

Measuring OC in Latin America

A methodology for developing and validating scores and composite indicators for measuring OC at national and subnational level

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Introduction

This working paper aims at developing and testing a methodology for measuring Organized Crime (hereinafter OC) in a list of selected countries of the Latin American region. This study represents one of the first systematic attempts to obtain reliable and comparable measurement of OC presence and threats in the region.

The outcomes will provide a more comprehensive view on how to measure and to analyze OC today in Latin America, taking into account the regional specificities of this phenomenon. Moreover, creating a valid measurement of OC has relevant policy implications, since valid indicators may improve the effectiveness of government and enforcement actions.

To reach this aim and to partially overcome the problem connected with the data availability, the authors will develop a two-levels methodology.

- **LEVEL I:** a set of national scores will be produced for all the country analyzed. The scores assess the presence or absence of a number of relevant phenomena and features and aggregates them in order to get a first assessment of the OC presence. This first assessment serves the purpose of giving a general measure of the relevant dimensions of OC in the country and, eventually, understanding what is missing in order to improve the data collection and achieve a better measurement of OC prevalence.
- **LEVEL II:** a set of quantitative composite indicators will be implemented when the country has enough quantitative data at subnational level. These indicators will measure in more details the extent, impact and relevance of the main dimensions of the OC.

These scores and composite indicators will be created using a standardized and clear methodology and starting from the conceptual framework presented in a previous working paper written by the authors (Savona, Dugato, & Garofalo, 2012).

Furthermore, the results obtained will be tested in order to assess their validity. The validation of the scores created and composite indicators will produce both an original piece of research and a methodology that could also be transferable and applicable to other contexts.

The countries, selected in coordination with Center of Excellence (CoE), UNODC and INEGI by taking into account data availability, geographic representativeness and local experts' opinions, are Chile, Colombia and Mexico. For all of them, the national scores will be defined. While, for Mexico only the second level will be reached computing the composite indicators.

In conclusion, it should be reminded that the main aim and focus of this working paper is on the definition of a series of methodological steps that could help countries in analyzing the OC issue starting from the available data. Therefore, the results obtained for the three analyzed countries should be seen as examples of how this methodology works and how the possible outcomes could appear. Clearly, this represents a preliminary stage for defining effective countermeasure and policies and it should be followed by and combined with other analyses on the specific situation of each country that are beyond the scopes of this study. Therefore, this working paper do not aim at giving specific advises or recommendations to the single states, but at providing them with reliable and comparable starting points for discussing, constructing, evaluating and refocusing their efforts against OC.

1. Roots of the working paper

1.1 Aim of the Working Paper

This working paper aims at developing and testing a set of national scores and composite indicators for measuring OC in the Latin American countries. Overall, the main objectives of this paper are:

- **Measuring and testing OC in Latin America.** The purpose is to produce a quantitative research paper focused on how to measure OC through evidence-based knowledge in order to provide an overall picture of the phenomenon of OC in Latin America through a systematic analysis of its players, activities, and the social and governmental contexts in which it emerges.
- **Understanding which data are present and which are missing in order to improve knowledge of OC.** Indeed, not all countries collect extensive and high quality data which are helpful in measuring OC. Therefore, a quantitative methodology is not always possible or meaningful. This paper may be an important first assessment aiming to show what could be done and orient the improvement in the data collection and analysis in the future.
- **Facilitating the comparability of OC measurements over countries and over time.** The general objective of this working paper is to produce an applicable and transferable methodology, as well as comparable outcomes.

The results will be a first attempt to measure five dimensions of OC presence and threats in Latin America region, taking into account the regional specificities of this phenomenon. Clearly, better and reliable OC assessment tools are important because they could lead to more efficient counteracting policies. For this reason, ensuring the consistency or the outcomes obtained is fundamental and, therefore, a broad part of this paper concerns the presentation of the methodology used for creating and validating the scores and composite indicators.

1.2 Definition of OC

Before presenting the methodology proposed and the results obtained, a brief introduction concerning the definition of OC used in this working paper and some considerations about the existing approaches for measuring OC is needed.

The United Nations Convention against Transnational Organized Crime (UNTOC) gives a comprehensive definition of OC.

“A structured group of three or more persons, existing for a period of time and acting in concert with the aim of committing one or more serious crimes and offences, in order to obtain, directly or indirectly, a financial or other material benefit” (UNTOC, 2004).

In the context of the UNTOC, a serious crime is defined as a conduct constituting an offence punishable by a maximum deprivation of liberty of at least four years or a more serious penalty. Based on such specifications, legal and operational definitions have been defined at country or regional level. However, this definition is too wide to orient meaningfully precise policies or research activities. Therefore, a narrower definition comprising the different elements and the regional specificities of the phenomenon is needed. This study employs the following definition of OC as a framework for developing indicators to measure this phenomenon.

“OC is any criminal activity conducted for material benefit by groups that engage in extreme violence, corruption of public officials, including law enforcement and judicial officers, penetration of the legitimate economy and interference in the political process (Kenney & Finckenauer, 1995; Levi, 2002). These elements seem to be universal features of OC (Van Dijk, Shaw, & Buscaglia, 2002). Moreover, the use of violence and corruption of public officials are considered also as facilitating factors of organized criminal activities” (Savona, Dugato, & Garofalo, 2012).

This definition has been proposed and extensively motivated in the author’s previous paper “A framework for the quantification of organized crime and assessment of availability and quality of relevant data in three selected countries of Latin America and the Caribbean”. The authors stressed how much important it is to identify the elements that compose OC especially in Latin America and the Caribbean, in order to identify the possible variables needed to develop a specific methodology to measure this phenomenon. Extreme violence, corruption, penetration in the formal economy, political interference, as well as the social and economic conditions supporting the flourishing of illegal activities, are the main characteristic of OC in this geographical area that are needed to be explored (Savona, Dugato, & Garofalo, 2012).

Notably, five broad dimensions extensively characterize OC. These five dimensions can be grouped into two categories: the ‘direct’ and the ‘contextual’ dimensions. The former describe the main characteristics of the criminal groups and their main activities, whereas the latter focus on the background factors that may enhance or hinder the OC phenomenon. A brief description of each dimension follows.

DIRECT DIMENSIONS:

- **Groups:**

OC in Latin America is characterized by the presence of numerous groups, often homegrown. Therefore, analyzing their number and their size and characteristics is fundamental for better understanding their connections and power relationships. Moreover, those groups frequently employ violent methods rather than alternative *modi operandi*, to influence rivals or other actors outside the organization. Several violence indicators (e.g. homicide rates) show a time variation highlighting how OC groups react to external factors such as enforcement actions, and change their spatial pattern accordingly. Violence is not only related to the presence of OC itself, but also to the contemporaneous presence of many groups with conflicting targets (IEP, 2013). Moreover, violence is often associated to particular situations such as drug trafficking, competition and enforcement operations (Rios, 2012). However, groups do not rely always on violence. Indeed, they may infiltrate the national system through corruption. Information on these aspects should be analyzed.

- **Activities**

Latin American criminal groups have historically focused on specific activities that allow them to gain profits. The drug trade is by far the largest and most lucrative OC operation. It is also among the oldest and the most studied, especially in some countries, like Mexico (Vilalta, 2013). Nevertheless, OC groups have shown resilience and have expanded towards other activities like firearms and human trafficking, kidnapping and other crimes. Moreover, OC groups tend to invest their earnings in the formal economy and, consequently, they perform more or less accurate money laundering schemes (Guerrero-Gutierrez, 2011). Overall, OC groups try to exploit illegal markets (drugs, firearms and so on), rely on appropriative activities like extortion and/or enter the legitimate economy through money laundering or investments in legal activities.

CONTEXTUAL DIMENSIONS:

- **State response**

This dimension is directed to identify the level of state response to the activities of OC groups: the efforts made by the law enforcement agencies and the effectiveness of the criminal justice system. Indeed, the state response dimension affects the risks and the opportunities that criminal groups face in engaging in their illegal activities. The presence of agencies specialized in fighting OC or a specific legislation are important signal of the national commitment against this issue (IEP, 2013; Guerrero-Gutierrez, 2011).

- **Enablers**

The evolution of organized crime is strictly connected with the opportunities offered by a specific territory or a country in general. A wide range of social, demographic, economic, physical conditions of an area could facilitate the development of criminal organizations and their activities (Savona, Dugato, & Garofalo, 2012).

- **Civil society**

This dimension takes into account the main actors who are able to raise awareness towards OC issues, to provide information and/or to support victims. The civil society plays a fundamental role in the fight against OC and in preventing crime in general, prompting the reform of criminal justice and protecting the victims. The civil institutions have an important role in making society sensitive to OC threats (Savona, Dugato, & Garofalo, 2012).

1.3 Methods and challenges in measuring OC

In this section, the most relevant existing methodologies developed for measuring OC are briefly recalled and outlined. As already mentioned, one of the main difficulties of measuring this phenomenon arises from the lack of a common definition and from the complexity of the issue (von Lampe, 2004). The concept of OC is multi-faceted. Therefore, it cannot be directly assessed and measured and it should be deconstructed and divided into different simpler elements, which can be directly measurable.

Traditional approaches to OC have focused more on criminal groups and/or crime activities (direct dimension) and less on the opportunities exploited for its development (contextual dimension). Attention to the direct dimension naturally leads to develop crime control policies, to try to arrest members of the groups and to make efforts to impede their activities. This approach may be inadequate to fight OC if it is not supported by other different actions. Prevention is the key missing factor. Indeed, policy makers have recently started to enforce preventive measures aimed at diminishing those opportunities that make OC alive and strong (UNODC, 2010).

Having this framework in mind, two different methodologies may be employed in order to measure OC: the top-down one and the bottom-up one. The top-down methodology is adopted whenever the aim is to break down the whole complex phenomenon and have a more specific and in-depth view, analyzing its sub-components. This methodology focuses on macro units of analysis and tries to move from the general view to the smallest and more specific sub-components. The bottom-up methodology focuses on the smallest unit of analysis or few single cases. It is adopted whenever the aim is to reconstruct the general view of the problem and assess it. This methodology starts from the analysis of micro data with the purpose of evaluating the extent of OC within the area considered (macro level). For a more extensive review see the paper by Savona, Dugato and Garofalo (2012).

Obviously measuring OC may pose many challenges. Overall, four main factors have to be faced or considered: the scope of the assessment, the selection and the interpretation of the dimensions and subdimensions it comprehends, the different contexts in which it emerges and the data availability.

First, selecting the tools or the methodologies to be used, as well as defining which characteristics of the phenomenon should be considered by the analysis are strictly connected to the final scope pursued. In this case, the general scope is to provide an overview of the OC phenomenon in the region in order to orient policy interventions, enhance data collection and foster researchers and studies on this topic. Therefore, a flexible methodology that can be adapted to different aspects of the phenomenon and that can provide comparable and broad results is proposed.

Second, as mentioned above, quantifying and understanding OC is very complex because it encompasses a number of dimensions that go beyond the identification of organized groups and the legal definition of crimes committed under the label of OC. Qualitative and quantitative information is needed; some information relates to aggregates, other to individual cases or persons. Here, the authors proposed to frame information on OC in five main dimensions or clusters: groups, activities, state response, enablers and civil society. Moreover, the five dimensions/clusters could be further divided into different sub-dimensions outlining the OC phenomenon and its characteristics. The more they are known, the more precise the view of the phenomenon is and the more its strengths or weaknesses can be outlined. These strengths and weaknesses should drive policies and actions to dismantle this phenomenon. In this working paper, the division of dimensions in sub-dimensions will be carefully treated and, accordingly to data availability, the main aspects of each dimension have been catalogued in several key variables that can effectively summarize the sub-dimension under investigation. However, this categorization should not be seen as a division in rigid and separate clusters. Indeed, these dimensions are closely interrelated. For instance, criminal groups are likely to keep relations with other actors, pursue a broad spectrum of activities either in the criminal markets or in the legitimate economy, act according to the risk posed by law enforcement agencies, consider the opportunities posed by the contextual socio-economic factors and by the attention and the awareness of the civil society. Within this framework, other factors, such as corruption, lack of governance, social inequality, can be identified and can specifically enter each dimension. For this reason, the authors split the phenomenon in five dimensions but they suggest to analyze the results jointly in order to take into account specific inter-relations among dimensions. For instance, a low level of civil society response is less worrying in an environment where the level of activities is low, while it would be alarming if many illegal activities were performed in that country.

Third, the methodology should fit the regional specificities of the phenomenon and should be tailored in order to highlight the peculiarities of the areas under study or the ensure comparison among different contexts. On the one hand, this working paper customizes the definition of OC to be used and the data collection procedures according to the specificities of OC in the Latin America. On the other hand, it employs a standard and replicable methodology that could provide comparable results for all the countries in the region with the only constraint of the presence of enough available data.

In connection with this last consideration, the fourth and last criticality to be considered regards the data quality and availability. Indeed, the characteristic of the information and data available discriminate the methodology employed. Data should be collected for each dimension and could be at a basic or advanced level, depending on their availability and on the capability of planning data collection on this topic. More precise and direct information result in more reliable measurement procedures. Furthermore, the availability of a large number of information allows the use of advanced statistical methods for evaluating and validating the results obtained.

1.4 The methodology proposed: a two-level approach

This working paper starts from a set of available data aiming at measuring each different dimension of OC: the groups involved, the illegal activities, the enablers that may facilitate or contrast it and the state and civil society responses to the problem (Savona, Dugato, & Garofalo, 2012). Starting from this set of available data, the authors will derive some quantitative and qualitative measures of OC presence and threats, and highlight the existing lacks of information. In particular, in order to measure OC this paper proposes the definition of a set of national scores and composite indicators that could be produced according to the characteristics of the information available.

Composite indicators and scores are increasingly recognized as a useful tool in the analysis of many social and criminal phenomena. As an example, they have been already used for assessing the OC presence in Italy (Calderoni, 2011; Transcrime, 2013) and in Europe (Europol, 2013). Moreover, they are easy to present to the general public, they naturally call for comparison among countries, and, since they identify the main variables behind them, they may unveil interesting trends and suggest political actions to reduce the problems under study (OECD, 2008).

Data availability, data quality and data coherence have been the main discriminant among the two approaches that this paper has followed. When a high percentage of the dataset required is present and when data are collected at subnational level (i.e. states, regions, provinces, municipalities, etc.), the computation of quantitative composite indicators is allowed. Otherwise, more qualitative national scores, primarily aimed at identifying the lack of existing information and guiding the enhancement of the data collection procedures, can be defined. National scores may look simpler and less informative, but they are still useful tools. Here, the two approaches are briefly presented:

1. **The scores (LEVEL I)** are calculated at national level. They are mainly based on qualitative information and each variable measures the presence or the extent of a certain phenomenon, event or feature. Their easiness allows their repetition and comparability among many countries. For each dimension of OC highlighted in the previous paragraph, this working paper will develop a national score. National scores can be calculated even if data are of a very poor quality, which means that they are scarce, missing or simply not reliable. In this paper, national scores have been computed for all the countries considered: Chile, Colombia and Mexico. Their easiness may allow the increasing of the number of countries investigated in a relative little amount of time.
2. **The composite indicators (LEVEL II)** can be calculated only for those countries for which an extensive number of data are available at subnational level. In these cases, a quantitative approach is possible. For each dimension of OC, a composite indicator will be developed summarizing the available data and presenting a quantification of the single dimensions and subdimensions of the OC presence and threats. The construction of the composite indicators follows the guidelines suggested by OECD, scholars and other contributions in the field (OECD, 2008; Transcrime, 2013). For this working paper and according to the data gathered in collaboration with CoE, UNODC, INEGI, the second level has been reached only for Mexico.

Both levels involve the calculation of five different scores and composite indicators, one for each dimension, i.e. groups, activities, state response, enablers and civil society. The methodological choices and the procedures used are properly and extensively described below.

2. The national scores – Level I

2.1 Methodology for defining and validating the scores

The scores are calculated at national level. They are based on qualitative information and each variable measures the presence (or absence) of a certain phenomenon, event or feature. When the given variable is not available due for instance to lack of measurement, it will not be considered in the final computation of the score. Despite their simplicity, national scores are useful in order to get a first picture of OC presence in the country and summarize the information available and the missing ones. Furthermore, their easiness allows their repetition and comparability among many countries.

The scores are calculated for each dimension of OC. The variables are selected according to the literature and in order to cover all the identified dimensions and subdimensions of the phenomenon. Those variables are summarized into a scoreboard that has been administrated to each country involved in the study by the CoE local contact points in order to collect the information to be used in the analysis. Unfortunately, due to the few number of countries considered, a quantitative validation of the internal coherence of the selected variables was impossible. Therefore, the authors critically motivate and justify the choice of each variable. Nevertheless, if the computation of scores will be carried out also for other countries, a quantitative validation of the scores coherence will be possible in the future. This is the reason why the computation of national score may be seen as a first level in order to reach a better comprehension of the phenomenon and as a sort of check-list which highlights what information is still missing for orienting the data collection procedures.

The methodology proposed for defining the national scores comprises the following 7 phases (Figure 1):

Phase 1. Definition of the scoreboard

Starting from the theoretical framework proposed by Savona, Dugato and Garofalo (2012) and considering the basic information useful for assessing the OC features which are more likely to be collected by the countries, the authors drafted a scoreboard composed by 44 items. Those items refer to a single variables or information and they have been selected in order to cover all the five dimensions of OC identified (the complete scoreboard can be found in ANNEX 1).

Phase 2. Internal coherence of the scoreboard (Validation)

Due to the low number of cases considered (3 countries), a quantitative validation of the internal coherence of the selected variable composing the scoreboard is not feasible. Therefore, the authors critically motivated the choice of the variables and their clustering in subdimensions according to an overall literature consensus. In the future, if the methodology for national scores will be employed in other countries, a quantitative validation may be performed.

Phase 3. Information gathering

The critically motivated list of variables was sent to the CoE in order to be filled by local experts given their comparative advantage in understanding what is present and what is not and which information is actually available in each country.

Phase 4. Numerical conversion

In order to obtain a numerical evaluation of the extensiveness of the data coverage and to summarize the information about OC characteristics as included in the scoreboards the authors

assigned the value of 1 if a variable is present and 0 otherwise. The variable is checked as N/A if the information is not sufficient to assess its presence or its absence. These kinds of answers are not taken into account in the numerical conversion. However, the presence of not sufficient information is highlighted in the presentation of the final results with a given column called percentage of information available. The presentation of the percentage of the information available serves two purposes. Firstly, it allows considering properly a given result according to the availability of information from which it comes from. Indeed, two identical scores may have two different meanings if one comes from a complete scoreboard and the other from a partial one. This point will be better clarified with a practical example when commenting the results of the scores for Chile, Colombia and Mexico (see paragraph 2.2)

Secondly, one of the aims of the national scoreboards is to provide knowledge about what is present and what is still missing, but needed in order to improve our comprehension of OC through proper measurement. Therefore, highlighting the fields that should be filled in in the near future may provide some guidance in the sharpening of the data collection process.

Phase 5. Subdimensions aggregation

Each dimension is divided in two or more sub-dimensions which are formed by one or more variables. The aim of the sub-dimension is to identify a particular aspect of OC. As the list is filled and the value were numerically converted, the authors take the arithmetic sum to obtain the overall value for each sub-dimension. The fact that some indicators may be differently associated with the presence or the threat of OC could results in misleading information if a single arithmetic mean is used. Therefore, all the numeric values of the items are transformed considering value 1 if the available information indicates a possible risk or the presence of the OC and value 0 otherwise. In this way all the scores can be interpreted considering the higher the risk, the higher the value of the score.

The obtained sums are then divided by the maximum possible scores achievable for each subdimension and the results are multiplied by 10 in order to obtain a set of comparable indexes. All variables composing each subdimension are equally weighted (i.e. the authors do not value some variables more than others) because this qualitative phase does not allow a quantitative assessment of weights validity. Moreover, given that some variables may not be filled due to lack of information, a weighting procedure may increase the bias due to unavailable data in the aggregation process. Nevertheless, if this phase will be enlarged (e.g. covering at least 20 or 30 countries) a different approach may be used.

Phase 6. Final aggregation

Once each sub-dimension has got its score, the comprehensive score of the dimension is just the arithmetic mean of the scores of the sub-dimensions. However, if for some reason, not all the items forming the sub-dimensions are available, the remaining variables belonging to that sub-dimension will define the score of that sub-dimension. Likewise, if all the variables that compose the sub-dimension are missing due to lack of information, we compute the arithmetic mean of the remaining sub-dimensions. This rule is valid for all the five dimensions of OC.

Nevertheless, if a sub-dimension is missing, the overall score must be interpreted accordingly. Therefore, in the presentation of the results, the authors will highlight which data are missing. Also for this reason, the computation of scores may be also interpreted as a check-list of what is missing in order to reach a better comprehension of the phenomenon of OC.

Figure 1 Procedure for constructing the national scores for each dimension

PHASE	METHOD
1 Definition of the scoreboard	<ul style="list-style-type: none"> • Selection of the most relevant variables for assessing OC
2 1° Validation: Internal Coherence	<ul style="list-style-type: none"> • Check the existing literature
3 Information gathering	<ul style="list-style-type: none"> • Analysis of the existing national sources
4 Numerical conversion	<ul style="list-style-type: none"> • Value of 1 if a feature is present and 0 otherwise
5 Subdimensions aggregation	<ul style="list-style-type: none"> • Aggregation method: Arithmetic sum • Indexing (Base: 10)
6 Final aggregation	<ul style="list-style-type: none"> • Aggregation method : Arithmetic mean

2.1 Critical assessment of the information composing the national scores

This paragraph summarizes the composition of the national scoreboards justifying the choices made during the selection and the identification of the items composing the scoreboards.

Groups dimension: this dimension identifies the general characteristics of OC groups such as their presence and size. Moreover, a special focus is given to the general methods used by OC groups to reach their goals. In particular, these methods can be divided into two main categories, depending on the implication of the use of violence or corruption. Therefore, the variables of the groups dimension naturally form three main sub-dimensions.

The first refers to the presence of OC groups, both homegrown and foreign. These two variables summarize the presence of OC groups. The second and third sub-dimensions regard the modus operandi of these groups. In particular, one focuses on the violent methods they may adopt. Homicides are the best indicator of violence since they are likely to be reported and violence is always seen as inherently related to OC groups (Finckenauer, 2005; Hagan, 2006). The last sub-dimension summarizes another aspect of the OC groups modus operandi such as the infiltration in legal bodies or entities through corruptive practices (Transcrime, 2013). These three sub-dimensions summarize three different aspects of the groups dimension (Table 1).

Table 1 Variables selected for constructing the national score for the Groups dimension

SUBDIMENSION	VARIABLE
Presence	Presence of organized crime groups active in the country
	Presence of foreign organized crime groups active in the country
Modus operandi: violence	Presence of intentional homicides or attempted homicides related to organized crime
	Presence of homicides related to organized crime targeting government personnel/representatives of institutions (e.g. politicians, policemen, judges)
	Presence of homicides related to organized crime targeting members of civil society (e.g. journalists, bloggers, businessmen, citizens)
Modus operandi: corruption	Presence of elected/state representatives or civil servants (e.g. politicians, policemen, judges) arrested/prosecuted/convicted for organized crime (or having facilitated organized crime)
	Presence of members of the civil society or media representatives (e.g. journalists, bloggers, businessmen, citizens) arrested/prosecuted/convicted for organized crime (or having facilitated organized crime)

Activities dimension: this dimension includes information about profitable activities usually carried out by OC groups in order to obtain or invest money or to ensure the existence of the organization. The choice of these activities follows two main directives. Firstly, they should require a high level of organization and coordination among the actors involved and should also guarantee great profits. Secondly, they have been selected according to the specificities of OC in Latin American countries derived from the existing literature. Illegal markets, other criminal activities and investments in the legitimate economy are the three main sub-dimensions composing the activities dimension. Illegal markets have been chosen according to UNODC reports and academic literature on the topic. UNODC identifies which are the main markets exploited by OC in Latin America with a special focus on drug production and trafficking (UNODC, 2010; 2013). Other scholars argued about the importance of other illegal markets for OC such as firearms trafficking (Goodman & Marizco, 2010) and human trafficking and smuggling (Europol, 2013; UNODC, 2007). Other crimes, such as extortions or kidnapping, are usually perceived as corollary activities of OC groups, but they may be as harmful to society as the exploitation of illegal markets. Finally, OC usually tends to invest in the legitimate economy. The authors assume that the presence of evidence of money laundering and investments in valuable assets may synthetically summarize the efforts of OC in this direction (Transcrime, 2013) (Table 2).

Table 2 Variables selected for constructing the national score for the Activities dimension

SUBDIMENSION	VARIABLE
Illegal markets	Presence of organized crime groups involved in drug trafficking
	Presence of organized crime groups involved in drug production
	Presence of organized crime groups involved in firearms trafficking
	Presence of organized crime groups involved in human trafficking-related crimes
	Presence of organized crime groups involved in smuggling of migrants related crimes
Other criminal activities	Presence of organized crime groups involved in kidnapping related crimes
	Presence of organized crime groups involved in extortion related crimes
	Presence of organized crime groups involved in stolen vehicles related crimes

SUBDIMENSION	VARIABLE
Investments in the legitimate economy	Presence of organized crime groups involved in money laundering related crimes
	Evidence of investment/interest in the legitimate economy (economic assets like companies or stocks / properties like real estate / liquid assets like bank account) by organized crime groups

Enablers dimension: this dimension comprises a set of background information useful for analyzing the social, economic and institutional situation of a country. All these elements can be considered as enablers of OC, since their presence can facilitate or even cause the growth of criminal groups (Savona, Dugato, & Garofalo, 2012). The first sub-dimension refers to social inequality variables such as unemployment, economic inequality, poverty rate, education and the level of informal economy. Indeed, people with limited resources are more likely to enter or support OC groups. The second sub-dimension considers some macro-variables such as lack of governance, overall quality of institutions, and exposure to corruption. The last sub-dimension refers to the efficiency of the justice system. OC may flourish by exploiting inefficiencies or flaws in these sectors. (Table 3). It should be noticed that the table below reports arbitrary thresholds for some of the considered variables. These thresholds define if the condition of a particular country can be considered as problematic. In general, the best choice would have been to define the thresholds in relation to the average value of the area (i.e. considering all the Latin American countries). In this case, due to lack of information, this solution was not applicable. Therefore, the authors decided to use arbitrary thresholds. When possible, these have been defined according to criteria known in the literature (e.g. the threshold for the pour population is derived from a standard definition used by the World Bank (2008) and the one for the GINI coefficient is a common value widely accepted by researchers of economic inequality (Bourguignon, 2004). Otherwise, the authors proposed reasonable thresholds (e.g. for the World Bank indicators the average score of the index worldwide has been considered as a benchmark). Obviously, these values can be modified on the basis of better knowledge or updated information without altering the validity of the methodology proposed.

Table 3 Variables selected for constructing the national score for the Enablers dimension

SUBDIMENSION	VARIABLE
Social and economic inequality	Presence of a structural high unemployment rate
	Presence of a structural high young unemployment rate
	Presence of a high percentage of population living under the poverty threshold (more than 5% living with less than 1.25\$)
	Presence of a high percentage of population not completing first-level education, e.g. primary school (more than 20%)
	Presence of a high GINI coefficient on income (more than 0.40)
	Presence of a large informal economy (estimates above 25%)
Government efficiency	Low rank in the Political Stability and Absence of Violence World Bank Indicator (below world average)
	Low rank Regulatory Quality World Bank Indicator (below world average)
	Presence of corruption-related offences regarding high ranking officials and elected representatives (e.g. politicians, policemen, judges)
	Low rank in the Control of Corruption World Bank Indicator (below world average)
	Low rank in the Rule of Law World Bank Indicator (below world average)
	Low rank in the Government Effectiveness World Bank Indicator (below world average)
Justice system efficiency	High average duration of penal and civil processes (more than 7 years on average)
	Low public confidence in courts, or other measures regarding population's trust/confidence toward the justice system (at least 20% does not trust)

State response dimension: this dimension intends to identify the level of state response to the activities of OC groups. In particular, the efforts made by law enforcement agencies, as well as the structure and effectiveness of the criminal justice system for counteracting and preventing OC threats. The better its performance, the greater the risk imposed upon OC. The interpretation of this score can be tricky. A higher score should not be interpreted inevitably as more positive than a lower one. Indeed, a country with a low level may have low problems connected with the groups and activities dimension, meaning that the state is not entitled to react to a threat that actually does not exist. Three subdimensions compose the state response: effectiveness of law enforcement, resources devoted to it and a dedicated legislation. Effectiveness is summarized on the one hand by the presence of people arrested for OC and on the other hand by the presence of civil servants arrested for corruption. Since the economic resources may be difficult to measure due to difficulties in attributing government expenditure, it is assumed that the presence of special entities aimed at fighting OC is an important indicator of the resources that a government devotes to counteract the phenomenon. A possible future extension may regard the measure of the use of force by the police engaged in fighting OC (Vilalta, 2014). Moreover, it is relevant to understand if some special tools, such as special legislation are active in the country (Table 4).

Table 4 Variables selected for constructing the national score for the State response dimension

SUBDIMENSION	VARIABLE
Effectiveness of law enforcement	Presence of people arrested/prosecuted/convicted for organized crime
	Presence of civil servants (e.g. policemen, judges) arrested/prosecuted/convicted for corruption
Resources devoted to counteracting OC	Presence of police forces specifically addressed to fight organized crime
	Presence of specialized anti-organized crime prosecutors
Specific legislation	Presence of special legislation against organized crime

Civil society dimension: this dimension takes into account the main actors who are able to raise awareness towards OC issues, to provide information and to support victims in order to reduce the impact of OC upon society (Savona, Dugato, & Garofalo, 2012). Moreover, some indicators regarding the openness of a society and the citizen's capability of expressing their opinion are taken into account. Overall, three main subdimensions compose this dimension. First, media article, citizens associations and informative campaigns represent people awareness about the presence of OC. The second subdimension comprehends the extent to which scholars have studied OC in the country, while the last variables, as already stated, are indicators of the voice of the society (Table 5).

Table 5 Variables selected for constructing the national score for the Civil society dimension

SUBDIMENSION	VARIABLE
Society awareness	Presence of media related article about organized crime
	Presence of citizens associations against organized crime (pro victims, etc.)
	Presence of informative campaigns against organized crime
Scientific awareness	Presence of studies about organized crime commissioned by the government
	Presence of studies about organized crime commissioned by the other public or private authorities
	Presence of independent/academic studies about organized crime
Voice of the society	Presence of a low percentage of population having access to the Internet (under 50%)
	High rank in the Voice and Accountability World Bank Indicator (above world average)

2.2 Results

This paragraph exemplifies the methodology described above by presenting the final scores for three countries of the Latin American region: Mexico, Chile and Colombia. Starting from the national scoreboard scheme, the CoE experts checked the availability and collected the information and data that have been used for defining the scores for each country. The results of the data collection are summarized in the ANNEX 1.

For facilitating the interpretation of these results, it should be remembered that the higher the value of the scores, the more problematic and potentially dangerous is the situation in the country.

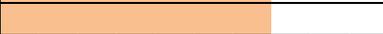
2.2.1 Mexico

Mexico is the country with the higher data availability among the ones considered. Indeed, 39 out of 44 indicators have been collected (about 88.6%). Therefore the scores obtained are likely to be reliable and consistent.

The scores for the Groups and Activities dimensions highlighted an extremely high level of the presence and vitality of the OC groups in the country. Both scores reach the highest value of 10. The Enabler dimension results in a quite high score (7.3) denoting some criticalities that may result in or enhance problematic situations. In particular, the efficiency of the justice system seems to be challenging. Regarding the State response, a specific threat emerged in relationship with the effectiveness of the law enforcement agencies. In particular, this is due to the presence of corruption among civil servants. Finally, analyzing the awareness and the social capabilities of the Civil Society in Mexico the online possible criticality emerges considering the possibility of people to express freely their opinions and influencing the administration (Table 6).

The picture of the Mexican situation that emerges from these scores, highlights a highly problematic situation regarding an active presence of OC groups in the country. The results obtained suggest the need of focusing preventive policies on improving the socio-economic conditions and the efficiency of the state. Indeed, the enablers dimension seems to be the more critical contextual dimension. These results also suggest to address specific interventions for reducing corruptive behaviors in the law enforcement and improving the citizen's voice.

Table 6 Final scores for Mexico

MEXICO 					
<i>DIMENSIONS</i>	<i>Risk</i>			<i>SCORE</i>	<i>% Available indicators</i>
	<i>LOW</i>		<i>HIGH</i>		
GROUPS				10	71%
Presence				10	50%
Modus operandi: violence				10	100%
Modus operandi: corruption				10	50%
ACTIVITIES				10	100%
Illegal markets				10	100%
Other criminal activities				10	100%
Investments in the legitimate economy				10	100%
ENABLERS				7.3	79%
Social and economic inequality				6	83%
Government efficiency				6	83%
Justice system efficiency				10	50%
STATE RESPONSE				1.7	100%
Effectiveness of law enforcement				5	100%
Resources devoted to counteracting OC				0	100%
Specific legislation				0	100%
CIVIL SOCIETY				1.7	100%
Society awareness				0	100%
Scientific awareness				0	100%
Citizen's voice				5	100%

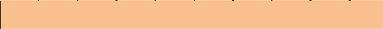
2.2.2 Chile

Regarding Chile, 33 out of 44 indicators are available (75%). Looking at the data availability, it emerges how this country should foster the data collection especially regarding the information about OC presence and activities. The Activities dimension scores are calculated using only 60% of the original indicators, whereas the for the Groups dimension only 29% of the items are available. This lack of information could affect the reliability of the results achieved. This situation, in comparison with the Mexican case, clearly explains the usefulness of reporting the percentage of the available information along with the obtained scores for better interpreting the results. Indeed, looking at the score of the Activities dimension, Chile and Mexico may seem identically affected by this dimension of OC. However, whereas the Mexican value is fully reliable, since all the required information are available, the Chilean one is calculated only considering about a half (60%) of the needed data. Therefore, the Chilean results should be considered cautiously since they are likely to change if more data will be collected in the future.

Nevertheless, the other scores obtained show an encouraging situation for Chile. Indeed, although some OC groups are present and they carry out several activities in the country as denoted by the Groups and Activities dimensions scores, the information about the others dimensions highlights a set of social and administrative features able to counteract efficiently the phenomenon and its threats.

A part from improving the data collection the main issues that the Chilean law enforcement agencies and local policy makers should focus are: the low public confidence in the justice system and the presence of corrupted civil servants (i.e. police officers or judges) (Table 7).

Table 7 Final scores for Chile

CHILE 				
DIMENSIONS	Risk		SCORE	% Available indicators
	LOW	HIGH		
GROUPS			3.3	29%
Presence			10	100%
Modus operandi: violence			0	0%
Modus operandi: corruption			0	0%
ACTIVITIES			10	60%
Illegal markets			10	80%
Other criminal activities			10	33%
Investments in the legitimate economy			10	50%
ENABLERS			4.4	86%
Social and economic inequality			3.3	100%
Government efficiency			0	83%
Justice system efficiency			10	50%
STATE RESPONSE			1.7	100%
Effectiveness of law enforcement			5	100%
Resources devoted to counteracting OC			0	100%
Specific legislation			0	100%
CIVIL SOCIETY			0	100%
Society awareness			0	100%
Scientific awareness			0	100%
Citizen's voice			0	100%

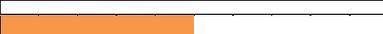
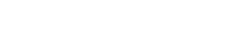
2.2.3 Colombia

In Colombia 34 out of 44 indicators are available (about 77.3%). As regarding Chile, some lacks of information emerge that may distort the values obtained for the five scores. Nevertheless, for almost each subdimension at least one indicator is present suggesting that the picture emerging from this analysis is somewhat complete. The only subdimension without information available is the one related with the corruptive behaviors of the OC groups.

As for Mexico, the data reveal a significant presence and activity of the OC groups in the country. In particular, considering the first two dimensions, 5 out of 6 subdimensions score the highest value of 10 and the remaining one has a null value because of the lack of data. Regarding the Enablers dimension the data show a quite problematic situation regarding the socio-economic equality and the government efficiency, whereas no useful information are available for assessing the efficiency of the justice system. On the contrary, the Colombian State Response seems to be fully adequate to the threats posed by OC in the country. Indeed, all the subdimensions related show a null value. Finally, no main issues emerge about the Civil Society dimension, a part from the need of increase the citizen's voice (Table 8).

These results suggest that the Colombian authorities should address the issue focusing primarily on the contrast of the illegal activities of the OC groups and fostering preventive policies by improving some contextual factors, such as reducing inequality or increasing citizen's voice.

Table 8 Final scores for Colombia

COLOMBIA 				
DIMENSIONS	Risk		SCORE	% Available indicators
	LOW	HIGH		
GROUPS			6.7	57%
Presence			10	50%
Modus operandi: violence			10	100%
Modus operandi: corruption			0	0%
ACTIVITIES			10	70%
Illegal markets			10	80%
Other criminal activities			10	67%
Investments in the legitimate economy			10	50%
ENABLERS			4.2	79%
Social and economic inequality			6.7	100%
Government efficiency			6	83%
Justice system efficiency			0	0%
STATE RESPONSE			0	80%
Effectiveness of law enforcement			0	50%
Resources devoted to counteracting OC			0	100%
Specific legislation			0	100%
CIVIL SOCIETY			1.7	100%
Society awareness			0	100%
Scientific awareness			0	100%
Citizen's voice			5	100%

2.3 Conclusion and critical points

The three examples above demonstrate how the national scores can represent an easy to use tool for providing a first assessment of the characteristics of the OC presence in a country. This method does not require extensive knowledge in statistical methods and does not require a huge amount of data. Moreover, the results obtained are directly comparable and useful for have a complete picture of the phenomenon in all the country of the region. It should be remind that those results can be considered a preliminary overview of the situation in each country that should be used for focusing new in depth-analysis on the main criticalities emerged for eventually suggesting effective policies and interventions.

Obviously, the reliability of the results is largely affected by the data availability. Indeed, the proposed method has been created for producing a score independently of the number of available items for each subdimension. Nevertheless, the higher the completeness of the available data, the richest the information and the more consistent the final scores obtained. In this sense, as shown by the three examples, matching the final scores with the percentage of available indicators is a useful information for the country indicating the areas where the lack of information are more relevant and suggesting in which directions the data collection should be improved.

3. The composite indicators: the Mexican example – Level II

The national scores are useful for assessing the lacks of information and for highlighting the presence of OC threats in a country. However, they could only give rough indications about the characteristics of the phenomenon in a country because they focus only partially on its local specificities and they provide a general indicator without any distinctions among different regions of the country.

The second level of this analysis aims at overcoming these limitations by creating a set of composite indicators at subregional level. As stated above, see Paragraph 1.4, composite indicators are powerful and valuable tools for describing and quantifying complex phenomena.

Obviously, to reach this second level of the analysis and construct the composite indicators a country should be able to collect a wide range of quantitative data for each administrative region (e.g. state, region, province, county) included in the analysis. The higher the number of these local units of analysis, the greater the precision of the analysis and the robustness of the composite indicators.

In this paragraph, a methodology for defining a set of composite indicators for measuring the different dimensions of OC in a country is presented. Moreover, a practical example is shown providing the five composite indicators to measure the OC presence and potential threats in the Mexican states.

The choice of Mexico follows two main criteria. The first one is the data availability: according to a preliminary exploration of the information available conducted in cooperation with the CoE, Mexico is one of the countries with the more precise and advanced system of data collection. Moreover, Mexico has a relevant number of subnational territorial units (32 federal entities)¹ ensuring the implementation of quantitative methods during the analysis. The second criterion refers to the existing knowledge about OC in Mexico: several researches have been already conducted in this country for assessing the characteristics of the active OC groups. Therefore, the results obtained in this study could be eventually compared with other analyses for validating (or discussing) their soundness.

3.1 Methodology for defining and validating the composite indicators

The aim of a set of composite indicators is to summarize the knowledge about the several aspects of OC in a country maximizing the information available and highlighting the different characteristics of the local units considered.

Constructing a composite indicator is not an easy task. It requires the availability of a complete and large dataset and implies several methodological and theoretical choices. Different picks involve different final results and, possibly, different interpretations.

The methodology presented in this working paper follows the procedure proposed by the OECD (2008) and aims at ensuring the following criteria:

- **Methodological soundness:** the methodological choices for constructing the composite indicators are made according to the type and characteristics of the available data.

¹ The Mexican federal entities comprise 31 states and 1 federal district. For simplicity reasons, hereafter all these 32 entities are defined as states.

- **Theoretical coherence:** the creation of the composite indicators follows the theoretical framework presented by Savona, Dugato and Garofalo (2012) which distinguishes the different direct and contextual dimension of OC.
- **Statistical consistency:** the methodology chosen ensures that the selected variables composing the composite indicator are statistically as reliable as possible and fitting the dimension they have to measure.

Here below the 8 phases defining the methodology proposed are briefly described. The same steps are summarized in Figure 2. The following procedure has been applied for constructing all the five composite indicators, one for each direct (Groups and Activities) and contextual (Enablers, State Response and Civil Society) dimension of OC.

Figure 2 Procedure for constructing the composite indicator for each dimension

PHASE	METHOD
1 Data Gathering	<ul style="list-style-type: none"> • Analysis of the existing national and international sources
2 Data Treatment	<ul style="list-style-type: none"> • Missing data imputation (regression imputation) • Calculation of the rates by 100,000 inhabitants (if needed)
3 I° Validation: Internal Coherence	<ul style="list-style-type: none"> • Principal component analysis • Selection of the relevant variables • Identification of the subdimensions
4 Data Normalization	<ul style="list-style-type: none"> • Standardization of the single indicators (z-scores)
5 Subdimensions aggregation	<ul style="list-style-type: none"> • Aggregation method: Arithmetic mean • Standardization of each subdimension indicator (z-scores)
6 Weighting and final aggregation	<ul style="list-style-type: none"> • Equal weights • Aggregation method : Arithmetic mean
7 Ranking	<ul style="list-style-type: none"> • Classification of the states according to their obtained values
8 II° Validation: Sensitivity analysis	<ul style="list-style-type: none"> • Comparing the obtained rank with the ones resulting from different normalization, aggregation and weighting methods

Phase 1. Data gathering

The authors, in collaboration with the CoE experts, drafted a list of relevant variables useful to investigate the several dimensions of OC presence and threats in Mexico considering the regional specificities of the phenomenon. This list was taken from and inspired by the methodological framework proposed by (Savona, Dugato, & Garofalo, 2012). After this preliminary step, the CoE local experts and the authors explored the availability of the data for the 32 Mexican states. Only the variables ensuring a high coverage (i.e. the values are collected in almost all the states) and an adequate update (i.e. excluding values before 2010) has been considered.

Obviously, this assessment did not result in an ideal dataset. Therefore, in order to obtain an acceptable number of information for each dimension and constructing the composite indicators, when possible, some proxy variables are included in place of the missing data. In the future, improvements in the data collection methods could guarantee a better definition of the original dataset and, consequently, a better precision of the resulting composite indicators.

A similar exploration of the available data has been conducted also for other Latin American countries. However, the results obtained did not allowed for implementing a sound and complete methodology in other contexts.

Phase 2. Data treatment

Before implementing any statistical analysis or transformation, some modifications of the original variables included in the dataset have to be made.

The first step refers to the imputation of the missing values. Indeed, four variables included in the dataset present some lacks of information (i.e. their value is unknown for some of the Mexican states). In order to keep these variables in the analysis a missing data imputation procedure has been implemented. The possible ways for treating missing data are several. In this analysis, considering that the variables presenting missing information are logically associated with other variables in the dataset, a regression imputation has been used. In particular, the missing values (y_i) are substituted by the predicted values (\hat{y}_i) obtained from a linear regression model where the dependent variable (Y) is the variable hosting the missing information and the regressor (X) is the variable that is considered as more logically connected with the dependent.

$$\hat{y}_i = x_i$$

In particular, in the Mexican case that will be presented in the next paragraphs, missing data regarding the number of active members of OC groups has been imputed considering as regressor the number of OC groups recorded in the state; data about kidnapping has been used for calculating missing information for extortion and human trafficking offences; and, consequently data on extortion has been used for filling the gaps of the kidnapping variables. Obviously, the variables presenting a high value of missing data have been excluded from the analysis.

The authors suggest using a regression model for estimating the missing because it appears to be the more flexible and reliable way of guessing the missing values. However, the regression results can be considered as reliable if the model meets some specific assumptions. Therefore, if the available information do not allow for using this method, a country can choose among other options that can be used alternatively according to the characteristics of its data. As an example, alternative ways of dealing with missing data are:

- Using the mean (or median) value recorded by the variable in all the other cases;

- Using the average value of the cases (i.e. regions) that share at least one border with the missing one;
- Using the value of the case more similar to the missing one according to some socio-economics, demographics, criminals or physical characteristics;

The second step of the data treatment phase involves the transformation of the raw data expressed in absolute value in a rate by 100,000 inhabitants. This transformation is needed in order to allow a more reasonable comparison of the prevalence of each phenomenon in the states regardless of their different size and populations. Obviously, this transformation is not required when the original variables are already expressed as a ratio (e.g. percentage)

Phase 3. Internal coherence of the indicators (I° Validation)

The third phase aims at verifying the interrelationships among the variables selected for creating each composite indicator. This stage is fundamental for evaluating which variables to include or eventually exclude from the composite indicator and for guiding the following phases by identifying the existing subdimensions described by the data used. This phase represents the first level of validation of the soundness and internal coherence of the indicator not only from a theoretical, but also from a mathematical perspective.

The tool used for this part of the process is the Principal Component Analysis (hereafter PCA). Briefly, PCA analyzes the variables in a dataset in order to extract the more relevant information and to express this information as a set of new orthogonal variables called principal components obtained as linear combinations of the original variables. However, describing the details of this statistical technique is beyond the aims of this working paper.² For the purpose of this study it can be stressed that the identification of the relevant principal components³ is useful to analyze the existing correlations structure between the considered variable and detect the subgroups of variables that are statistically related. In particular, these subgroups can be assimilated to the different subdimensions composing the composite indicators.

If a variable was not significantly associated with any relevant principal components, it has been excluded from the construction of the composite indicators since it is considered as not relevant for describing any subdimensions of the phenomenon under study.

Besides, the subgroups of the remaining variables represented the basis for the aggregation process. The aim is to avoid an unequal representation of the different subdimensions in the construction of the composite indicator (for more details see Phase 5).

Before moving to the next step, a methodological advice is needed. Like many other statistical techniques, the violation of the statistical assumptions on which PCA relies on may cause some problems in the reliability of the results. However, in this case the use of PCA is not addressed to neither use the resulting principal components (i.e. the aggregation method follows a different path as described in the paper) nor the aim is to generalize the obtained results to other samples. On the contrary, the reason for using PCA here is just to explore the underlying structure of the data. Therefore, according to several scholars, some of the assumptions (i.e. the normality of the variables) are not a strict requirement and can be overlooked (Jolliffe, 2002). In this specific

² For more information please refer to Dunteman (1989) or Jolliffe (2002).

³ A component with an eigenvalue greater than 1 is defined as relevant (Corbetta, 1992; Kaiser, 1960)

analysis, the only assumption that may be problematic regards the absence of extreme outliers in the variables distributions. Nevertheless, almost all the detected outliers can be considered as random (i.e. the authors consider a case as non-random outlier if it presents abnormal values⁴ in several variables). Therefore, the authors decided to avoid further modification of the variables for not losing information or increasing the complexity in the analysis. In any case, according to the data available in each case, the countries may decide to apply some data modifications or to skip this step relying only on a theoretical validation of the internal coherence of the indicators.

Phase 4. Data normalization

Data normalization is a fundamental step prior to the aggregation process in order to overcome the problems connected with the different nature of the original variables (e.g. different measurement units, variances, ranges, etc.). There are several methods to normalize the data (for a review see OECD, 2008). The methodology suggested applies a standardization of the original variables by calculating the corresponding z-scores. The z-scores are calculated by subtracting to the value recorded in each state the mean of the distribution and dividing the results by the standard deviation of the original variable. The resulting normalized variable has a mean of zero and a standard deviation of one.

$$y_{i \text{ stand}} = \frac{y_i - \bar{y}}{\sigma}$$

Different normalization methods result in different values of the normalized variables and, consequently, in different outcome of the composite indicators. In order to verify the reliability of the final results of the analysis on this choice a sensitivity analysis is conducted at the end of the process (see Phase 8).

Phase 5. Subdimensions aggregation

Once normalized the single variables can be aggregated into composite indicators. However, reflecting the nested structure of the dimensions and subdimensions identified and in order to avoid an unwanted uneven weighting of the different components of the composite indicator, a preliminary step is required before the final aggregation. In particular, the single variables have been aggregated together according to the subgroups emerged from the PCA results. This stage results in a set on composite indicators for each subdimension of the dimension considered.

As regards the normalization, the aggregation process requires a methodological choice about the best procedure to be used. In this study, we used an arithmetic mean of the values of the single normalized variables for each state. Again, different choices lead to different results that have been evaluated in the final step of the procedure (see Phase 8).

Phase 6. Weighting and final aggregation

The composite indicators defined for each subdimension can be aggregated together forming the final composite indicator. For an internal methodological coherence, the aggregation procedure is the same adopted in Phase 5. The values obtained express the measure of the direct or contextual dimension of the OC presence or threat in all the Mexican states. During this phase, the different components of the final indicator have been weighted equally, assuming that all of them contribute in the same way to the definition of the dimension considered. However, it is possible to weight in a

⁴ In this study a value is considered abnormal if greater than the variable mean plus 3 standard deviations, or lower than the variable mean minus 3 standard deviations.

different way the subdimension composite indicators. The different weights can be the results of mathematical procedures as well as a theoretical reasoning. Consequences of different choices are evaluated in Phase 8.

Phase 7. Ranking

In order to improve the understandability and communicability of the final outcomes to a general audience. The values of the composite indicator have been transformed by replacing them with a number expressing the position of the state when the data are sorted (e.g. the first position is associated with the state recording the highest value).

Phase 8. Sensitivity analysis (II° Validation)

The final step of the methodology proposed aims at checking the robustness of the composite indicators and their dependence on the methodological choices taken during the construction procedure. This practice is useful for evaluating the confidence in the results achieved assessing how they are associated with the subjective judgments made in different phases of the methodology proposed (OECD, 2008). In particular, among the main critical steps are the normalization of the data (Phase 4), the aggregation procedure (Phase 5 and Phase 6) and the weighting criteria of the different subdimensions (Phase 6).⁵

In order to raise awareness on the influence of the methodological choices taken the final results for each state have been compared with the ones obtained applying alternative procedures. The outcomes are a range of possible values that express how the composite indicator is robust in analyzing a particular dimension in each of the states considered. This phase represent, on the one hand a validation procedure of the reliability of the composite indicators and, from another hand, a methods for orienting future analysis by selecting the methodology that fits better the data and the required results and by evaluating how the improvement in the data quality and availability influence the robustness of the measurements. Table 9 describes the methodological choices taken and the alternatives considered.⁶

Table 9 Phases involving methodological choices and possible alternatives

Phase	Method (in grey the selected one - In white the alternatives)	Code
Normalization	Standardization (z-scores)	Z
	Min-Max (Min=0; Max =1)	M
	Index (Max =100)	I
	Ranking	R
Weighting	Equal weights	E
	Weights based on literature	L
Aggregation	Arithmetic mean	A
	Geometric mean	G

⁵ Other possible sources of variation in the values of the final composite indicators are the inclusion or exclusion of one variable and the missing data imputation procedure. The first has not been considered here because the soundness of the single indicators to be used has been already evaluated in Phase 3. The latter has not been evaluated since this procedure has been applied only to 4 variables out of 31 used and influence only 2 of the 5 composite indicators created.

⁶ For a detailed description of the alternative procedure see OECD (2008)

3.2 Data collection and availability

The following table (Table 10) summarizes the variables used for constituting the composite indicators. The column indicator corresponds to the name given during the analysis, the column variable identifies the precise definition of the data used. This list results from the procedures of data evaluation and selection described above.

Table 10 Indicators and variables used for constructing the composite indicators in Mexico

Indicator	Variable	Sources	Year
Groups dimension			
Criminal groups active in the country	Cartel Presence per State (as of August 2011)	Guerrero-Gutiérrez (2011)	2011
Active members of criminal groups	Delitos previstos en la Ley Federal contra la Delincuencia Organizada.	Censo Nacional de Gobierno, Seguridad Pública y Sistema Penitenciario Estatales (INEGI)	2011
Intentional homicides	Defunciones por muerte violenta	INEGI	2011
Intentional homicides related to organized crime	Ejecuciones y Enfrentamientos por grupos rivales	Oficina de la Presidencia de la República	2010
Intentional homicides committed with firearm	Defunciones por muerte violenta, según causa de muerte (Arma de Fuego)	INEGI	2011
Intentional homicides targeting government personnel/representatives of institutions (e.g. politicians, policemen, judges)	Defunciones por muerte violenta según ocupación (funcionarios y directivos + trabajadores de fuerzas armadas, protección y vigilancia)	INEGI	2011
Intentional homicides targeting government personnel/representatives of institutions (e.g. politicians, policemen, judges)	Number of journalists killed	INEGI	2011
Activities dimension			
Extortion	Extorsión (procuración)	INEGI, Censo de Gobierno, Impartición de Justicia (2012) y Procuración de Justicia (2012)	2011
Kidnapping	Secuestro (procuración)	INEGI, Censo de Gobierno, Impartición de Justicia (2012) y Procuración de Justicia (2012)	2011
Stolen vehicles	Vehículos robados (procuración)	INEGI, Censo de Gobierno, Impartición de Justicia (2012) y Procuración de Justicia (2012)	2011
Drug production	Producción	Secretariado Ejecutivo	2012
Drug transportation	Transporte	Secretariado Ejecutivo	2012
Drug trafficking	Tráfico	Secretariado Ejecutivo	2012
Drug selling	Comercio	Secretariado Ejecutivo	2012
Human trafficking related crimes	Trata de personas (procuración)	INEGI, Censo de Gobierno, Impartición de Justicia (2012) y Procuración de Justicia (2012)	2011
Enablers dimension			
Unemployed population	Tasa de desocupación	INEGI, Banco de información económica	2011
Unemployed youth population	Tasa de desocupación (14-29 años)	INEGI, Encuesta Nacional de Ocupación y Empleo (ENOE)	2010
Population not completing first level of education (e.g. primary school)	Tasa primaria incompleta	INEGI, Censo de Población y Vivienda 2010	2010
Informal economy	Mercado informal - personas en el mercado informal	INEGI	2010

Indicator	Variable	Sources	Year
Corruption and good government index	Índice de corrupción y buen gobierno	Transparencia Mexicana	2010
Quality and transparency index	Índice de calidad de la transparencia	CIDE	2010
Election districts requiring special attention (SAE)	Secciones con atención especial	IMOCORP	2010
State response dimension			
Police officers addressed to law enforcement	Recursos humanos para seguridad pública	INEGI, Seguridad Pública (2012)	2011
Courtrooms	Recursos de órganos jurisdiccionales - Recursos materiales - Inmuebles	INEGI, Impartición de justicia (2012)	2011
Specialized anti-organized crime prosecutors	Agencias del Ministerio Público - Agentes del Ministerio Público - Agencia Especializada en Delitos contra la Salud + Agencia Especializada en Secuestros	INEGI, Impartición de justicia (2012)	2011
Public confidence in law enforcement and courts	Confianza en los jueces	ENVIPE	2012
Justice quality index	Índice de calidad institucional de la justicia - Index 1-5	Consejo Coordinador Financiero	2010
Judges fairness	Imparcialidad de los jueces - Index 1-5	Consejo Coordinador Financiero	2010
Civil society dimension			
Perception of organized crime presence or threat	Temas que generan mayor preocupación según la percepción de la población - Narcotráfico	ENVIPE	2012
Participation in elections	Participación ciudadana en las elecciones - % sufragio	IMOCORP	2010
Population using the Internet	Porcentaje de hogares que cuentan con internet	ENIGH	2010
Perception of safety	Índice de percepción de inseguridad - % población de 18 años o más que sienten su estado inseguro	ICESI	2010

3.3 Results

The following paragraph presents the results obtained from the analysis of the Mexican data. In particular, one paragraph for each dimension briefly discusses the final outputs. Before showing the results two considerations have to be made: on the one hand, the composite indicators obtained represent only a first attempt and they are strongly dependent on the quantity, quality and reliability of the available data. Improvements in the data collection methods and in the quality of the information will result also in enhanced precision and strength of the composite indicators. On the other hand, the Mexican pilot should be considered as an example of what can be done also by other states if they implement their data collection and management procedures.

3.3.1 Groups dimension

To analyze the Groups dimension, that expresses both the presence and the typical modus operandi of the OC groups, seven of the variables available have been selected and considered as relevant. In particular, the PCA reveals that these indicators refer to two subdimensions of the Groups dimension: the first is connected with the presence of intentional homicides that can be directly or indirectly related to OC presence and denote a violent attitude of the criminal groups. Whereas, the second subdimension relates to the relevance and size of the OC groups in the Mexican states. Table 11 shows the correlations between each variable and the principal components (i.e. subdimensions) identified.⁷

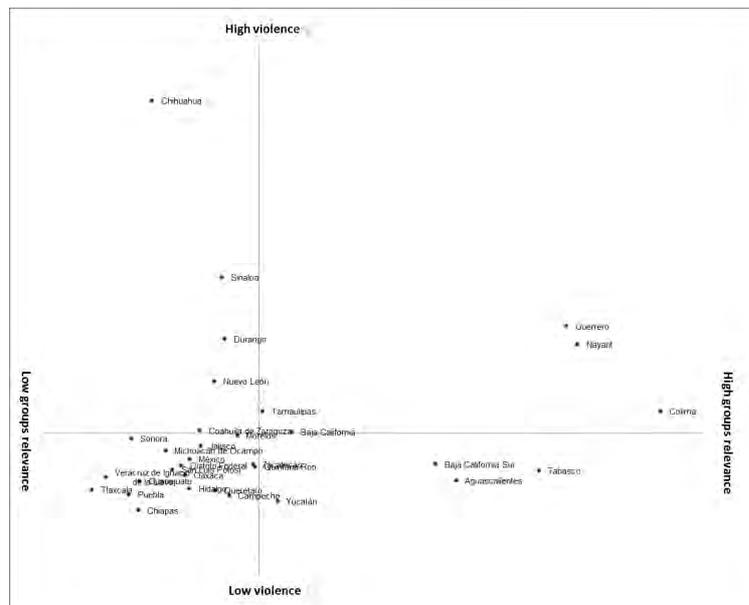
⁷ ANNEX 2 reports the scree plots calculated for this and the following dimensions.

Table 11 Correlations between the single variables and the principal components obtained

Principal components analysis (Groups dimension)		
Variable	Violence	Groups relevance
Criminal groups active in the country	.242	.675
Active members of criminal groups	.056	.799
Intentional homicides	.987	-.070
Intentional homicides related to organized crime	.960	-.167
Intentional homicides committed with firearm	.986	-.062
Intentional homicides targeting government personnel/representatives of institutions (e.g. politicians, policemen, judges)	.924	.095
Intentional homicides targeting government personnel/representatives of institutions (e.g. politicians, policemen, judges)	.955	-.007

Clearly, the two subdimensions reveal different aspects of the presence and threats of OC groups and they are not necessarily equally relevant in all the Mexican states. This is strictly connected with the nature and the characteristics of the different OC groups. As an example, some states could present a relatively high level of violence caused by few or little criminal groups, while others could denote a stronger but more peaceful presence. This difference should also reflect different approaches in the counteracting strategies by the national or local authorities. Indeed, a high level of group relevance associated with a low level of violence may suggest a stable situation that should be addressed focusing more efforts on the activities of the OC. Whereas, when a high level of violence is present, specific interventions directly aimed at disrupting the criminal organization from a military point of view may be implemented. The graph below shows the different positions of the Mexican states according to the two subdimensions. The axes express the mean values of the two distributions (Figure 3).

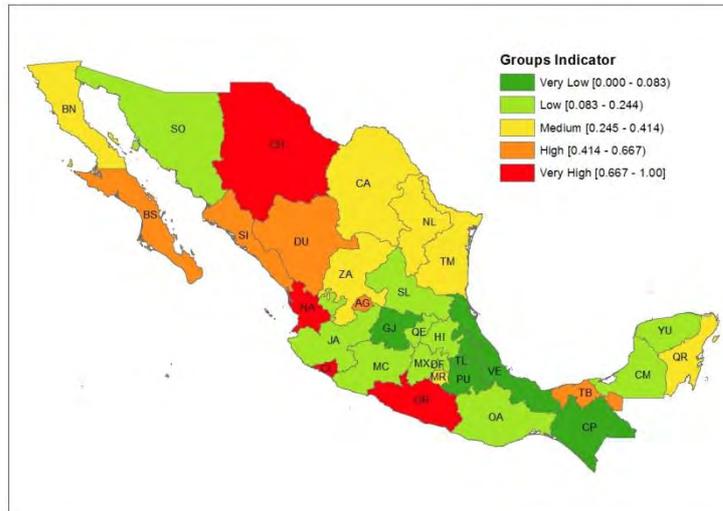
Figure 3 Mexican states according to their Groups subdimensions values



Although the existing differences, the main aim of a composite indicator is to summarize the information and to give a clear and concise view of the dimension analyzed. Figure 4 presents the map of the Mexican states according to their values in the composite indicator for the groups

dimension obtained from the combination of the two subdimensions presented before. To facilitate the readability of the map the values have been normalized using a Min-Max transformation⁸ and they have been categorized in five classes using the Jenks Natural Breaks algorithm.⁹

Figure 4 Final composite indicator results for the Groups dimension



The map shows how Guerrero, Chihuahua, Navarrit and Colima are the Mexican states with a higher presence and threat of OC groups. In general, the states in the North of Mexico and some exceptions in the Central area of the country seem to be particularly affected by the presence of active OC groups.

For a correct interpretation of the composite indicator, two aspects must be recalled: firstly, using rates by inhabitants the results obtained should be read as a measure of relative and not absolute risk (e.g. two OC groups in a smaller state could be considered as a higher threat than five groups in a bigger one). Secondly, these values are defined considering the subdimensions jointly. Therefore, some states, although similar in the final score, could present very different situations. Colima and Chihuahua are a clear example: the first has a high value regarding the groups relevance subdimension, whereas the latter is far more characterized by the violence one.

The following table reports the ranking obtained following the methodology proposed (ZEA) and compares it with the ones resulting from the applications of alternative choices (see Paragraph 3.1) (Table 12).

⁸ This transformation assigns to value 1 the higher value of the distribution and 0 to the lower one rescaling all the others accordingly. This procedure has been applied for drawing each following composite indicator map.

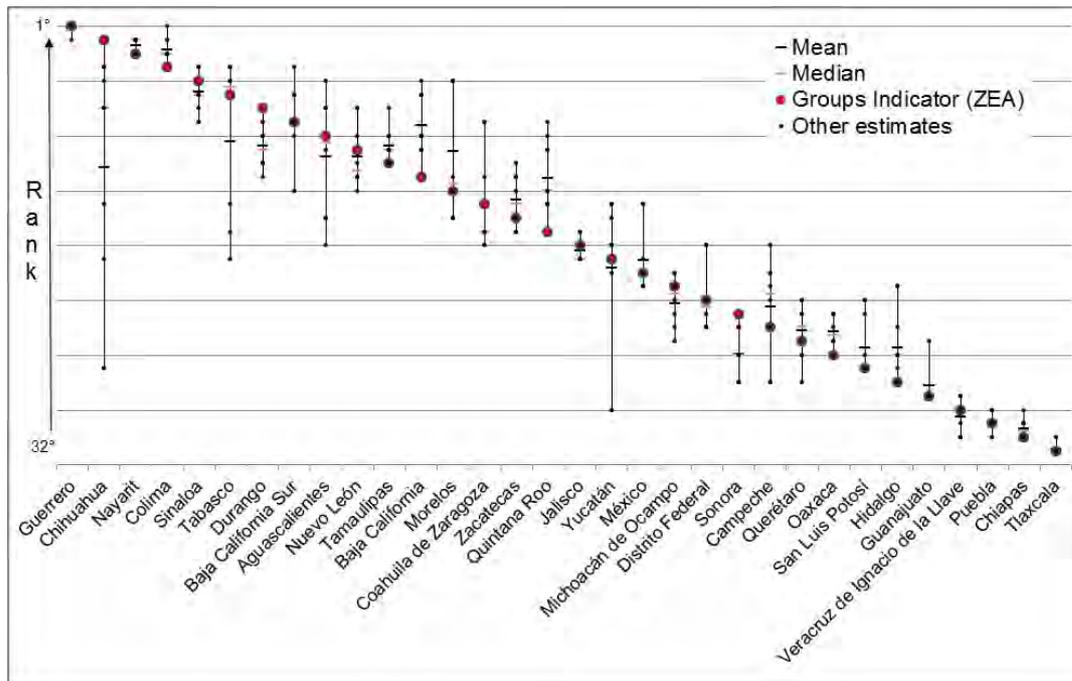
⁹ The Natural Breaks method optimized by the Jenks algorithm has the merit of emphasising points of discontinuity in the distribution of a variable minimizing the variance within each single class and maximizing the one between different classes.

Table 12 Sensitivity analysis: final ranking and alternatives ones

STATE	Rank	Other estimates									Median	Mean	Min	Max
	ZEA	ZLA	MEA	MLA	IEA	ILA	REA	REG	RLA	RLG				
Guerrero	1	2	1	1	1	1	1	1	1	1	1	1.1	1	2
Chihuahua	2	5	4	7	4	7	14	26	18	26	7	11.3	2	26
Nayarit	3	3	2	3	2	3	2	2	2	2	2	2.4	2	3
Colima	4	1	3	2	3	2	3	3	3	3	3	2.7	1	3
Sinaloa	5	7	6	8	6	8	4	4	6	4	6	5.8	4	8
Tabasco	6	4	5	4	5	4	16	18	14	18	5.5	9.4	4	18
Durango	7	8	9	11	9	11	8	11	12	11	10	9.7	7	12
Baja California Sur	8	6	8	6	8	6	9	13	4	13	8	8.1	4	13
Aguascalientes	9	17	7	5	7	5	15	15	10	15	9.5	10.5	5	17
Nuevo León	10	11	12	12	12	12	9	7	13	7	11.5	10.5	7	13
Tamaulipas	11	10	11	10	11	10	7	9	9	9	10	9.7	7	11
Baja California	12	9	10	9	10	9	5	6	6	6	9	8.2	5	10
Morelos	13	12	13	15	13	15	5	5	5	5	12.5	10.1	5	15
Coahuila de Zaragoza	14	16	16	17	16	17	12	8	16	8	16	14	8	17
Zacatecas	15	13	15	16	15	16	12	12	11	12	14	13.7	11	16
Quintana Roo	16	14	14	13	14	13	9	10	8	10	13	12.1	8	14
Jalisco	17	18	18	18	18	18	17	16	18	16	18	17.4	16	18
Yucatán	18	15	17	14	17	14	19	29	14	29	17	18.6	14	29
México	19	20	19	20	19	20	18	14	18	14	19	18.1	14	20
Michoacán de Ocampo	20	23	20	24	21	24	20	19	22	19	20.5	21.2	19	24
Distrito Federal	21	22	23	23	23	23	21	17	21	17	21.5	21.1	17	23
Sonora	22	27	25	27	25	27	23	23	27	23	25	24.9	22	27
Campeche	23	19	21	19	20	19	23	27	17	27	20.5	21.5	17	27
Querétaro	24	21	22	21	22	21	27	25	24	25	23	23.2	21	27
Oaxaca	25	24	24	22	24	22	23	22	25	22	23.5	23.3	22	25
San Luis Potosí	26	26	26	26	26	26	22	21	25	21	26	24.5	21	26
Hidalgo	27	25	27	25	27	25	26	20	23	20	25	24.5	20	27
Guanajuato	28	28	28	28	28	28	24	28	24	24	28	27.2	24	28
Veracruz de Ignacio de la Llave	29	31	29	31	29	31	29	28	30	28	29	29.5	28	31
Puebla	30	29	30	29	30	29	31	30	31	30	30	29.9	29	31
Chiapas	31	30	31	30	31	30	30	31	29	31	30.5	30.4	29	31
Tlaxcala	32	32	32	32	32	32	31	32	32	32	32	31.9	31	32

The results seem quite stable and the positions in the ranking vary slightly considering the different methodologies. The main exceptions are Chihuahua, Yucatan and Tabasco presenting the largest ranges between the higher and the lower rank calculated. Not surprisingly, both these states register contrasting values in the two subdimensions composing the final indicator. Therefore, it is highly likely that in these cases procedures that emphasize one of the two subdimensions (e.g. unequal weighting) or reduce the compensability of conflicting information (e.g. geometric aggregation) could lead to a wider range of possible values. The graph in Figure 5 summarizes the results of the sensitivity analysis.

Figure 5 Sensitivity analysis final results summarized



3.3.2 Activities dimension

The construction of the composite indicator for the Activities dimension started from the selection of eight relevant variables. The PCA identifies four significant subdimensions resulting from the data considered. A higher number of principal components than the subdimensions identified for the previous dimension is connected to the wider range of different activities conducted by the OC groups. However, those subdimensions are likely not to cover all the possible activities in which OC is involved. As an example, no information on the infiltration in the legal economy is considered due to the lack of available data.

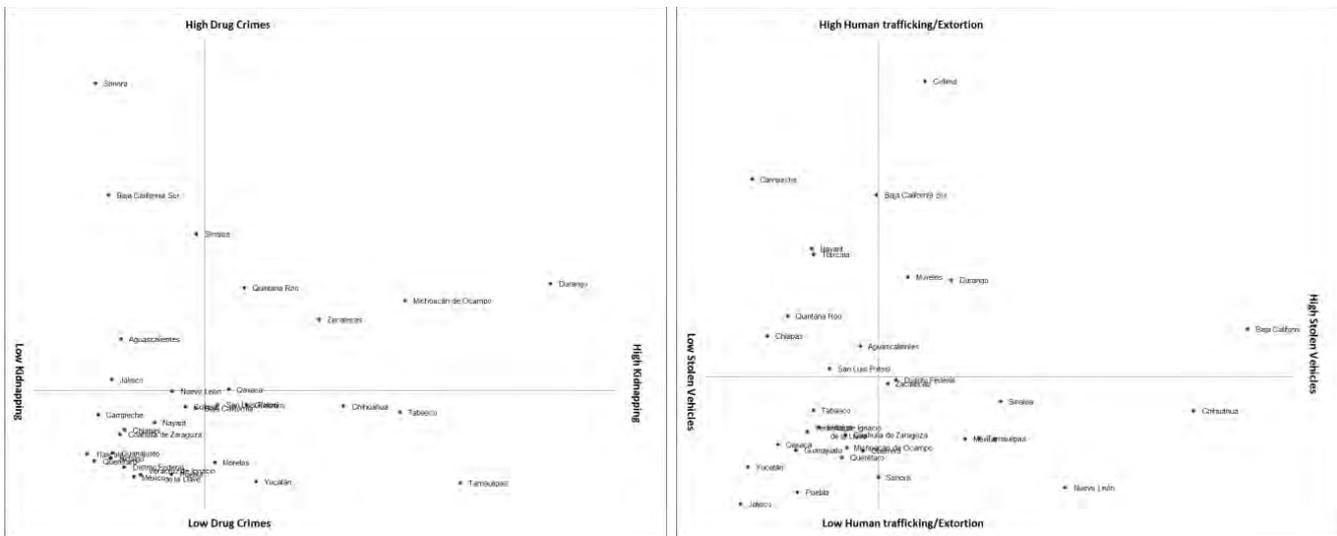
The first subdimension regards all those crimes related to drug production and trafficking, a core business of many OC groups in the region (UNODC, 2013). The second and third subdimensions are related to kidnapping, human trafficking and extortion, other typical OC activities (Europol, 2013; Asmundo & Lisciandra, 2008; UNODC, 2007; UNODC & World Bank, 2007). The fact that data show a high correlation between human trafficking and extortion could suggest that those activities, although different, are likely to be conducted in Mexico by the same OC groups. The fourth subdimension is related to the relevance of the stolen vehicles which can be both resold or used for carrying on other illegal activities (e.g. smuggling of goods or human beings) (Table 13).

Table 13 Correlations between the single variables and the principal components obtained

Principal component analysis (Activities dimension)				
Variable	Drug crimes	Kidnapping	Human trafficking / Extortion	Stolen vehicles
Extortion	.312	.131	.845	.210
Kidnapping	.167	.802	.160	-.366
Stolen vehicles	.257	.584	.075	.528
Drug production	.669	-.015	-.506	.082
Drug transportation	.705	-.463	-.239	-.045
Drug trafficking	.547	.110	.182	-.725
Drug selling	.680	.205	-.133	.311
Human trafficking related crimes	.300	-.626	.629	.072

Once again, the Mexican states present a wide variety of situations regarding the criminal activities related to OC. Some states record high or low values in almost all the subdimension indicators (e.g. Durango or Puebla), whereas others show some peculiarities (e.g. Sonora regarding drug crimes). The graphs below summarize the situations of the Mexican states in relationship with the four Activities subdimensions (Figure 6). These results also suggest that the counteracting policies should be customized according to the main problems of each state. Moreover, since most of these activities involved illicit flows of goods or people, analyzing the states highly affected by a specific criminal phenomenon could help in reconstructing the transnational illegal networks and markets.

Figure 6 Mexican states according to their Activities subdimensions values



The following map (Figure 7) presents the result of the composite indicator for the Activities dimension. It can be clearly seen how the states in the North-West of the country are the ones where the criminal activities of the OC groups seem to be more relevant. This is likely to be caused on the one hand by the significant presence of OC groups (as show by the first composite indicator, see Paragraph 3.3.1) and, on the other, by the closeness to the US border that could enhance the criminal opportunities connected with the trafficking of goods and/or human beings.

Figure 7 Final composite indicator results for the Activities dimension

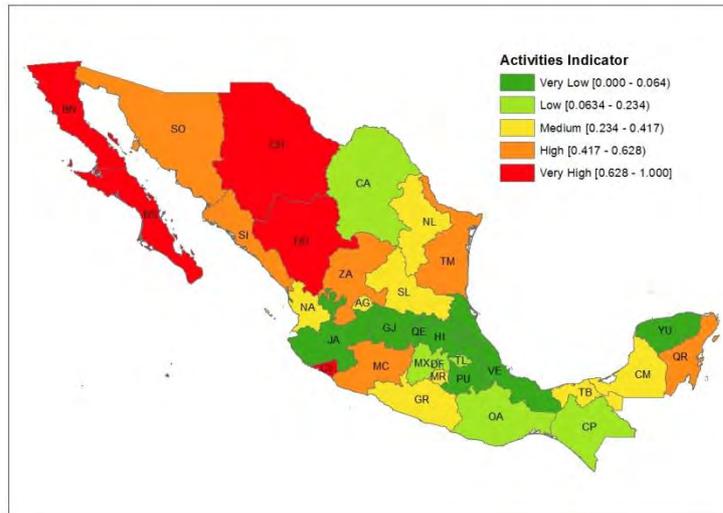


Table 14 and Figure 8 summarize the results of the sensitivity analysis conducted with the aim of analyzing the influence of the methodological choices taken on the outcomes of the composite indicator. Comparing the different rankings obtained the composite indicator for the Activities dimension seems slightly less stable than the one for the Groups.

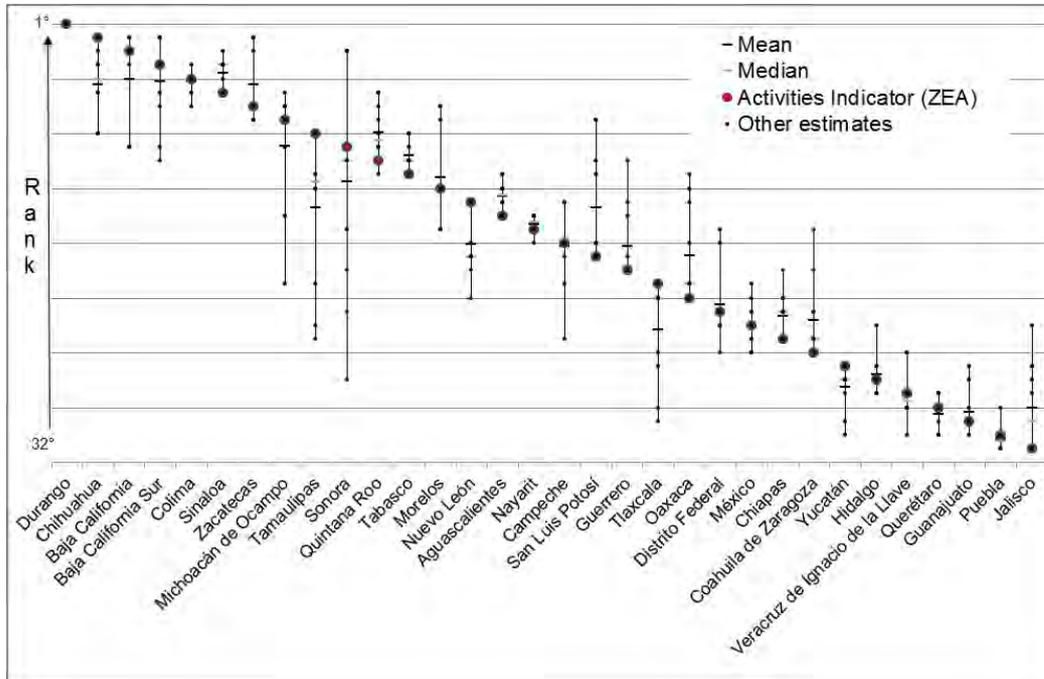
Table 14 Sensitivity analysis: final ranking and alternatives ones

STATE	Rank ZEA	Other estimates									Median	Mean	Min	Max
		ZLA	MEA	MLA	IEA	ILA	REA	REG	RLA	RLG				
Durango	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Chihuahua	2	9	2	9	3	9	4	6	4	6	5	5.4	2	9
Baja California	3	10	3	10	2	10	3	2	4	3	3	5	2	10
Baja California Sur	4	2	4	2	4	2	7	10	6	11	4	5.2	2	11
Colima	5	5	5	5	5	5	6	5	7	4	5	5.2	4	7
Sinaloa	6	4	6	4	6	4	4	4	3	5	4	4.6	3	6
Zacatecas	7	8	7	8	7	8	2	3	2	2	7	5.4	2	8
Michoacán de Ocampo	8	6	8	7	8	7	10	15	10	20	8	9.9	6	20
Tamaulipas	9	12	9	12	9	13	13	23	20	24	12.5	14.4	9	24
Sonora	10	3	11	3	11	3	19	22	16	27	11	12.5	3	27
Quintana Roo	11	7	10	6	10	6	10	12	8	9	9.5	8.9	6	12
Tabasco	12	11	12	11	12	11	9	9	9	10	11	10.6	9	12
Morelos	13	16	13	16	13	16	8	7	13	7	13	12.2	7	16
Nuevo León	14	18	14	18	14	18	17	18	19	21	18	17.1	14	21
Aguascalientes	15	13	15	13	15	12	14	13	14	12	13.5	13.6	12	15
Nayarit	16	15	16	15	16	15	16	17	15	15	15.5	15.6	15	17
Campeche	17	14	17	14	17	14	20	24	17	18	17	17.2	14	24
San Luis Potosí	18	17	18	17	18	17	12	8	11	8	17	14.4	8	18
Guerrero	19	19	19	19	19	19	15	11	18	14	19	17.2	11	19
Tlaxcala	20	21	20	21	20	21	25	30	26	29	21	23.3	20	30
Oaxaca	21	20	21	20	21	20	17	14	12	13	20	17.9	12	21
Distrito Federal	22	23	22	23	22	23	22	16	25	17	22	21.5	16	25
México	23	25	23	25	23	25	21	20	24	22	23	23.1	20	25
Chiapas	24	22	24	22	24	22	24	21	21	19	22	22.3	19	24
Coahuila de Zaragoza	25	24	25	24	25	24	22	19	22	16	24	22.6	16	25
Yucatán	26	27	26	27	27	27	31	28	30		27	27.5	26	31
Hidalgo	27	28	27	28	26	28	26	26	27	23	27	26.6	23	28
Veracruz de Ignacio de la Llave	28	29	28	29	28	29	29	25	31	25	28.5	28.1	25	31
Querétaro	29	31	29	31	29	31	29	28	30	28	29	29.5	28	31
Guanajuato	30	30	30	30	30	30	31	27	29	26	30	29.3	26	31
Puebla	31	32	31	32	31	32	32	29	32	31	31.5	31.3	29	32
Jalisco	32	26	32	27	32	26	28	32	23	32	30	29	23	32

However, this higher variation is probably due to the presence of four subdimensions that increase the complexity of the composite indicator. Moreover, the only relevant differences are recorded by

the states of Sonora, Tamaulipas and Michoacán de Ocampo and the results obtained using the suggested methodology (ZEA) are very close to the median values of all the possible estimates, suggesting that the procedure proposed provides reliable outcomes.

Figure 8 Sensitivity analysis final results summarized



3.3.3 Enablers dimension

The Enablers dimension is the first of the so-called contextual dimension and it is probably the most difficult one to measure. Indeed, although it is relatively easier to find variables and information regarding socio-demographic or economic aspects of a country, the difficulties emerge when an interpretation of the connections between these factors and the OC is required. Moreover, this dimension covers a huge range of different topics and features of a country that cannot easily be summarized.

In particular, the available Mexican data at state level with a possible link with OC rise and development are reported in Table 15. The same table shows the three subdimensions identified using the PCA. The first one is related with the local government efficiency and with the capability of the population to have a direct control on the political authorities. The capability is estimated considering both the level of education and the presence of external factors destabilizing the electoral process. The second subdimension regards the state prosperity, approximated using the general level of unemployment. Finally, the third dimension regards the opportunities connected with an transparent and legal labor market and economy.

In commenting these results it should be bare in mind that there may be other subdimensions equally relevant for understanding the criminal opportunities in a country, but so far the available data do not allow for exploring them properly. As an example, the authors tried to retrieve some reliable information and data on evidences of money laundering or investments in the legal economy by the OC in order to highlight the risks connected with specific economic sectors or activities. However, no or very few data were available. Therefore, the authors prefer avoiding to include possible distortions and create problems in the transferability of the method considering that the

types of investments could vary significantly among different OC or countries. This lack may be addressed and filled in the future using new and more complete data.

Table 15 Correlations between the single variables and the principal components obtained

Principal component analysis (Enablers dimension)			
Variable	Government efficiency / Population control	Territory wealth	Job opportunities
Population not completing first level of education	.529	-.692	-.292
Informal economy	.000	-.080	.883
Corruption and good government index	.446	.337	-.372
Quality and transparency index	.621	.541	.289
Election districts requiring special attention (SAE)	.568	.502	-.267
Unemployed youth population	.469	.027	.525
Unemployed population	-.667	.627	-.069

The graphs in Figure 9 report the values of each state considering its values for the three subdimensions. The scatterplots show that the Territory wealth subdimension presents a wider variability than the other ones. Indeed, the latter are characterized by a quite homogenous distribution among the mean value with few outliers (e.g. Baja California and Colima). Even in this case, states are likely to perform differently in the three subdimensions revealing the peculiarities of their local situations.

Figure 9 Mexican states according to their Enablers subdimensions values

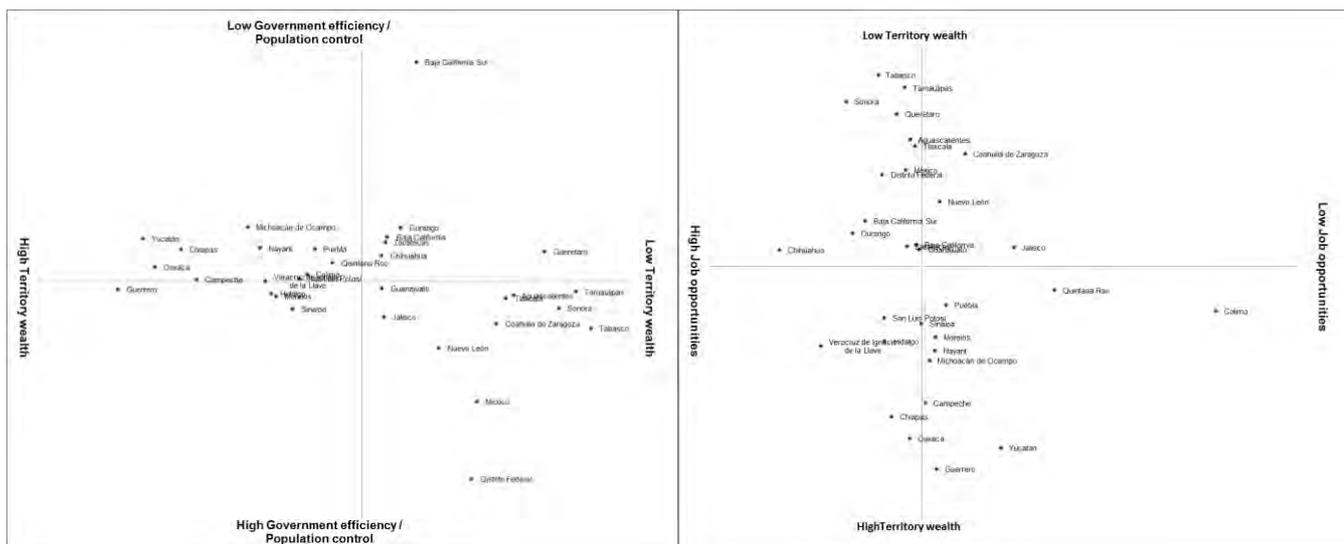
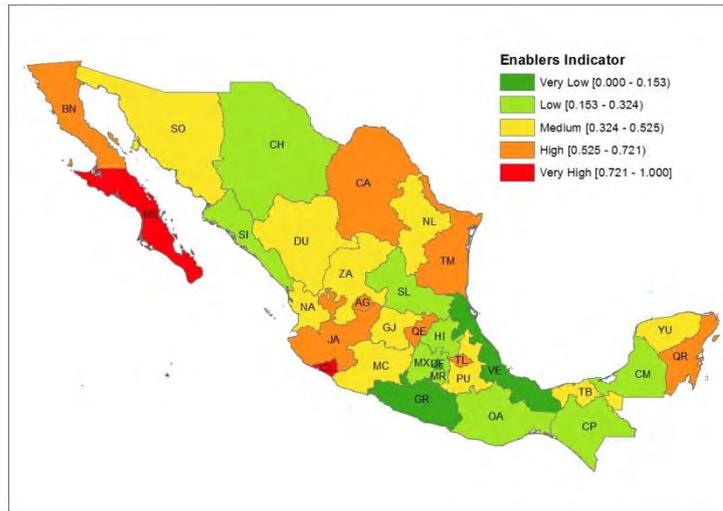


Figure 10 presents the composite indicator for the Enablers dimension obtained from the merging of the three subdimensions analyzed. Being an indirect measure of OC, since it does not evaluate the phenomenon per se but some contextual features that may enhance it, and considering that some

relevant information are probably missing due to data availability, the results must be interpreted cautiously.

Figure 10 Final composite indicator results for the Enablers dimension



However, it is interesting that some states recording high values in the previous dimensions present a problematic situation from the enablers point of view, whereas other states like Guerrero and Chihuahua, record unexpectedly very low values. This can be motivated by two causes: firstly, it is likely that some enablers have been omitted from the analysis or not properly explored due to scarce data availability. Secondly, the socio-economic characteristics considered could have an ambiguous relationship with the presence of OC groups. As an example, although poorer states are usually breeding grounds for OC groups, a wealthy territory can also be attractive for them fostering activities that are more lucrative.

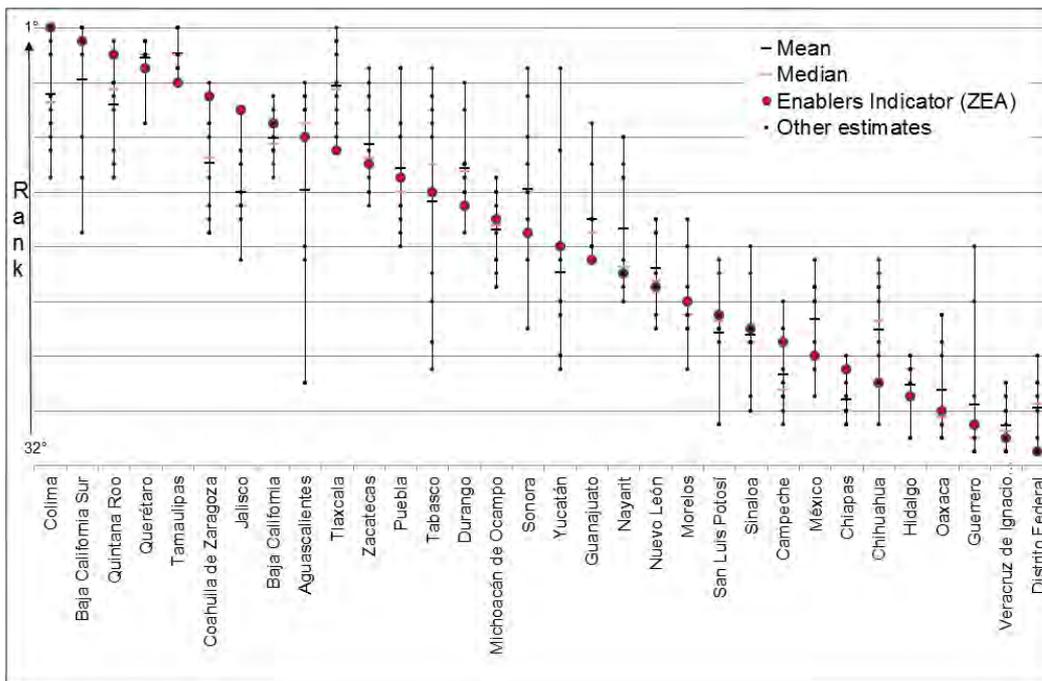
The sensitivity analysis conducted for this composite indicator does not produce encouraging results (Table 16). On average, the range between the maximum and minimum positions for each state considering all the possible alternative rankings is 11, a wide interval considering a total of 32 states. Moreover, this instability is not due to huge variations in a small number of cases (as happened for the first two composite indicators) but it characterized almost all the Mexican states (Figure 11). Therefore, the ranking obtained cannot be considered as totally consistent and it is likely not to provide a reliable picture of the real conditions.

Nevertheless, this does not mean that the tool itself is not useful. On the contrary, it highlights the need of more precise and accurate information for refining and improving the correctness and accuracy of this composite indicator.

Table 16 Sensitivity analysis: final ranking and alternatives ones

STATE	Rank ZEA	Other estimates										Median	Mean	Min	Max
		ZLA	MEA	MLA	IEA	ILA	REA	REG	RLA	RLG					
Colima	1	3	1	8	2	9	6	7	12	10	7	6	1	12	
Baja California Sur	2	1	2	1	1	1	12	16	3	9	2	5	1	16	
Quintana Roo	3	5	5	11	10	12	2	6	7	5	6	7	2	12	
Querétaro	4	2	3	2	3	2	8	3	3	2	3	3	2	8	
Tamaulipas	5	4	4	3	4	3	3	1	1	1	3	3	1	5	
Coahuila de Zaragoza	6	12	8	9	5	8	15	14	16	16	11	11	5	16	
Jalisco	7	15	10	14	13	14	14	11	18	14	14	13	7	18	
Baja California	8	7	12	10	11	10	9	10	8	6	10	9	6	12	
Aguascalientes	9	6	6	5	7	7	18	27	17	27	8	13	5	27	
Tlaxcala	10	8	9	7	6	5	1	2	2	3	6	5	1	10	
Zacatecas	11	10	13	12	14	13	7	5	6	4	11	10	4	14	
Puebla	12	14	14	17	15	16	4	4	9	8	13	11	4	17	
Tabasco	13	9	7	4	8	6	24	26	19	21	11	14	4	26	
Durango	14	11	16	13	12	11	11	13	5	7	12	11	5	16	
Michoacán de Ocampo	15	16	18	20	18	19	13	12	14	13	16	16	12	20	
Sonora	16	13	11	6	9	4	18	23	13	15	13	13	4	23	
Yucatán	17	21	21	25	25	26	4	18	10	22	21	19	4	26	
Guanajuato	18	17	17	15	17	17	15	8	15	11	16	15	8	18	
Nayarit	19	18	19	21	19	20	9	9	11	12	19	16	9	21	
Nuevo León	20	19	15	16	16	15	22	20	23	20	20	19	15	23	
Morelos	21	23	22	23	22	22	20	15	26	17	22	21	15	26	
San Luis Potosí	22	22	24	22	23	23	30	19	30	18	23	23	18	30	
Sinaloa	23	24	23	24	24	24	28	17	29	19	24	24	17	29	
Campeche	24	28	27	30	28	29	26	21	28	23	28	26	21	30	
México	25	26	20	18	20	21	20	24	21	28	21	22	18	28	
Chiapas	26	25	28	29	30	30	29	29	27	29	29	28	25	30	
Chihuahua	27	20	25	19	21	18	27	30	20	24	23	23	18	30	
Hidalgo	28	27	26	26	26	25	31	25	31	26	26	27	25	31	
Oaxaca	29	30	30	31	31	31	22	22	24	25	30	28	22	31	
Guerrero	30	31	32	32	32	32	17	28	21	31	31	29	17	32	
Veracruz de Ignacio de la Llave	31	29	31	27	29	28	32	32	32	30	31	30	27	32	
Distrito Federal	32	32	29	28	27	27	25	31	25	32	29	29	25	32	

Figure 11 Sensitivity analysis final results summarized



3.3.4 State response dimension

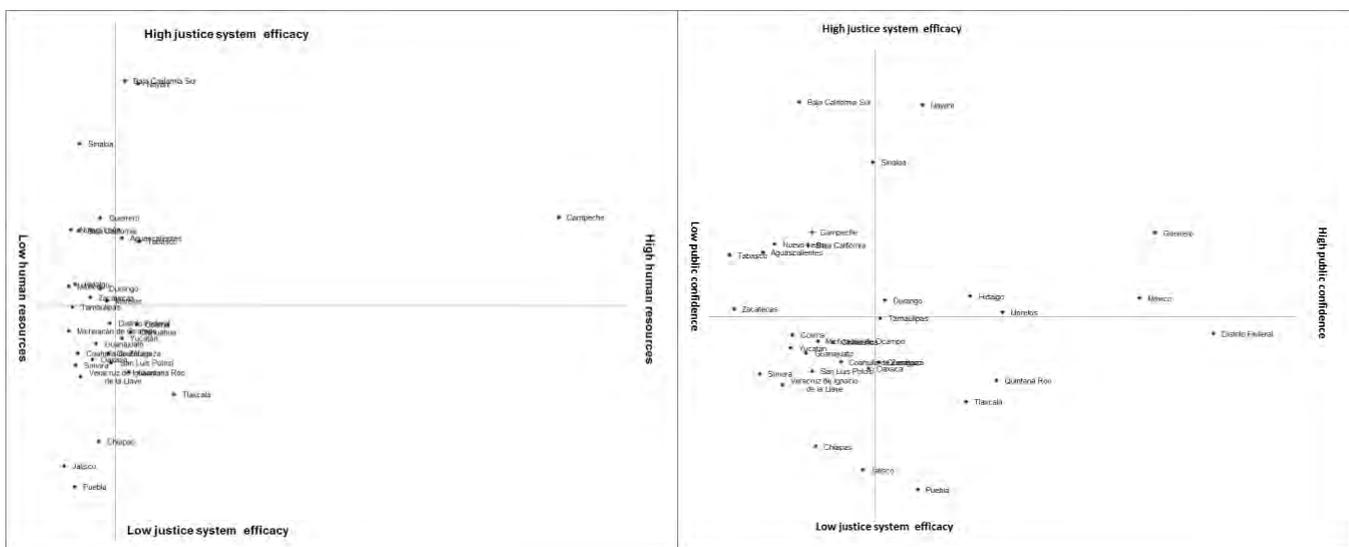
The fourth composite indicator still examines a contextual dimension of OC and is connected with the efficacy and efficiency of the State response to this threat: the higher the level and quality of the response, the lower should be the presence of OC groups. As shown in Table 8 six variables and three subdimensions have been identified. The first subdimension summarizes the human resources (e.g. police officers and specialized prosecutors) aimed at counteracting the phenomenon. The second one refers to the justice system efficacy, whereas the third one to the confidence and trust people has with the law enforcement agencies and the justice system (Table 17).

Table 17 Correlations between the single variables and the principal components obtained

Principal component analysis (State response dimension)			
Variable	Human resources	Justice system efficacy	Public confidence
Police officers addressed to law enforcement	.844	.198	.247
Courtrooms	.075	.587	-.539
Specialized anti-organized crime prosecutors	.730	.247	-.465
Public confidence in law enforcement and courts	.394	.224	.747
Justice quality index	-.313	.759	-.055
Judges fairness	-.364	.664	.386

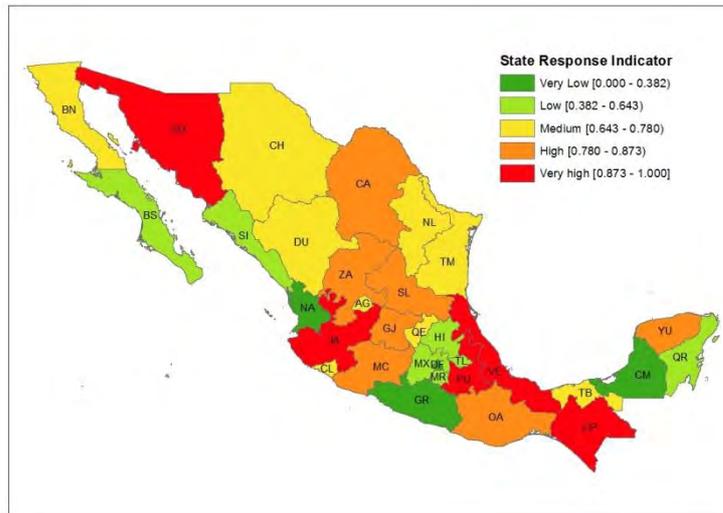
Regarding the different subdimensions it can be noticed from the scatterplots below (Figure 12) that the human resources indicator records similar values in most of the states with the only exception of Campeche which shows surprisingly higher values. The variability of the two other subdimensions presents less evident outliers, however some states emerge as particularly problematic (e.g. Puebla, Jalisco and Chiapas for the justice efficacy and Tabasco and Zacatecas for people’s confidence).

Figure 12 Mexican states according to their State response subdimensions values



The final composite indicator for the State response dimension highlights a potentially problematic situation in most of the Mexican states (Figure 13). The areas presenting positive conditions for this composite indicator are the states around the capital in the central part of the country, some states in the South-East and some on the West coast.

Figure 13 Final composite indicator results for the State response dimension



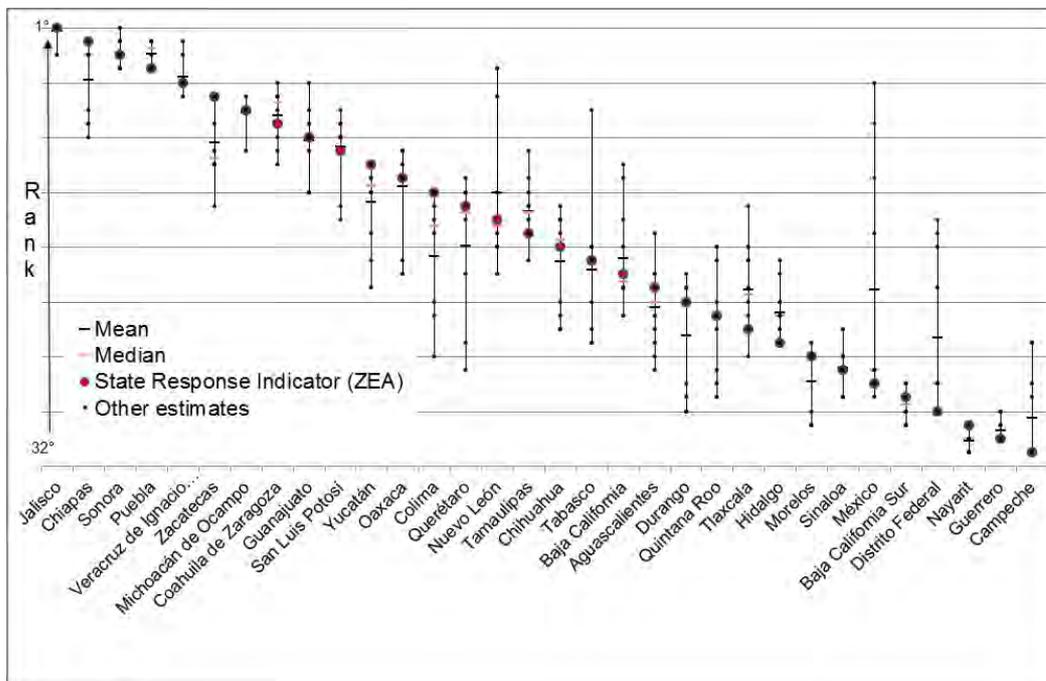
Again, it must be remembered that this composite indicator analyzes a contextual features that may be related to OC, therefore the picture taken expresses a risk of OC threat rather than the actual presence of existing criminal groups. However, this indications are not useless since the can be used for highlighting existing vulnerabilities and anticipating the rise of possible problematic situations in the future.

Table 18 shows the results of the sensitivity analysis. As for the Enablers dimension the variations among the states ranking position according to the methodology used are significant for some cases (e.g. México and Tabasco above the others). However, the composite indicators seem to perform well at least in identifying the higher and lower positions of the ranking. Even in this case, it is likely that new and more accurate information may lead to an improvement of the composite indicator performance. Figure 14 summarizes the results obtained and the range of estimates for each state.

Table 18 Sensitivity analysis: final ranking and alternatives ones

STATE	Rank	Other estimates										Median	Mean	Min	Max
	ZEA	ZLA	MEA	MLA	IEA	ILA	REA	REG	RLA	RLG					
Jalisco	1	1	1	1	1	1	3	1	1	1	1	1	1.2	1	3
Chiapas	2	3	2	3	3	3	7	9	8	8	3	4.8	2	9	
Sonora	3	4	3	4	4	4	1	2	2	3	3	3	1	4	
Puebla	4	2	4	2	2	2	4	3	4	2	2.5	2.9	2	4	
Veracruz de Ignacio de la Llave	5	5	5	5	5	5	2	5	3	6	5	4.6	2	6	
Zacatecas	6	11	6	11	8	11	11	6	14	10	10.5	9.4	6	14	
Michoacán de Ocampo	7	7	7	7	7	7	7	10	6	7	7	7.2	6	10	
Coahuila de Zaragoza	8	6	10	6	6	6	7	11	5	9	6.5	7.4	5	11	
Guanajuato	9	8	9	9	10	9	5	13	7	13	9	9.2	5	13	
San Luis Potosí	10	9	8	8	9	8	7	14	9	15	9	9.7	7	15	
Yucatán	11	12	11	12	11	13	13	18	16	20	12.5	13.7	11	20	
Oaxaca	12	10	12	10	12	10	12	19	11	18	12	12.6	10	19	
Colima	13	15	13	14	13	16	22	21	25	25	15.5	17.7	13	25	
Querétaro	14	13	15	13	14	12	19	26	19	24	14.5	16.9	12	26	
Nuevo León	15	17	16	19	17	19	6	4	13	4	15.5	13	4	19	
Tamaulipas	16	14	18	16	16	14	13	15	10	12	14.5	14.4	10	18	
Chihuahua	17	16	14	15	15	15	23	23	22	21	16.5	18.1	14	23	
Tabasco	18	24	17	21	18	23	18	7	24	17	18	18.7	7	24	
Baja California	19	20	20	22	20	22	15	12	17	11	19.5	17.8	11	22	
Aguascalientes	20	23	19	24	19	25	20	16	26	22	21	21.4	16	26	
Durango	21	19	21	20	21	20	29	29	27	28	21	23.5	19	29	
Quintana Roo	22	18	23	17	22	17	27	28	21	26	22	22.1	17	28	
Tlaxcala	23	21	22	18	23	18	25	17	20	14	20.5	20.1	14	25	
Hidalgo	24	22	24	23	24	21	21	22	18	19	22	21.8	18	24	
Morelos	25	25	25	25	25	24	30	30	29	30	25	26.8	24	30	
Sinaloa	26	28	26	28	26	28	25	25	23	23	26	25.8	23	28	
México	27	26	28	26	27	26	16	8	12	5	26	20.1	5	28	
Baja California Sur	28	30	27	29	28	30	27	27	30	29	28.5	28.5	27	30	
Distrito Federal	29	27	29	27	29	27	17	20	15	16	27	23.6	15	29	
Nayarit	30	31	30	31	31	31	32	32	32	32	31	31.2	30	32	
Guerrero	31	29	31	30	30	29	31	31	31	31	31	30.4	29	31	
Campeche	32	32	32	32	32	32	24	24	28	27	32	29.5	24	32	

Figure 14 Sensitivity analysis final results summarized



3.3.5 Civil society dimension

The last contextual dimension examined regards the civil society consciousness and response to OC threats. Unfortunately, no information about the activism of social or political movement organizations against this phenomenon as well as systematic data on the media coverage of this problem are available. Therefore, the variables used for the construction of this composite indicator comprise information about the social awareness and political participation of the people in each state and their level of fear of crime, assuming that more fear is associated with less capability of counteracting criminal behaviors or abuses (Table 19).

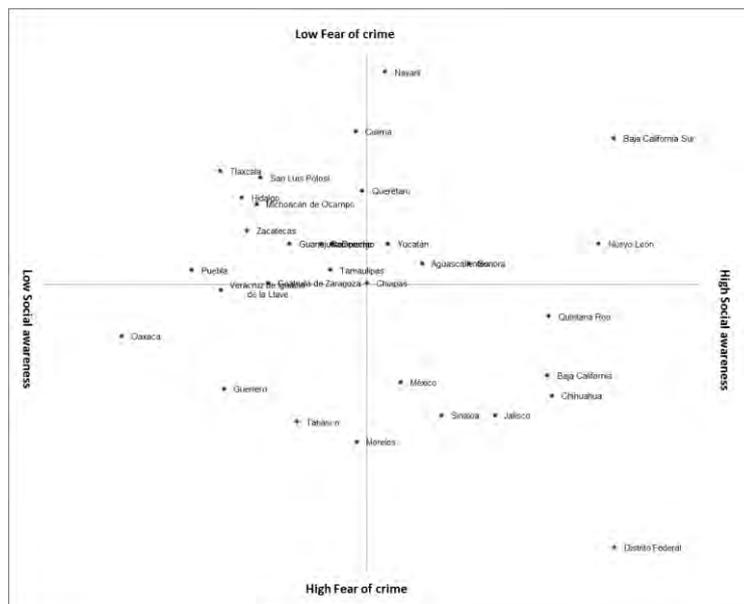
Table 19 Correlations between the single variables and the principal components obtained

Principal component analysis (Civil society dimension)		
Variable	Social awareness	Fear of crime
Perception of organized crime presence or threat	.762	.059
Participation in elections	.495	-.732
Population using the Internet	.828	.011
Perception of safety	.382	.808

As the scatterplot below shows clearly, the 32 Mexican states perform very unevenly in the two subdimensions considered (Figure 15). Some present concordant values (e.g. Baja California Sur) whereas others record inconsistent data. The main example is Distrito Federal that has the higher values for fear of crime and one of the highest levels of social awareness. However, this particular case can be explained considering the peculiarities of this district comprising one of the biggest metropolitan areas worldwide. Indeed, it is likely that the urban environment in this case boosts the high value for the fear of crime subdimension that is almost certainly connected mainly with volume crimes rather than OC influence.

This example highlights how the values of this subdimension could be polluted by several factors distorting the final results. Therefore, to have a more precise picture of the problem more precise data should be collected.

Figure 15 Mexican states according to their Civil society subdimensions values



The Civil Society composite indicator summarized in the map below (Figure 16) highlights that the more problematic situation are concentrated in the South-West areas of the country, although all the central states of Mexico present some criticalities regarding this dimension.

Figure 16 Final composite indicator results for the Civil Society dimension

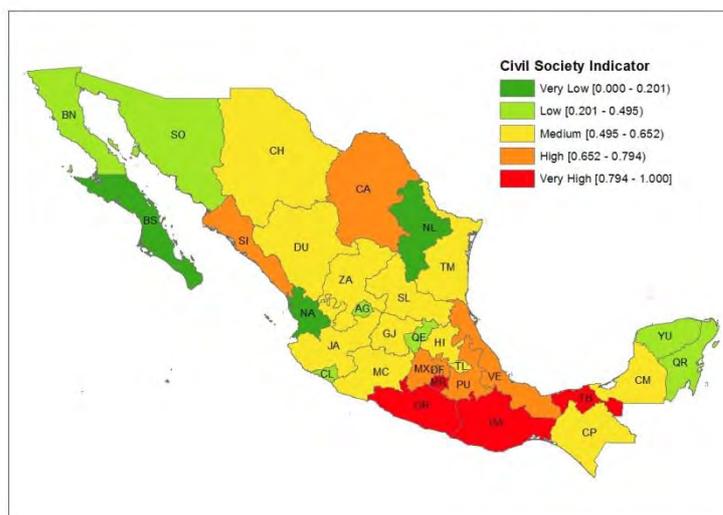
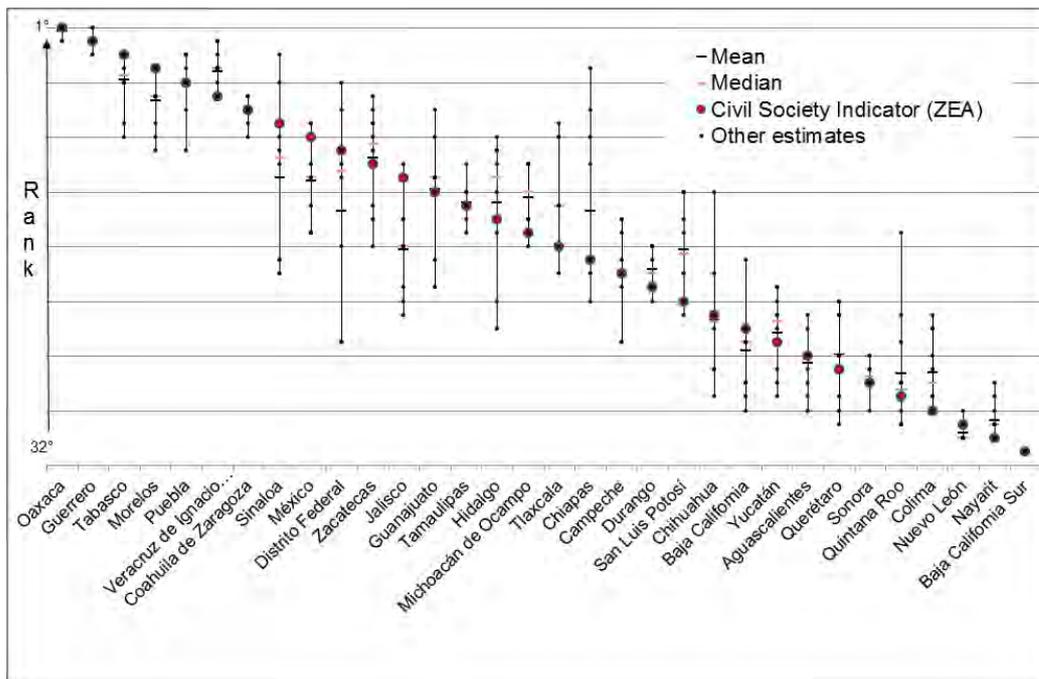


Table 20 and Figure 17 present the results of the sensitivity analysis conducted for this composite indicator by comparing alternative methodological choices. The analysis of the different rankings obtained reveals how the composite indicator seems to perform decently. Indeed, although some states record significant ranges in their position variation, the different methodologies tested provide comparable outcomes. The states recording the most inconsistent results are Chiapas, Sinaloa, Chihuahua and Distrito Federal.

Table 20 Sensitivity analysis: final ranking and alternatives ones

STATE	Rank ZEA	Other estimates									Median	Mean	Min	Max
		ZLA	MEA	MLA	IEA	ILA	REA	REG	RLA	RLG				
Oaxaca	1	1	1	1	1	1	2	1	2	1	1	1.2	1	2
Guerrero	2	2	2	2	2	2	1	3	1	3	2	2	1	3
Tabasco	3	4	3	5	3	5	3	8	5	9	4.5	4.8	3	9
Morelos	4	6	4	9	4	6	6	6	10	8	6	6.3	4	10
Puebla	5	3	5	3	5	3	5	10	4	7	5	5	3	10
Veracruz de Ignacio de la Llave	6	5	6	4	6	4	4	2	3	2	4	4.2	2	6
Coahuila de Zaragoza	7	7	7	6	7	7	7	9	8	6	7	7.1	6	9
Sinaloa	8	18	10	18	9	19	11	3	19	5	10.5	12	3	19
México	9	14	8	16	8	16	11	12	16	12	12	12.2	8	16
Distrito Federal	10	24	12	24	11	24	7	5	17	10	11.5	14.4	5	24
Zacatecas	11	8	9	7	10	8	14	17	6	15	9.5	10.5	6	17
Jalisco	12	20	17	22	15	22	15	11	21	17	17	17.2	11	22
Guanajuato	13	12	13	12	12	12	9	20	7	18	12	12.8	7	20
Tamaulipas	14	15	16	14	14	14	11	14	13	13	14	13.8	11	16
Hidalgo	15	10	11	10	13	10	16	23	9	21	12	13.8	9	23
Michoacán de Ocampo	16	11	15	11	16	11	17	15	11	11	13	13.4	11	17
Tlaxcala	17	9	14	8	17	9	19	19	14	14	14	14	8	19
Chiapas	18	19	21	19	18	18	9	7	11	4	18	14.4	4	21
Campeche	19	16	18	15	19	15	19	24	20	24	19	18.9	15	24
Durango	20	17	20	17	20	17	18	21	17	20	19	18.7	17	21
San Luis Potosí	21	13	19	13	21	13	19	22	15	16	17.5	17.2	13	22
Chihuahua	22	26	23	28	22	26	19	13	26	19	22.5	22.4	13	28
Baja California	23	28	24	29	24	27	23	18	27	23	24	24.6	18	29
Yucatán	24	21	22	20	23	20	26	27	22	28	22.5	23.3	20	28
Aguascalientes	25	23	27	26	28	29	25	25	22	25	25	25.5	22	29
Querétaro	26	22	25	21	25	21	28	30	22	29	25	24.9	21	30
Sonora	27	27	26	25	26	25	27	26	29	27	26.5	26.5	25	29
Quintana Roo	28	30	29	30	27	30	24	16	27	22	27.5	26.3	16	30
Colima	29	25	28	23	29	23	29	28	22	26	27	26.2	22	29
Nuevo León	30	31	31	31	31	31	30	29	31	31	31	30.6	29	31
Nayarit	31	29	30	27	30	28	31	31	30	30	30	29.7	27	31
Baja California Sur	32	32	32	32	32	32	32	32	32	32	32	32	32	32

Figure 17 Sensitivity analysis final results summarized



3.4 Conclusion and critical points

This chapter proposed a methodology for measuring the presence and threats of OC in a selected country by constructing a set of composite indicators aimed at revealing the extensiveness and relevance of each single direct and contextual dimension of the phenomenon. In particular, the benefits of this approach are four: firstly, it allows summarizing a high number of information. Secondly, it is a flexible methodology that can be adapted to the existing and available data and customized according to each country specificities. Thirdly, it gives a clear picture of the different aspects of OC focusing not only on the actual situations, but also on potential future harms. Finally, a composite indicator at subnational level is fundamental for better assessing the local situations and eventually orienting policies and interventions.

As an example, Table 21 reports the 32 Mexican states and their ranks in the five created composite indicators, in all the cases the higher the positions in the ranking the higher the risk connected to the corresponding dimension. Comparing the different performances of each state is useful for highlighting the local peculiarities of the phenomenon and the main weaknesses that should be addressed by law enforcement agencies and political authorities.

Table 21 Final ranking for all the five OC dimensions

State	DIMENSIONS				
	GROUPS	ACTIVITIES	ENABLERS	STATE RESPONSE	CIVIL SOCIETY
Aguascalientes	9	15	9	20	25
Baja California	12	3	8	19	23
Baja California Sur	8	4	2	28	32
Campeche	23	17	24	32	19
Chiapas	31	24	26	2	18
Chihuahua	2	2	27	17	22
Coahuila de Zaragoza	14	25	6	8	7
Colima	4	5	1	13	29
Distrito Federal	21	22	32	29	10
Durango	7	1	14	21	20
Guanajuato	28	30	18	9	13
Guerrero	1	19	30	31	2
Hidalgo	27	27	28	24	15
Jalisco	17	32	7	1	12
México	19	23	25	27	9
Michoacán de Ocampo	20	8	15	7	16
Morelos	13	13	21	25	4
Nayarit	3	16	19	30	31
Nuevo León	10	14	20	15	30
Oaxaca	25	21	29	12	1
Puebla	30	31	12	4	5
Querétaro	24	29	4	14	26
Quintana Roo	16	11	3	22	28
San Luis Potosí	26	18	22	10	21
Sinaloa	5	6	23	26	8
Sonora	22	10	16	3	27
Tabasco	6	12	13	18	3
Tamaulipas	11	9	5	16	14
Tlaxcala	32	20	10	23	17
Veracruz de Ignacio de la Llave	29	28	31	5	6
Yucatán	18	26	17	11	24
Zacatecas	15	7	11	6	11

Another interesting aspect is to compare how the different dimensions are related among them. Table 22 shows the correlation matrix of the five composite indicators obtained. Not surprisingly the only positive and significant relationship is the one between the two direct dimension of OC (Groups and Activities), whereas the other seems to perform independently. The only other significant correlations are the negative associations between Groups and State response dimension and the one between Civil society and Enablers. The first one can be explained considering that states with a higher evidence of the phenomenon have also a high level of State response (it must be remember that high values of the composite indicator reveal problematic situations). As regards the latter relationship, it is more difficult to find a coherent interpretation. However, it may be hypothesized that at some extent problematic socio-economic conditions could boost the awareness of the inhabitants making them more conscious and less vulnerable to the OC problems.

Table 22 Correlations between the five OC dimensions

	GROUPS	ACTIVITIES	ENABLERS	STATE RESPONSE	CIVIL SOCIETY
GROUPS	1				
ACTIVITIES	.552**	1			
ENABLERS	.172	.317	1		
STATE RESPONSE	-.340*	-.155	.214	1	
CIVIL SOCIETY	-.194	-.327	-.548**	.081	1

* $p \leq .05$; ** $p \leq .01$

Obviously, when interpreting the outcomes of these composite indicators an important remark must be kept in mind: all those results are largely connected and affected by the data quality and quantity. The large variations in the final ranking of some composite indicators recorded by applying alternative methodologies reveal how the consistent and reliable results are largely dependent to the type of existing information: the larger the number of precise variables available, the more precise, stable and sound the composite indicator obtained (Table 23).

Table 23 Average difference between the highest and the lowest ranking positions for each state

	Average difference H-L
GROUPS	6.2
ACTIVITIES	7.2
ENABLERS	11.0
STATE RESPONSE	8.3
CIVIL SOCIETY	8.2

Conclusion

This working paper was aimed at developing a methodology for assessing the characteristics of OC in Latin American countries starting from the available information and, eventually, orienting new strategies for counteracting or improving the knowledge about this phenomenon. As already stated in the introduction of this paper the main focus of this research is on the methodology and on the steps that each country should follow for obtaining reliable assessments of this complex crime.

The main added value of the proposed methodology is to overcome pictures of OC based only on a single indicator (e.g. homicides) and to summarize a set of different information in few composite indicators allowing an analysis of how those single factors correlate and a comparison with other dimensions of the phenomenon. This approach make a step forward in respect to the simple mapping of the single variables since the resulting scores and indicators provide a picture of the presence of OC far more complete and useful.

Moreover, although some of the emerging results may not look surprising or unexpected to the local experts on the field, applying a standardized and transferable methodology is fundamental for better monitoring the evolution of the phenomenon and for having a shared base for discussing and eventually implementing counteracting efforts at transnational levels. Of course, in defining these scores and indicators many challenges and potential pitfalls arise. Among the others, three main issues should be recalled: the first one regards the definition of OC and its dimensions, due to its complexity and high variety among different contexts. The second regards the characteristics and the amount of the available information: different data require different methodological approaches. The third is connected to the methods used for the measurement that should be as coherent as possible, in order to guarantee reliable and comparable results, and as flexible as possible, in order to be applied in different countries with different level of data quality and availability. This working paper tried to suggest some methods for overcoming these issues.

Regarding the first problem, the authors started from the existing literature on the topic for providing an extensive and detailed definition of OC. In particular, they suggest to analysis separately the different dimensions and subdimensions of this phenomenon in order to have a more precise overview of its features and peculiarities. Five dimensions have been identified, two direct (Groups and Activities) and three contextual (Enablers, State Response and Civil Society). These dimensions, their worth and a set of subdimensions and potential indicators for each one of them were previously discussed in a working paper by Savona, Dugato and Garofalo (2012).

Answering to the following two issues represents the main challenge of this research. The proposed solution is basically based on a multistep process. The first stage is the assessment of the data availability. Thus, the authors, in cooperation with the experts of the CoE, started from a preliminary exploration of the existing and available data in a batch of selected countries. Considering the obtained results, three categories of country has been identified: countries with very few or barely no information; countries with a significant number of information at national level, but mainly qualitative; and countries with many available and reliable data, both quantitative and qualitative, at national and local level.

In the first case, no reliable assessments can be produced. As already stressed in the author's previous paper (Savona, Dugato, & Garofalo, 2012) reliable data are the basis of any effective policies and actions that a country can produce against OC. Therefore, a country that is not able to produce enough information for calculating at least the national scores (Level I) should start

rethinking and improving its data collection. In this sense, the scoreboard and the proposed list of indicators should be used as a guide for defining a roadmap aimed at orienting and improving the collection of data and information about OC in those countries. Another suggestion could be to compare the national information with the ones collected by other countries in the region in order to develop a common collection methods that will enhance the comparability of the findings obtained.

Whereas, for the other situations where enough data are available, the authors proposed a two level approach to the measurement. The first level defines a set of scores at national level for each dimension and subdimension of the phenomenon. This level applies to all the countries with enough information (both qualitative and quantitative) at national level that could be assessed through a specific scoreboard defined by the authors. This methodology is easy to apply and can also provide an overview of the missing information. In the last category of countries the available data allow for defining the second level of analysis: creating a set of composite indicators measuring the different features of OC in all the administrative regions (e.g. state, region, province, county) considered. This approach allows having a more precise overview and helping policy makers or law enforcement agencies in quantifying the phenomenon and identifying its local specificities by comparing different areas of the country. Obviously, the higher the number of these local units of analysis, the greater the precision of the analysis and the robustness of the composite indicators. The methodology used for defining these composite indicators requires several steps and methodological choices that has been discussed in this working paper.

In conclusion, the authors are aware that the proposed ones are not the only possible solution, and that more refined and precise methodologies may be developed in the future. However, aside from the statistical and methodological aspects, one of the main goals of this research was to prove how treating the available data through a sound methodology could be fundamental for improving a systematic knowledge about OC and its features in a country, and how this could have a relevant utility for local policy makers and law enforcement agencies.

First, defining some measurements, although approximated, is important for moving the national and international debate on the topic from the perception of the phenomenon towards its quantification. Second, a systematic overview of the existing information could help each country in focusing the areas where to invest on or enhance the collection of updated and reliable data. Finally, the authors believe that the efforts for improving the quality and availability of the data and for defining better analyses are fundamental for orienting efficient counteracting measures or policies following an evidence-based approach (Sherman, 1998). This method has already proved its validity in counteracting common crimes, such as robbery or burglary, but could be applied successfully also in the fight against OC, even more so considering the complexity of this problem.

References

- Asmundo, A., & Lisciandra, M. (2008). The cost of protection racket in Sicily. *Global Crime*, 9(3), 221–240.
- Bourguignon, F. (2004). *The Poverty-growth-inequality triangle*. New Delhi, India: Indian Council for Research on International Economic Relations.
- Calderoni, F. (2011). Where is the mafia in Italy? Measuring the presence of the mafia across Italian provinces». *Global Crime*, 12(1), 41.
- Corbetta, P. (1992). *Metodi di analisi multivariata per le scienze sociali*. Bologna: Il Mulino.
- Dunteman, G. H. (1989). *Principal component analysis*. Newbury Park, CA: SAGE Publications.
- Europol . (2013). *Socta 2013. EU Serious and Organised Crime Threat Assessment*. The Hague, The Netherlands: Europol.
- Finckenauer, J. O. (2005). Problems of Definition: What Is Organized Crime? *Trends in Organized Crime*, 63-83.
- Goodman, C., & Marizco, M. (2010). U.S. Firearms Trafficking to Mexico: New Data and Insights Illuminate Key Trends and Challenges. *Working Paper Series on U.S.-Mexico Security Cooperation. Woodrow Wilson Center for International Scholars - Trans-Border Institute, University of San Diego*.
- Guerrero-Gutierrez, E. (2011). *Security, Drugs and Violence in Mexico: a Survey*. Washington DC: 7th North American Forum.
- Hagan, F. E. (2006). “Organized Crime” and “organized crime”: Indeterminate Problems of Definition. *Trends in Organized Crime*, 127-137.
- IEP. (2013). *Mexico Peace Index 2013*. México: Institute for Economics and Peace.
- Jolliffe, I. (2002). *Principal component analysis* (II ed.). New York: Springer-Verlag.
- Kaiser, H. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement*, 20, 141-151.
- Kenney, D., & Finckenauer, J. (1995). *Organized crime in America*. Belmont: Wadsworth Publishing Company.
- Levi, M. (2002). The organization of serious crime. In M. Maguire , R. Morgan, & R. Reiner (Eds.), *Oxford handbook of criminology*. Oxford: Oxford University Press.
- OECD. (2008). *Handbook on constructing composite indicators - methodology and user guide*. Paris: OECD.
- Rios, V. (2012). Why did Mexico become so violent? A self-reinforcing violent equilibrium caused by competition and enforcement. *Trends in Organized Crime*, 138-55.
- Savona, E. U., Dugato, M., & Garofalo, L. (2012). *A framework for the quantification of organized crime and assessment of availability and quality of relevant data in three selected countries of Latin America and the Caribbean*. Aguascalientes, Mexico: Presented at INEGI/UNODC

“First International Conference on Statistics of Government, Crime, Victimization and Justice”.

- Sherman, L. (1998). *Ideas in American Policing*. Washington, DC: Police Foundation. Retrieved from <http://www.policefoundation.org/sites/pfrest1.drupalgardens.com/files/Sherman%20%281998%29%20-%20Evidence-Based%20Policing.pdf>
- Transcrime. (2013). *Project NOP Security 2007-2013: Mafias Investments. Report Line 1*. Rome: Italian Ministry of Interior. Retrieved from <http://www.investmentioc.it/>
- UNODC & World Bank. (2007). *Crime, Violence, and Development: Trends, Costs, and Policy Options in the Caribbean*. Wien: United Nations Office on Drugs and Crime and the Latin America and the Caribbean Region of the World Bank.
- UNODC. (2007). *Crime and Development in Central America*. Wien: United Nations Office on Drugs and Crime.
- UNODC. (2010). *The globalization of crime. A transnational organized crime threat assessment*.
- UNODC. (2013). *World Drug Report 2012*. UNODC.
- UNTOC. (2004). *United Nations Convention against Transnational Organized Crime and the Protocols Thereto*. New York: United Nations-Office on Drugs and Crime.
- Van Dijk, J., Shaw, M., & Buscaglia, E. (2002). The TOC Convention and the Need for Comparative Research: Some Illustrations from the Work of the UN Centre for International Crime Prevention. In H.-J. Albrecht, & C. Fijnaut (Eds.), *The Containment of Transnational Organized Crime. Comments on the UN Convention of December 2000*. Freiburg: Max-Planck-Institut für ausländisches und internationales Strafrecht.
- Vilalta, C. (2013). How Did Things Get So Bad So Quickly? An Assessment of the Initial Conditions of the War Against Organized Crime in Mexico. *European Journal of Criminal Policy and Research*, 20(1), 137-161 .
- Vilalta, C. (2014). A preliminary analysis of the use of force by the Mexico City Metropolitan Area Police. *Global Crime*.
- von Lampe, K. (2004). Making the second step before the first: Assessing organized crime. The case of Germany. *Crime, Law and Social Change*, 42, 227-259.
- World Bank. (2008). *Poverty data - A supplement to World development indicators*. Washington, D.C.: World Bank.

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ANNEX 1

PRESENCE OF ORGANIZED CRIME ASSESSMENT - NATIONAL SCOREBOARDS

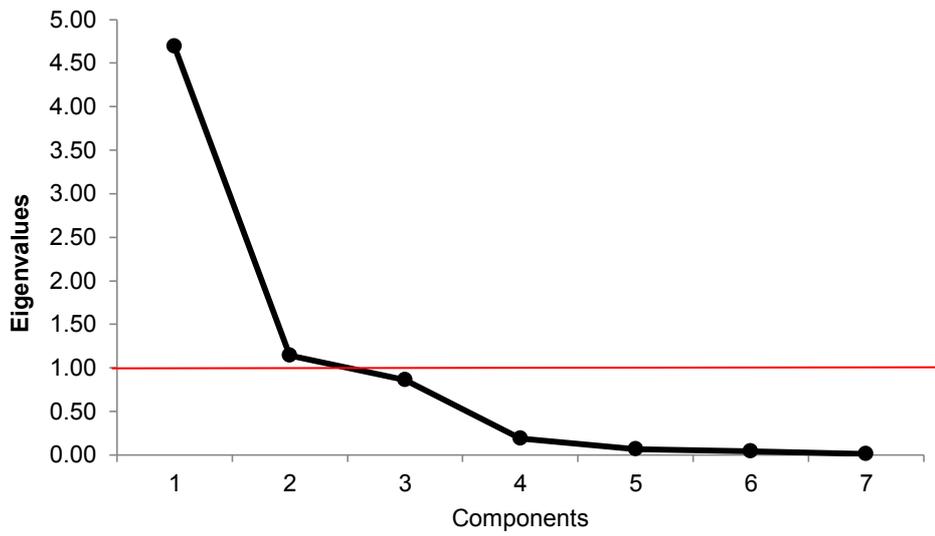
ID	INDICATORS	ANSWERS		
		CL	CO	MX
		COUNTRY:		
GROUPS DIMENSION				
1.1	Presence of organized crime groups active in the country	P	P	P
1.2	Presence of foreign organized crime groups active in the country	P	N/A	N/A
1.3	Presence of intentional homicides or attempted homicides related to organized crime	N/A	P	P
1.4	Presence of homicides related to organized crime targeting government personnel/representatives of institutions (e.g. politicians, policemen, judges)	N/A	P	P
1.5	Presence of homicides related to organized crime targeting members of civil society (e.g. journalists, bloggers, businessmen, citizens)	N/A	P	P
1.6	Presence of elected/state representatives or civil servants (e.g. politicians, policemen, judges) arrested/prosecuted/convicted for organized crime (or having facilitated organized crime)	N/A	N/A	P
1.7	Presence of members of the civil society or media representatives (e.g. journalists, bloggers, businessmen, citizens) arrested/prosecuted/convicted for organized crime (or having facilitated organized crime)	N/A	N/A	N/A
ACTIVITIES DIMENSION				
2.1	Presence of organized crime groups involved in drug trafficking	P	P	P
2.2	Presence of organized crime groups involved in drug production	P	P	P
2.3	Presence of organized crime groups involved in firearms trafficking	N/A	P	P
2.4	Presence of organized crime groups involved in human trafficking-related crimes	P	P	P
2.5	Presence of organized crime groups involved in smuggling of migrants related crimes	P	N/A	P
2.6	Presence of organized crime groups involved in money laundering related crimes	P	P	P
2.7	Presence of organized crime groups involved in extortion related crimes	N/A	P	P
2.8	Presence of organized crime groups involved in stolen vehicles related crimes	N/A	N/A	P
2.9	Presence of organized crime groups involved in kidnapping related crimes	P	P	P
2.10	Evidence of investment/interest in the legitimate economy (economic assets like companies or stocks / properties like real estate / liquid assets like bank account) by organized crime groups	N/A	N/A	P
ENABLERS DIMENSION				
3.1	Presence of a structural high unemployment rate (+10%)	A	P	A
3.2	Presence of a structural high young unemployment rate (+25%)	A	A	A
3.3	Low rank in the Political Stability and Absence of Violence World Bank Indicator (below world average)	A	P	P
3.4	Low rank Regulatory Quality World Bank Indicator (below world average)	A	A	A
3.5	Low rank in the Rule of Law World Bank Indicator (below world average)	A	P	P
3.6	Low rank in the Control of Corruption World Bank Indicator (below world average)	A	P	P
3.7	Low rank in the Government Effectiveness World Bank Indicator (below world average)	A	A	A
3.8	Presence of a high percentage of population living under the poverty threshold (more than 5% living with less than 1.25\$)	A	P	P
3.9	Presence of a high percentage of population not completing first-level education, e.g. primary school (more than 20%)	A	A	N/A
3.10	Presence of a high GINI coefficient on income (more than 0.40)	P	P	P
3.11	Presence of a large informal economy (estimates above 25% of the GDP)	P	P	P
3.12	High average duration of penal and civil processes (more than 7 years on average)	N/A	N/A	N/A
3.13	Low public confidence in courts, or other measures regarding population's trust/confidence toward the justice system (at least 20% does not trust)	P	N/A	P
3.14	Presence of corruption-related offences regarding high ranking officials and elected representatives (e.g. politicians, policemen, judges)	N/A	N/A	N/A
STATE RESPONSE DIMENSION				
4.1	Presence of people arrested/prosecuted/convicted for organized crime	P	P	P
4.2	Presence of police forces specifically addressed to fight organized crime	P	P	P
4.3	Presence of specialized anti-organized crime prosecutors	P	P	P
4.4	Presence of civil servants (e.g. policemen, judges) arrested/prosecuted/convicted for corruption	P	N/A	P
4.5	Presence of special legislation against organized crime	P	P	P
CIVIL SOCIETY DIMENSION				
5.1	Presence of media related article about organized crime	P	P	P
5.2	Presence of citizens associations against organized crime (pro victims, etc.)	P	P	P
5.3	Presence of informative campaigns against organized crime	P	P	P
5.4	Presence of studies about organized crime commissioned by the government	P	P	P
5.5	Presence of studies about organized crime commissioned by the other public or private authorities	P	P	P
5.6	Presence of independent/academic studies about organized crime	P	P	P
5.7	Presence of a low percentage of population having access to the Internet (under 50%)	A	P	P
5.8	High rank in the Voice and Accountability World Bank Indicator (above world average)	P	P	P

P: Present - A: Absent - N/A: Not available

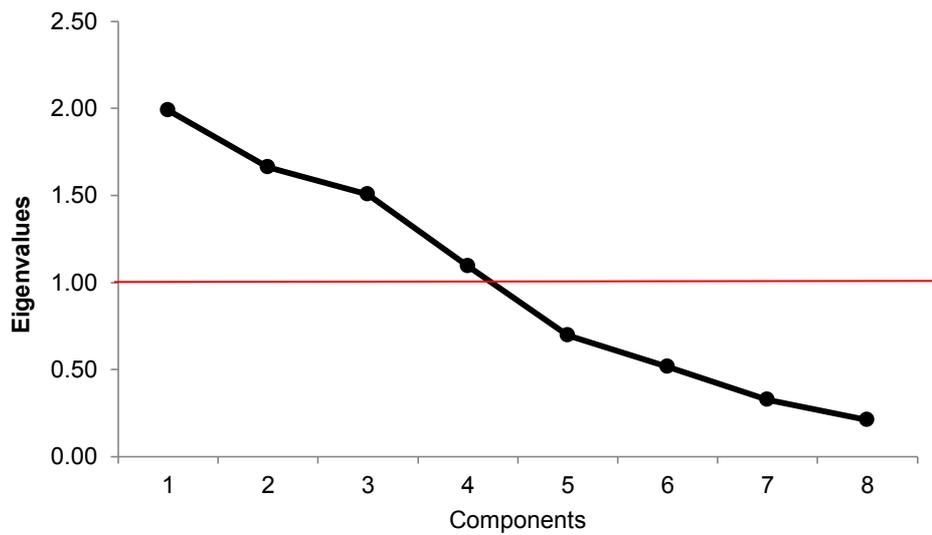
ANNEX 2

SCREE PLOTS for PCA

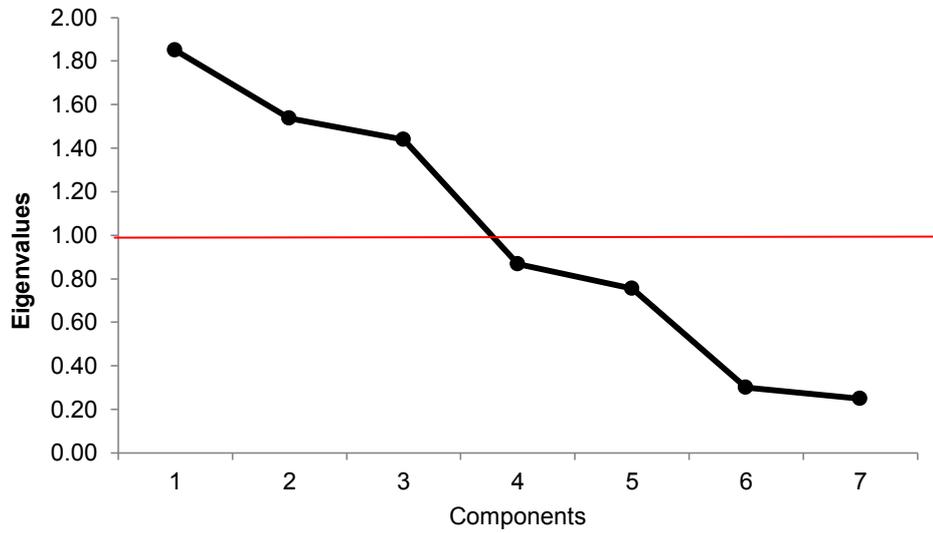
GROUPS DIMENSION



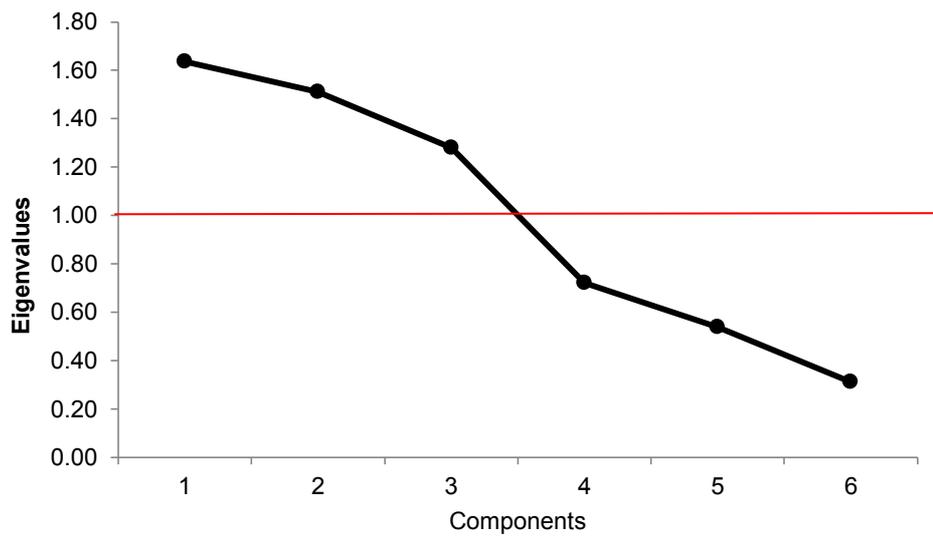
ACTIVITIES DIMENSION



ENABLERS DIMENSION



STATE RESPONSE DIMENSION



CIVIL SOCIETY DIMENSION

