practices that require “technical_cameras”.

Let’s go back to the user in our example. Assume the mayor’s advisor first uses the search engine to look for practices that deal with nuisance caused by students. He finds a list of results and clicks on one of the results, which brings him to a page with details on the practice: the issues, the context and the practice itself. After having read this information, he would like to be informed about similar initiatives. The platform gives a limited number (say three) suggestions with links to other, similar practices. The comparative method calculates the resemblance score for all other practices, enabling the system to present the three practices with the highest score. The question is: how to calculate this score?

The comparative method can calculate the resemblance score between two entries by taking into consideration *all* attributes for which comparison makes sense for identifying similar practices. An important question is how to determine the weights for each variable. Without weights each variable would add $(100/n)\%$ to the resemblance, but since there are many variables that describe the context, this aspect of a practice would dominate the comparison too much. Intuitively it seems plausible to reserve 33.3% for the three main characteristics of a practice: the issue it addresses, the context in which it is applied and the practice itself. This would imply that each of the five issue variables has a weight of $(33.3\%/5=)$ 6.66% in the resemblance score, while each of the 32 context variables has a weight of $(33.3\%/32=)$ 1.04%.

One question is how to deal with “missing data”. Assume the system compares two practices: A and B. For one practice, attribute X has been defined. For another this is not the case. For sure, this is not a perfect match, but can we conclude it is “no match”? A better choice could be to disregard the attribute, only for the comparison between A and B, thus reducing the n in calculating the resemblance score.

Another issue relates to the possibility that an attribute of a practice has multiple values. As indicated in Appendix C we accept “multiplicity” for various variables. For example, a practice can use several methods: `practice_method(1)`, `practice_method(2)`, etc.. What does this mean for the comparison? Assume we compare four practices: practice A with method X, practice B and C both with method X and Y and practice D with method Y. For sure, practice A is different from practice D. And practice B is equal to practice C. But how to compare practices A and D with B and C? If we use the procedure as described above for missing data, `practice_method(2)` is not defined for practices A and D, and therefore this factor will not be taken into consideration, but this is not what we want. For variables with multiplicity the comparative method should look for similar values in *all* attributes that have been specified. If there are seven comparative attributes for practice, the method has a weight of $(33.3/7=)$ 4.76%. If we compare B with C, they get the full 4.76%. If we compare A with D, the score is 0%. If we compare A with B or C with D, we ask the system to look at all

² In the comparative method, we will, however, not include the geographic location because we assume that context matters more than distance.

attributes, dividing the maximum score by the highest number of values specified for one attribute (h), which is in this example 2. This implies that both comparisons generate a score of 2.38%. The h has to be defined for a comparison between two practices. If we add a practice E with five methods V, W, X, Y and Z, this has no impact on the resemblance scores defined above. Only if we compare practices A, B, C or D with E, we will use h=5.

For several attributes, it is possible to use the concept of nearness through hierarchy and clustering. For example, assume we compare two practices (A and B), one with Practice_method_ICT_database and one with Practice_method_ICT_video surveillance. In this example, practice B gets only half of the maximum resemblance score for this attribute, which would be 2.38% in case of seven variables for practice. Since we only defined clusters and sub-clusters (and no sub-subclusters), this method can be applied to all attributes with hierarchy.

For all attributes with scaled values (ordinary variables) we can apply the concept of nearness by measuring the distance between two values. In case of three options (e.g. high, medium, low), the maximum distance is two (3 minus 1). With a distance of two the resemblance should be zero for this attribute. With a distance of one, we suggest awarding 25% of the maximum score for the attribute (e.g. 1.04% for each of the 32 context variables).

3.4.2. Ranking results of an advanced search

The comparative method can also be applied to rank the results of an advanced search. As we explained in section 2.3.2 the BESECURE platform allows users to search for relevant practices (and other information) by applying filters. A user may specify filters simultaneously or do this step by step, while the platform only shows the filters that are relevant for the active set of results, indicating how many practices will be returned by the database in case of selection. For the advanced search engine, we use the attributes for which comparison makes sense to identify similar practices, as identified in the coding structure (Appendix C).

Let's assume in our example that the user is particularly interested in practices that use communication and training/education. In that case, the user first clicks on "practice" to specify the practice. The system responds by showing an additional menu with practice-related attributes to filter the results, but only the ones for which there are differences between the practices. So, if all results of the set focus on "prevention" (practice_focus=prevention), the "focus" will not be displayed as an option to further specify the search. In this example, the user is interested in the "method" (practice_method). Clicking on "method" will result in a new list of options:

PRACTICE

Method:

- ICT (31)
- Communication (20)
- Training/education (30)
- Facilities (15)
- Physical improvements (23)
- Inspection (6)
- Aid (15)
- Organising sport activities (2)
- Research (8)
- Follow suspects (4)
- Collect data (19)
- Monitoring (21)

In this example, we can see that there are 20 practices that use communication and 30 that use training/education. By selecting ICT the user may further specify what kind of ICT methods (s)he is looking for. The number indicates how many results will remain by selecting the method. Please note that in the present example the number of practices is not necessarily equal to the sum of the numbers, since practices can use several methods simultaneously.

It is not necessary to use the concept of “nearness” in this application of the comparative method. As in other advanced search engines, it is up to the user to specify the search. He or she may decide to choose the filter `Practice_method_communication_advertisement`, which excludes other methods of communication, or the filter `Practice_method_communication`. The user may also look for two types of communication. Without nearness, the results of the advanced search engine appear in random order. They all meet the criteria defined by the user and there is no need to put them in a specific order. If the user has specified too many attributes he or she may decide to specify less.

Optionally, we could provide an advanced search engine which not only identifies the full matches, but also practices that meet only some of the specified criteria. In this scenario, the comparative method calculates a resemblance score as discussed above, but only for the attributes specified by the user, who might be more interested in context-related factors or issue-related factors. Assume for example that the user defines values for five attributes. Practices with a 100% score will appear on top of the list, but how to deal with other practices? In that case, each attribute has a weight of 20% in the resemblance score. In case of scaled values and hierarchy in values, the system will use the concept of nearness as discussed above. The difference is that only compare the attributes defined by the user. An extra feature would be to allow the user to specify weights, although it is questionable if users will use this option. Or the user could make a distinction between strict conditions (that need to be met in order to appear as a result) and preferred conditions (nice to have). All these features are relatively easy to implement.

The user may also enter the MyZone environment to specify the context the user is looking for. It is simply another way of specifying filters for context. There is one problem, however. Assume that the user has defined his zone, which implies the user has put values to 32 attributes. If the user then specifies one more attribute, e.g. related to the issue, this attribute has a weight of only $(1/33=)$ 3%. The solution for this problem could be to reserve 33.3% for the context defined by MyZone. The remaining 66.7% can then be distributed among the factors manually set by the user.

3.4.3. Comparing practices

Users of the platform will initially use the advanced search functionality to identify practices that are similar, sharing attributes related to the context, issues and the practice itself. At some point, however, the user might be interested in learning about the differences - instead of the similarities - between the results of the search. At this stage the user is no longer interested in the resemblance score. The front-end platform allows the user to select a limited number of practices (say up to a maximum of four) to be compared.

In Appendix C we included a column which identifies the attributes for which this type of comparison (comparing similar practices) makes sense: all context area descriptors and some attributes providing information about the practice.

By default the system will generate an analysis of differences between the practices, taking all relevant attributes into consideration. Another default option could be to hide attributes that are similar for all selected practices (with the option to unhide these attributes). In addition, there are two possibilities to exclude attributes: 1) by making a choice between context (where?) and practice (what?); and 2) by manually selecting the attributes that should be included.

The result of the comparison is a table with practices described in the columns, and attributes presented in the rows. For all ordinal variables we can calculate the distance between values, in the same way as we do for calculating the resemblance score. This time, however, we can use the distance for highlighting differences between practices.

For example, a user might be interested in comparing all attributes concerning the area descriptors (high, medium, low) for the context area in which four particular practices have been applied. By selecting these practices and pressing the “compare” button, the user gets the following response:

	Practice 1	Practice 2	Practice 3	Practice 4
Problem area	high	high	high	high
Government interference	high	medium	high	high
History of incidents	high	high	medium	high
Voter turnout in the area	low	low	low	low

Etc.

Alternatively our user may be interested in the characteristics of the practice itself, and the results of an evaluation. With only a few mouse clicks, the system generates a good overview of the aspects chosen by the user. It is up to the user to interpret these results and identify the practice(s) most relevant for him or her.

4. Conclusion

In the previous chapters we have described the coding structure and the comparative method: an important underlying structure and important underlying method of the BESECURE toolbox. We have explained how qualitative case study files can be coded by defining attributes related to the practice, the issues and the context. The coding structure facilitates access to the rich information gained from various case studies, allowing users to search and compare inspiring practices from different sources.

Both the coding structure and the comparative method operate at the back-end of the BESECURE toolbox, interacting with the user-friendly platforms at the front-end. Users will be able to search the case study registry by specifying their demands for information and inspiration. The system will respond to these demands by looking for practices with identical attributes and values that nearly correspond and by calculating a resemblance score using weights for the various attributes. With this algorithm the BESECURE system will be able to recommend comparable practices and to rank results of an advanced search according to their relevance for the user. Moreover the system will allow users to compare a limited number of similar practices by highlighting the differences rather than the similarities.

Appendix A

CASE FILE TEMPLATE			
	Attribute	Value	
Issue	What? – Type of issue	<i>Issue type (e.g. burglary) and/or description of the problems</i>	
	Where? – Location of issue	<i>Description of the area in the city where the issue(s) occur(s) (e.g. bar district, specific street)</i>	
	Who? – Victim	<i>The (groups of) people that are victims of or suffering from the issue</i>	
	Who? – Perpetrator	<i>The (groups of) people that cause the problem (e.g. commit the crimes)</i>	
	When?	<i>Day time, night time, weekdays, weekends, or other specification of time when problems occur (a combination is possible)</i>	
	Frequency of occurrence	<i>Statistical information on crime rates for locality or qualitative assessment where this information is not available</i>	
	Comments	<i>Any other relevant info, other causation/motivation factors e.g. racially motivated, is the issue part of a wider national or global trend etc.</i>	
Context	Land Use Type	<i>Residential, retail and commercial services, hospitality and entertainment, industry, public services and facilities, open space, transport infrastructure, office</i>	
	<ul style="list-style-type: none"> • Primary (%) • Secondary (%) • Tertiary (%) 		
	Area description	<p><i>overview of characteristics of the area that feel are important (based on research and consultations with stakeholders), or have influenced/contributed in some way to the file issue occurring (characteristics could be physical, societal, institutional, economic etc. in nature).</i></p> <p><i>Example: The neighbourhood explored as part of this case file may be described as relatively deprived, with average income level of residents below the city average. It is a multi-ethnic neighbourhood. The area is clearly in need of regeneration, with many public areas in poor condition.....</i></p>	
	Geographical extent of area km2 / m2	

	Usage 1 (low) through 5 (high)	<i>How busy the area is during day time and night time</i>
	Comments	<i>Other relevant information about the urban zone (e.g. historical developments).</i>
Practice	Name/title of the practice	<i>e.g. Mammoth Approach</i>
	Aim/objectives of the practice	<i>e.g. To achieve a 20% reduction in the number of incidents occurring</i>
	Time frame of practice	<i>e.g. Quick wins, long term etc.</i>
	Description of the practice	<i>details/mechanisms of the approach: methods, working elements, steps, phases, etc.</i>
	Keywords	<i>To describe/tag/summarise this practice</i>
	Rationale for intervention	<i>background information on the motivation/trigger for the practice - why was it necessary? On the basis of what information/evidence was it decided to implement this particular approach?</i>
	Nature of intervention + description	<i>Proactive & Preventative; Reactionary; Repressive; Other</i>
	Indirect effects / side effects of practice	<i>Are there any unintended consequences of this approach? What other issues does the approach address (other than the one(s) detailed in this case file?)</i>
	Who?	<i>Who initiated the intervention?</i> <i>Who is driving the intervention?</i> <i>Who is the intervention targeting/who is directly affected by the intervention? Other groups/persons that are involved?</i> <i>Other groups/persons that are indirectly affected?</i>
	Geographical applicability	<i>Where has the approach been applied? Has it been applied elsewhere? Other cities, nationally, regional?</i>
	Implementation/Evaluation	<i>Qualitative description of results and perceived success of the approach.</i> <ul style="list-style-type: none"> <i>Has this approach been successful and why?</i> <i>Would this approach be used again? (info on the</i>

References		<i>quality of the outcome as perceived by the stakeholder responsible or as expressed by quantitative results, where available)</i> <ul style="list-style-type: none"> • <i>How transferrable is this approach?(i.e. Could it be used in a different context where the issues is more/less severed or more/less frequent etc.)</i>
	Requirements for the practice	1. <i>Financial resources required to design and implement the approach</i> 2. <i>Technical/infrastructural requirements</i> 3. <i>Organisational requirements including human resources</i> 4. <i>Legal implications</i>
	Comments	<i>Any other relevant information on the Practice</i>
	References	<i>e.g. Stakeholders, documents, other sources, other respondents</i>
	Photographic evidence	<i>of physical characteristics</i>
	What is (still) missing / will be added at a later stage?	<i>e.g. respondents that have not been consulted yet, specific topics or questions that require further research, other sources that are not yet analysed etc.</i>

Appendix B

In the table below, the coding structure of attributes and values is presented. The first column states the attribute. There are general attributes, attributes related to the issue, attributes related to the context, attributes related to the practice, and attributes that are references.

The second column states the form that the value takes. There are five types of values:

- Numeric values are given as a number
- Text values are given as a qualitative description
- Geographical location values are given as geospatial codes of a specific location
- Scaled values are a score of high, medium or low
- Fixed values are one or more types (and subtypes where applicable) selected from a fixed set of types (and subtypes).

The third column presents the types and subtypes that together represent the fixed set of values for a 'fixed value' attribute. In case of types and subtypes, each type represent a cluster of subtypes that have a meaningful relation. These are presented as *type_subtype*. It should be kept in mind that new types and subtypes can be added at a later stage (during the project or by users).

Attribute	Form	Value
case file_id	numeric	
case file_name	text	
case file_city/country	fixed value	The Hague/Netherlands; Poznan/Poland; London/United Kingdom; ...
issue_description	text	
issue_category	fixed value	organised crime; violent crime; property crime; anti-social behaviour; public disorder; deterioration of the environment; drug-related crime

issue_type	fixed value	homicide; bombing; arson; drug trafficking; prostitution; weapon trafficking; stolen goods_trafficking; fraud; corruption; extortion; extortion_usury; extortion_racketeering; money laundering; counterfeit goods industry; abduction; theft; theft_pickpocketing; theft_shoplifting; theft_of motor vehicle; theft_from motor vehicle; robbery; burglary; raids; illegal occupation; sexual violence; sexual violence_rape; sexual violence_assault; sexual violence_harassment; sexual violence_abuse; sexual violence_battery; domestic violence; violent confrontation; violent confrontation_fight; physical abuse; physical abuse_assault; physical abuse_disproportionate use of force; physical abuse_battery; threat; threat_physical; threat_verbal; nuisance; nuisance_alcohol; nuisance_drug; nuisance_dog fouling; nuisance_uncontrolled pets; vandalism; vandalism_graffiti; vandalism_fly posting; vandalism_property damage; vandalism_setting fire; dumping rubbish; littering; loitering; verbal abuse; intimidating behaviour; intimidating behaviour_spitting; intimidating behaviour_blocking the way; intimidating behaviour_starting fights; racial harassment; begging and vagrancy; misuse of fireworks; drug dealing; riot; protest; demonstration; perception of security; truanting
issue_where_geographical	geographical location	
issue_where_description	text	
issue_where_critical location	fixed value	peripheral area; peripheral area_secondary streets; peripheral area_cul de sac; peripheral area_lack of lighting; peripheral area_abandoned activities; peripheral area_vacant buildings; busy area; busy area_city centre; busy area_main square; busy area_transportation node; busy area_shopping street; busy area_clubs and bar district; busy area_student housing area; busy area_station; border; border_symbolic division; border_natural

		<i>border; border_physical barrier; church square; public parks;</i>
issue_who_victim	fixed value	<i>elderly; ethnic minority; women; gay; residents; visitors; youth; children; employees; entrepreneurs</i>
issue_who_victim_description	text	
issue_who_perpetrator	fixed value	<i>youth; youth_group; youth_students; youth_children; youth_minors; gangmembers; ethnic minorities; relatives; hooligans; neighbours; members of criminal organisation; males; females; drug addicts; ex-offenders; burglars</i>
issue_who_perpetrator_description	text	
issue_when	fixed value	<i>continuously; day time; night time; weekday; weekend; winter; spring; summer; autumn; marching season; new year's eve</i>
issue_when_description	text	
issue_frequency of occurrence_description	text	
issue_causation factors_description	text	
context_description	text	
context_geographical location	geographical location	
context_adminitrative entity	fixed value	<i>neighbourhood; ward; (municipal) district; region; province; borough; quarter; city; street</i>
context_area descriptor_land use type	fixed value	<i>residential; retail and commercial services; hospitality and entertainment; office; industrial; open space; transport infrastructure; public services and facilities</i>
context_land use_description	text	
context_area descriptor_problem area	scaled value	<i>high; medium; low</i>
context_area descriptor_governmental interference	scaled value	<i>high; medium; low</i>
context_area descriptor_incident history	scaled value	<i>high; medium; low</i>
context_area descriptor_security presence	scaled value	<i>high; medium; low</i>
context_area descriptor_votes	scaled value	<i>high; medium; low</i>
context_area descriptor_income	scaled value	<i>high; medium; low</i>
context_area descriptor_income neighbouring area	scaled value	<i>high; medium; low</i>
context_area descriptor_property value	scaled value	<i>high; medium; low</i>

context_area descriptor_employment rate	scaled value	high; medium; low
context_area descriptor_vacancy	scaled value	high; medium; low
context_area descriptor_security perception	scaled value	high; medium; low
context_area descriptor_participation	scaled value	high; medium; low
context_area descriptor_age_0-14	scaled value	high; medium; low
context_area descriptor_age_15-25	scaled value	high; medium; low
context_area descriptor_age_26-64	scaled value	high; medium; low
context_area descriptor_age_>65	scaled value	high; medium; low
context_area descriptor_segregation	scaled value	high; medium; low
context_area descriptor_social housing	scaled value	high; medium; low
context_area descriptor_rented housing	scaled value	high; medium; low
context_area descriptor_second level education	scaled value	high; medium; low
context_area descriptor_third level education	scaled value	high; medium; low
context_area descriptor_transport	scaled value	high; medium; low
context_area descriptor_social infrastructure	scaled value	high; medium; low
context_area descriptor_quality of public realm	scaled value	high; medium; low
context_area descriptor_active frontage	scaled value	high; medium; low
context_area descriptor_passive surveillance	scaled value	high; medium; low
context_area descriptor_permeability	scaled value	high; medium; low
context_area descriptor_housing density	scaled value	high; medium; low
context_area descriptor_activity day	scaled value	high; medium; low
context_area descriptor_activity night	scaled value	high; medium; low
practice_description	text	
practice_intent	fixed value	security conditions; justice; legality; economic development; protection against criminal activities; stimulate/protect labour market; address issues of security;

		supporting/aiding victims of crime; regeneration of area; improve quality of life
practice_intent_description	text	
practice_target_issue	fixed value	issue category_issue type_subtype [same the respective lists of fixed values in the issue section above]
practice_target_group	fixed value	victims of organised crime; interface communities; women; minors at risk; troubled families; youth groups; hard-to- reach youth; addicts; leaders of youth group
practice_target_area	fixed value	EU objective region; interface area; nightlife district
practice_target_area_geographical location	geographical location	
practice_target_description	text	
practice_method	fixed value	ICT; ICT_tools; ICT_database; ICT_video surveillance; communication; communication_advertisement; communication_promotion; communication_campaign; communication_certificate; communication_publications; training/education ; training/education_training; training/education; educational program; training/education_information meeting; facilities; facilities_sport facilities; facilities_playground; facilities_community centre; facilities_designated area for drug users; physical improvements; physical improvements_litter bins; physical improvements_lighting; physical improvements_plants; physical improvements_street cleaning; legislation; inspection; inspection_house search; inspection_building search; inspection_vehicle search; inspection- _body search; inspection_area search; arrest offenders; aid; aid_drug substitution; aid_rehabilitation; aid_mediation; aid_incentives; organising_sport activities; research; follow suspects; collect data; monitoring;
practice_method_description	text	

practice_objective	fixed value	collaboration; transparency; administrative efficiency; managing confiscated properties; creating awareness; visibility; stimulate reporting of crime/incidents; labour mobility; community dialogue; community participation; reducing illegal activities; medical help for drug addicts; diffuse drug user scene; remove youth group from area; increase social cohesion
practice_objective_description	text	
practice_focus	fixed value	prevention; repression; reactionary; after care
practice_focus_description	text	
practice_structure	fixed value	program; project; set of integrated measures; overarching strategy; organisation_ <i>foundation</i> ; organisation_ <i>association</i> ; organisation_ <i>network</i> ; organisation_ <i>membership</i> organisation; organisation_ <i>shop</i> ; organisation_ <i>collaboration</i> ; duration_ <i>short</i> ; duration_ <i>long</i> ; duration_ <i>indefinite</i> ; duration_ <i>fixed term</i>
practice_structure_description	text	
practice_stakeholders	fixed value	government; government_ <i>municipality</i> ; government_ <i>ministry of justice</i> ; government_ <i>ministry of social affairs</i> ; government_ <i>state government</i> ; government_ <i>city government</i> ; police; police_ <i>regional</i> ; police_ <i>local</i> ; police_ <i>national</i> ; community; community_ <i>organisations</i> ; housing association; activists; interested regions; partnership; health services; health services_ <i>medical officers</i> ; health services_ <i>pharmacies</i> ; welfare services; welfare services_ <i>drug counseling</i> ; welfare services_ <i>youth workers</i> ; public prosecution; residents
practice_stakeholders_description	text	
practice_requirements_technical/infrastructural	fixed value	access to information infrastructure; shelters for battered women; health facilities; cameras
practice_requirements_organisational	fixed value	education program; territorial control; trust between partners; cooperation;
practice_requirements_financial	fixed value	long term investment;
practice_requirements_legal	fixed value	law to favour good reuses of confiscated properties; narcotic substance law;
practice_requirements_description	text	

practice_funding	fixed value	EU; national; government; subsidy
practice_funding_description	text	
practice_cost	scaled value	high; medium; low
practice_cost_description	text	description of costs (e.g. per year, total costs, costs per phase/part)
practice_geographical application	fixed value	national; regional; local; central; decentral
practice_geographical application_description	text	
practice_implementation	fixed value	pilot; study; workshop; training sessions
practice_implementation_description	text	
practice_time frame_implementation	fixed value	short term; medium term; long term
practice_time frame_effects	fixed value	quick wins; sustainable
practice_time frame_description	text	
practice_evaluation_results	fixed value	decrease crime rates; increase security perception; decrease of costs
practice_evaluation_results_description	text	
practice_evaluation_method_description	text	
practice_motivation_description	text	
practice_side effects	fixed value	displacement of issue; nuisance
practice_side effects_description	text	
References	text	
Links	text (hyperlink)	

Appendix C

The table below presents an overview of the attributes that are considered relevant for the comparative method. The second column indicates if comparison makes sense for identifying similar practices. The third column shows what attributes need to be taken into consideration in the analysis of differences between similar practices. The fourth and fifth column indicate if nearness can be operationalised either by hierarchy (subclusters) or scaled values. The most right column is about multiplicity: it shows whether an attribute can only have one value (1) or numerous (n) values, with n being equal to the number of possible values for that attribute. In many cases an attribute may also have no value (0).

Attribute	Identifying similar practices	Analysing similar practices	Hierarchy: subclusters	Scaled value (ordinal)	Multiplicity: number of values
case file_city/country	Yes	No	Yes	No	1
issue_category	Yes	No	No	No	1...n
issue_type	Yes	No	Yes	No	1...n
issue_where_critical location	Yes	No	Yes	No	0...n
issue_who_victim	Yes	No	No	No	0...n
issue_who_perpetrator	Yes	No	Yes	No	0...n
context_administrative entity	Yes	No	No	Yes	0...n
context_area descriptor_land use type	Yes	No	No	No	0...n
context_area descriptor_problem area	Yes	Yes	No	Yes	0/1
context_area descriptor_governmental interference	Yes	Yes	No	Yes	0/1
context_area descriptor_incident history	Yes	Yes	No	Yes	0/1
context_area descriptor_security presence	Yes	Yes	No	Yes	0/1
context_area descriptor_votes	Yes	Yes	No	Yes	0/1
context_area descriptor_income	Yes	Yes	No	Yes	0/1
context_area descriptor_income neighbouring area	Yes	Yes	No	Yes	0/1
context_area descriptor_property value	Yes	Yes	No	Yes	0/1
context_area descriptor_employment rate	Yes	Yes	No	Yes	0/1
context_area descriptor_vacancy	Yes	Yes	No	Yes	0/1
context_area descriptor_security perception	Yes	Yes	No	Yes	0/1
context_area descriptor_participation	Yes	Yes	No	Yes	0/1

Attribute	Identifying similar practices	Analysing similar practices	Hierarchy: subclusters	Scaled value (ordinal)	Multiplicity: number of values
context_area descriptor_age_0-14	Yes	Yes	No	Yes	0/1
context_area descriptor_age_15-25	Yes	Yes	No	Yes	0/1
context_area descriptor_age_26-64	Yes	Yes	No	Yes	0/1
context_area descriptor_age_>65	Yes	Yes	No	Yes	0/1
context_area descriptor_segregation	Yes	Yes	No	Yes	0/1
context_area descriptor_social housing	Yes	Yes	No	Yes	0/1
context_area descriptor_rented housing	Yes	Yes	No	Yes	0/1
context_area descriptor_second level education	Yes	Yes	No	Yes	0/1
context_area descriptor_third level education	Yes	Yes	No	Yes	0/1
context_area descriptor_transport	Yes	Yes	No	Yes	0/1
context_area descriptor_social infrastructure	Yes	Yes	No	Yes	0/1
context_area descriptor_quality of public realm	Yes	Yes	No	Yes	0/1
context_area descriptor_active frontage	Yes	Yes	No	Yes	0/1
context_area descriptor_passive surveillance	Yes	Yes	No	Yes	0/1
context_area descriptor_permeability	Yes	Yes	No	Yes	0/1
context_area descriptor_housing density	Yes	Yes	No	Yes	0/1
context_area descriptor_activity day	Yes	Yes	No	Yes	0/1
context_area descriptor_activity night	Yes	Yes	No	Yes	0/1
practice_intent	Yes	No	No	No	0...n
practice_target issue	Yes	No	Yes	No	0...n
practice_target group	Yes	No	No	No	0...n
practice_target area	Yes	No	No	No	0...n
practice_method	Yes	No	Yes	No	0...n
practice_objective	Yes	No	No	No	0...n
practice_focus	Yes	No	No	No	0...n
practice_structure	No	Yes	Yes	No	0...n

Attribute	Identifying similar practices	Analysing similar practices	Hierarchy: subclusters	Scaled value (ordinal)	Multiplicity: number of values
practice_stakeholders	No	Yes	No	No	0...n
practice_requirements_technical/ infrastructural	No	Yes	No	No	0...n
practice_requirements_organisational	No	Yes	No	No	0...n
practice_requirements_financial	No	Yes	No	No	0...n
practice_requirements_legal	No	Yes	No	No	0...n
practice_funding	No	Yes	No	No	0...n
practice_cost	No	Yes	No	Yes	0/1
practice_geographical application	No	Yes	No	No	0...n
practice_implementation	No	Yes	No	No	0...n
practice_time frame_implementation	Yes	Yes	No	Yes	0...n
practice_time frame_effects	Yes	Yes	No	No	0...n
practice_evaluation_results	No	Yes	No	No	0...n
practice_side effects	No	Yes	No	No	0...n