

# Measuring OC in Latin America

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

By Marco Dugato<sup>1</sup>, Marco De Simoni and Ernesto U. Savona \*

\* Università Cattolica del Sacro Cuore – TRANSCRIME, Milan, Italy

1. Corresponding author. Email: [marco.dugato@unicatt.it](mailto:marco.dugato@unicatt.it)

**June 2014**

## Table of Contents

<b>Introduction .....</b>	<b>3</b>
<b>1.Origins of the working paper.....</b>	<b>4</b>
1.1 Aim of the Working Paper .....	4
1.2 Definition of OC.....	4
1.3 Methods and challenges in measuring OC .....	6
1.4 The methodology proposed: a two-level approach .....	8
<b>2. The national scores – Level I .....</b>	<b>9</b>
2.1 Methodology for defining and validating the scores .....	9
2.1 Critical assessment of the information composing the national scores .....	11
2.2 Results.....	15
2.3 Conclusion and critical points.....	18
<b>3. The composite indicators: the Mexican example – Level II .....</b>	<b>19</b>
3.1 Methodology for defining and validating the composite indicators .....	19
3.2 Data collection and availability .....	25
3.3 Results .....	26
3.4 Conclusion and critical points.....	43
<b>Conclusion .....</b>	<b>45</b>
<b>References.....</b>	<b>47</b>
<b>Authors .....</b>	<b>49</b>
<b>Acknowledgments .....</b>	<b>49</b>
<b>ANNEX 1 .....</b>	<b>53</b>
<b>ANNEX 2 .....</b>	<b>54</b>

## Introduction

The aim of this working paper is to develop and test a methodology for measuring Organized Crime (henceforth OC) in selected countries of the Latin American region. This study is one of the first systematic attempts to obtain reliable and comparable measurements of OC presence and threats in that region.

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

To achieve this aim and partially to overcome the problem of data availability, the authors propose a two-level methodology.

**LEVEL I:** a set of national scores will be produced for all the countries analyzed. The scores assess the presence or absence of a number of relevant phenomena and features, and aggregate them to obtain a first estimate of the OC presence. This first estimate serves as a general measure of the relevant dimensions of OC in the country and may indicate what is required to improve data collection and achieve better measurement of OC prevalence.

**LEVEL II:** a set of quantitative composite indicators will be implemented when the country has sufficient quantitative data at subnational level. These indicators will measure in more detail the extent, impact and significance of the main dimensions of OC.

These scores and composite indicators will be created by 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 may be transferable to other contexts.

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

In conclusion, it should be pointed out that the main aim and focus of this working paper is 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 countries analyzed should be seen as examples of how this methodology works and how the possible outcomes may appear. Clearly, this is a preliminary stage for defining effective countermeasures and policies, and it should be followed by, and combined with, other analyses on the specific situation of each country; analyses that fall outside the scope of this study. Therefore, this working paper does not aim to give specific advice or recommendations to countries, but rather to provide them with reliable and comparable starting points for discussing, constructing, evaluating and refocusing their efforts against OC.

## 1. Origins of the working paper

### 1.1 Aim of the Working Paper

The aim of this working paper is to develop and test a set of national scores and composite indicators for measuring OC in the Latin American countries. Overall, the main objectives of the paper are:

- **To measure and test OC in Latin America.** The aim is to produce a quantitative research paper focused on how to measure OC through evidence-based knowledge, the purpose being to provide an overall picture of the phenomenon of OC in Latin America through systematic analysis of its players, activities, and the social and governmental contexts in which it emerges.
- **To understand what data are present and what are missing in order to improve knowledge on OC.** Not all countries collect extensive and high quality data helpful in measuring OC. Therefore, a quantitative methodology is not always possible or meaningful. This paper may be an important first assessment showing what could be done to improve data collection and analysis in the future.
- **To facilitate comparison of OC measurements among 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 constitute a first attempt to measure five dimensions of OC presence and threats in the Latin America region, taking the regional specificities of the phenomenon into account. Better and reliable OC assessment tools are obviously important because they may lead to more efficient counteracting policies. For this reason, ensuring the consistency of the outcomes obtained is crucial. Hence a large part of this paper concerns the methodology used to create and validate the scores and composite indicators.

### 1.2 Definition of OC

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

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 formulated at country or regional level. However, this definition is too wide to guide specific policies or research activities. Hence a narrower definition comprising the various elements and regional specificities of the phenomenon is needed. This study employs the following definition of OC as a framework in which to develop 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 authors’ 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 the importance of identifying the components of 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 of the formal economy, political interference, as well as the social and economic conditions supporting the flourishing of illegal activities: these are the main characteristic of OC in this geographical area that should be explored (Savona, Dugato, & Garofalo, 2012).

OC is characterized by five broad dimensions which can be grouped into two categories: the ‘direct’ and the ‘contextual’ dimensions. The former describe the main characteristics of criminal groups and their main activities, whereas the latter focus on the background factors that may exacerbate 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. Analyzing the number, size and characteristics of these groups is essential to gain better understanding of 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 related not only to the presence of OC itself but also to the simultaneous presence of many groups with conflicting targets (IEP, 2013). Moreover, violence is often associated with particular situations such as drug trafficking, competition and enforcement operations (Rios, 2012). However, groups do not always rely 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 enable them to earn 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, notably Mexico (Vilalta, 2013). Nevertheless, OC groups have shown resilience and have expanded into other activities like firearms and human trafficking, kidnapping and other crimes. Moreover, OC groups tend to invest their earnings in the formal economy, and they consequently engage in more or less refined 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 concerns 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 magnitude of state response 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 specific legislation are important signals of the national commitment in this regard (IEP, 2013; Guerrero-Gutierrez, 2011).

- **Enablers**

According to the crime opportunity theory, the evolution of organized crime is strictly connected with the opportunities offered by a specific territory or a country in general (Albanese, 2000). A wide range of social, demographic, economic, and physical conditions in an area may facilitate the development of criminal organizations and their activities (Savona, Dugato, & Garofalo, 2012).

- **Civil society**

This dimension comprises the main actors able to raise awareness on OC issues, to provide information, and/or to support victims. Civil society plays a fundamental role in the fight against OC and in preventing crime in general by prompting reform of the criminal justice system and protecting 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

This section briefly reviews the main methodologies developed to measure OC. 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 simpler elements which are 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 the development of crime control policies, attempts to arrest members of OC groups, and efforts to impede their activities. This approach may be inadequate in fighting OC if it is not supported by other actions. Prevention is the key missing factor. Indeed, policy makers have recently started to devise preventive measures aimed at diminishing the opportunities that make OC strong and resilient (UNODC, 2010).

Bearing this framework in mind, two different methodologies may be employed to measure OC: the top-down one and the bottom-up one. The top-down methodology is adopted when the aim is to break down the overall complex phenomenon and gain a more specific and in-depth view by analyzing its sub-components. This methodology focuses on macro units of analysis, and it seeks to move from the general view to the smallest and most specific sub-components. The bottom-up methodology focuses on the smallest units of analysis or a few single cases. It is adopted when the aim is to reconstruct the general view of the problem and assess it. This methodology analyses micro data in order to evaluate 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 encounter many challenges. Overall, four main factors have to be considered: the purpose of the assessment; the selection and interpretation of the OC dimensions and subdimensions; the different contexts in which the problem emerges; and data availability.

First, selecting the tools or the methodologies to be used, as well as defining what characteristics of the phenomenon should be considered by the analysis, are strictly connected to the final purpose pursued. In this case, the general purpose is to provide an overview of the OC phenomenon in the region so as to orient policy interventions, enhance data collection, and foster research and studies on this topic. Consequently, the authors propose a flexible methodology adaptable to different aspects of the phenomenon and that can provide comparable and broad results.

Second, as mentioned above, quantifying and understanding OC is a very complex undertaking because it encompasses a number of dimensions that extend 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 information to individual cases or persons. Here the authors frame information on OC in five main dimensions or clusters: groups, activities, state response, enablers, and civil society. Moreover, the five dimensions/clusters can be further divided into different sub-dimensions concerning OC and its characteristics. The better these are known, the more precise the view of the phenomenon becomes, and the more its strengths or weaknesses can be described. These strengths and weaknesses should drive policies and actions to dismantle the phenomenon. This working paper will carefully treat the division of dimensions into sub-dimensions. According to data availability, it will catalogue the main aspects of each dimension in several key variables that can effectively summarize the sub-dimension under investigation. However, this categorization should not be seen as a division into rigid and separate clusters. Indeed, these dimensions are closely interrelated. For instance, criminal groups are likely to maintain relations with other actors: pursue a broad spectrum of activities either in the criminal market or in the legitimate economy; act according to the risk posed by law enforcement agencies; and consider the opportunities offered by contextual socio-economic factors and by the attention and the awareness of civil society. Within this framework, other factors, such as corruption, lack of governance, social inequality, can be identified, and they may specifically enter each dimension. For this reason, the authors split the phenomenon into five dimensions but suggest analyzing the results jointly in order to take specific inter-relations among dimensions into account. 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 it should be tailored to highlight the peculiarities of the areas under study or to enable 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 Latin America. On the other hand, it employs a standard and replicable methodology that may yield comparable results for all the countries in the region, with the sole constraint of the presence of sufficient available data.

In regard to this last consideration, the fourth and last issue to be considered concerns data quality and availability. Indeed, the characteristic of the information and data available determine the methodology employed. Data should be collected for each dimension, and they may be basic or advanced depending on their availability and on the countries' capacity to organize data collection on OC. More precise and direct information results in more reliable measurement procedures.

Furthermore, the availability of a large amount of information allows the use of advanced statistical methods to evaluate and validate the results obtained.

#### 1.4 The methodology proposed: a two-level approach

The analysis reported by this working paper started from a set of available data in order to measure each different dimension of OC: the groups involved, the illegal activities, the enablers that may facilitate or impede OC, and the state and civil society responses to the problem (Savona, Dugato, & Garofalo, 2012). In light of the findings, the authors derive some quantitative and qualitative measures of OC presence and threats, and highlight the existing gaps in information. In particular, in order to measure OC this paper proposes the definition of a set of national scores and composite indicators that may be produced according to the characteristics of the information available.

Composite indicators and scores are increasingly recognized as useful for the analysis of many social and criminal phenomena. For example, they have been already used to assess 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 they may reveal interesting trends and suggest political actions to reduce the problems studied (OECD, 2008).

Data availability, data quality and data coherence have been the main discriminants between the two approaches described by this paper. When a high percentage of the requisite dataset is present and when data are collected at subnational level (i.e. states, regions, provinces, municipalities, etc.), the computation of quantitative composite indicators is possible. Otherwise, more qualitative national scores, primarily aimed at identifying the lack of existing information and guiding enhancement of the data collection procedures, can be defined. National scores may seem simpler and less informative, but they are still useful. The two approaches are now briefly described:

**LEVEL I: The scores** 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. The methodology used for their definition allows their repetition and comparability among many countries. For each dimension of OC highlighted in the previous section, this working paper will develop a national score. National scores can be calculated even if data are of 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 ease of computation may allow an increase in the number of countries investigated in a relatively small amount of time.

**LEVEL II: The composite indicators** can be calculated only for those countries for which an extensive amount of data is available at subnational level. In these cases, a quantitative approach is possible. Developed for each dimension of OC was a composite indicator summarizing the data available and presenting a quantification of the single dimensions and subdimensions of the OC presence and threats. Construction of the composite indicators followed the guidelines suggested by the 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 was 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 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, for instance due to lack of measurement, it is not considered in the final computation of the score. Despite their simplicity, national scores are useful to gain a first picture of OC presence in the country, and to summarize the information available and missing. Furthermore, their ease of calculation 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 administered 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 small number of countries considered, a quantitative validation of the internal coherence of the selected variables was impossible. Therefore, the authors critically motivated and justified the choice of each variable. Nevertheless, if the computation of scores is carried out for other countries as well, a quantitative validation of the scores coherence will be possible in the future. It is for this reason that the computation of national scores may be seen as a first level in order to gain better understanding of the phenomenon and as a sort of check-list highlighting what information is still missing to orient the data collection procedures.

The methodology used to define the national scores comprised 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 countries, the authors drafted a scoreboard composed of 44 items. Those items referred to a single variable or information and they were selected in order to cover all the five dimensions of OC identified (the complete scoreboard is set out 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 was 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 is 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 in by local experts, given their comparative advantage in understanding what is present and what is not, and what 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 was present and 0 otherwise. The variable was checked as N/A if the information was not sufficient to assess its presence or its absence. These kinds of answers were not taken into account in the numerical conversion. However, the presence of insufficient information is highlighted in the presentation of the final results with a column called 'percentage of information available'. The presentation of the percentage of the information available serves two purposes. Firstly, it enables consideration of a given result according to the availability of information from which it derived. 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 clarified with a practical example when commenting on the scores for Chile, Colombia and Mexico (see subsection 2.2)

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

#### ***Phase 5. Subdimensions aggregation***

Each dimension was divided into two or more sub-dimensions formed of one or more variables. The aim of the sub-dimension was to identify a particular aspect of OC. As the list was filled in and the values were numerically converted, the authors took 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 result in misleading information if a single arithmetic mean is used. Therefore, all the numeric values of the items were transformed considering value 1 if the available information indicated a possible risk or the presence of OC, and value 0 otherwise. In this way all the scores can be interpreted by considering the risk to be higher, the higher the value of the score.

The sums obtained were then divided by the maximum possible scores achievable for each subdimension, and the results were multiplied by 10 in order to obtain a set of comparable indexes. All variables composing each subdimension were equally weighted (i.e. the authors did not value some variables more than others) because this qualitative phase did not allow 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 is enlarged (e.g. covering at least 20 or 30 countries) a different approach may be used.

#### ***Phase 6. Final aggregation***

Once each sub-dimension had received its score, the overall score of the dimension was the arithmetic mean of the scores of the sub-dimensions. However, if for some reason, not all the items forming the sub-dimensions were available, the remaining variables belonging to that sub-dimension defined the score of that sub-dimension. Likewise, if all the variables composing the sub-dimension were missing due to lack of information, the authors computed the arithmetic mean of the remaining sub-dimensions. This rule was 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 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 gain better understanding of the OC phenomenon.

**Figure 1 Procedure for constructing the national scores for each dimension**

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

### 2.1 Critical assessment of the information composing the national scores

This subsection summarizes the composition of the national scoreboards. It explains the choices made during the selection and identifies the items composing the scoreboards.

**Groups dimension:** this dimension identifies the general characteristics of OC groups, such as their presence and size. Moreover, especial focus is on the general methods used by OC groups to reach their goals. These methods can be divided into two main categories, depending on whether violence or corruption are used. Therefore, the variables of the group 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 *modi operandi* of these groups. The first one focuses on the violent methods that they may adopt. Homicides are the best indicator of violence because 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 OC groups' *modi operandi*: the infiltration of legal bodies

or entities through corruptive practices (Transcrime, 2013). These three sub-dimensions summarize three different aspects of the group dimension (Table 1).

**Table 1 Variables selected to construct the national score for the Groups dimension**

SUBDIMENSION	VARIABLE
<b>Presence</b>	Presence of organized crime groups active in the country
	Presence of foreign organized crime groups active in the country
<b>Modus operandi: violence</b>	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)
<b>Modus operandi: corruption</b>	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 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 maintenance of the organization. The choice of these activities followed two main criteria. Firstly, they should require a high level of organization and coordination among the actors involved and should also guarantee large profits. Secondly, they were 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 were the three main sub-dimensions composing the activities dimension. Illegal markets were chosen according to UNODC reports and academic literature on the topic. UNODC identifies the main markets exploited by OC in Latin America with especial focus on drug production and trafficking (UNODC, 2010; 2013). Other scholars have emphasized 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 extortion 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 assumed that the presence of evidence of money laundering and investments in valuable assets could synthetically summarize the efforts of OC in this direction (Transcrime, 2013) (Table 2).

**Table 2 Variables selected to construct the national score for the Activities dimension**

SUBDIMENSION	VARIABLE
<b>Illegal markets</b>	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

SUBDIMENSION	VARIABLE
<b>Other criminal activities</b>	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
<b>Investments in the legitimate economy</b>	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 accounts) 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 a 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 noted that the table below reports arbitrary thresholds for some of the variables considered. These thresholds define whether the condition of a particular country can be considered 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). But, due to lack of information, this solution was not . Therefore, the authors decided to use arbitrary thresholds. When possible, these were defined according to criteria known in the literature (e.g. the threshold for the poor population is derived from a standard definition used by the World Bank (2008) and that for the GINI coefficient is a common value widely accepted by researchers on economic inequality (Bourguignon, 2004). Otherwise, the authors adopted reasonable thresholds (e.g. for the World Bank indicators the average score of the index worldwide was 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 to construct the national score for the Enablers dimension**

SUBDIMENSION	VARIABLE
<b>Social and economic inequality</b>	Presence of a structural high unemployment rate
	Presence of a structural high young unemployment rate
	Presence of a high percentage of the population living below the poverty threshold (more than 5% living with less than 1.25\$ )
	Presence of a high percentage of the 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%)
<b>Government efficiency</b>	Low ranking on the Political Stability and Absence of Violence World Bank Indicator (below world average)
	Low ranking on the 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 ranking on the Control of Corruption World Bank Indicator (below world average)
	Low ranking on the Rule of Law World Bank Indicator (below world average)
	Low ranking on the Government Effectiveness World Bank Indicator (below world average)

SUBDIMENSION	VARIABLE
Justice system efficiency	High average duration of criminal and civil processes (more than 7 years on average)
	Low public confidence in courts, or other measures regarding the population's trust/confidence in the justice system (at least 20% does not trust)

**State response dimension:** this dimension concerns 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 in counteracting and preventing OC threats. The better its performance, the greater the risk imposed upon OC. Interpretation of this score can be difficult. A higher score should not be interpreted as being necessarily 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, by the presence of civil servants arrested for corruption. Since economic resources may be difficult to measure due to difficulties in attributing government expenditure, it is assumed that the presence of special entities fighting OC is an important indicator of the resources that a government devotes to counteracting the phenomenon. A possible future extension may regard the extent to which force is used by the police engaged in fighting OC (Vilalta, 2014). Moreover, it is important to determine whether some special tools, such as special legislation are active in the country (Table 4).

**Table 4 Variables selected to construct 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 fighting organized crime
	Presence of specialized anti-organized crime prosecutors
Specific legislation	Presence of special legislation against organized crime

**Civil society dimension:** this dimension takes account of the main actors able to raise awareness of 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 a society's openness and citizens' resources to express their opinions are taken into account. Overall, three main subdimensions compose this dimension. First, media articles, citizens associations and information campaigns represent public awareness of the presence of OC. The second subdimension comprises 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 to construct the national score for the Civil society dimension**

SUBDIMENSION	VARIABLE
Society awareness	Presence of media articles on organized crime
	Presence of citizens associations against organized crime (pro victims, etc.)
	Presence of information campaigns against organized crime



SUBDIMENSION	VARIABLE
<b>Scientific awareness</b>	Presence of studies on organized crime commissioned by the government
	Presence of studies on organized crime commissioned by other public or private authorities
	Presence of independent/academic studies on organized crime
<b>Voice of the society</b>	Presence of a low percentage of the population with access to the Internet (under 50%)
	High ranking on the Voice and Accountability World Bank Indicator (above world average)

## 2.2 Results

This subsection exemplifies the methodology described above by presenting the final scores for three countries in 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 used to define the scores for each country. The results of the data collection are summarized in ANNEX 1.

In interpreting these results, it should be borne in mind that the higher the value of the scores, the more problematic and potentially dangerous is the situation in the country.














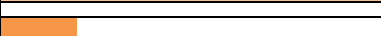


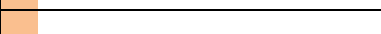
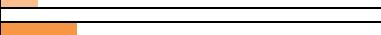
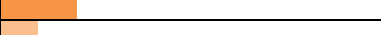
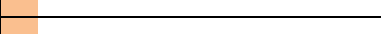

### 2.2.1 Mexico

Mexico is the country with the highest data availability among those considered. Indeed, 39 out of 44 indicators were 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 OC groups in the country. Both scores reached the highest value of 10. The Enabler dimension resulted in a quite high score (7.3) denoting some criticalities that may cause or exacerbate problematic situations. In particular, the efficiency of the justice system seems to be poor. Regarding the state's response, a specific threat emerged in relation to the effectiveness of the law enforcement agencies. In particular, this was 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 that emerges from these scores highlights a highly problematic situation regarding the active presence of OC groups in Mexico. The results obtained suggest the need to focus preventive policies on improving socio-economic conditions and the efficiency of the state. Indeed, the enablers dimension seems to be the most critical contextual dimension. These results also suggest designing specific measures to reduce corruption in law enforcement and improve the citizen's voice.

**Table 6 Final scores for Mexico**

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




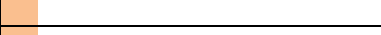
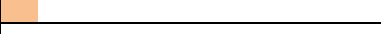






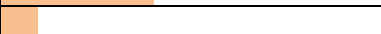

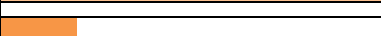


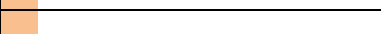
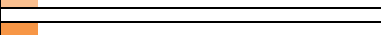
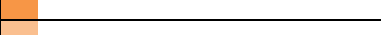
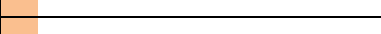
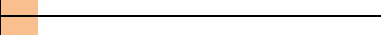
### 2.2.2 Chile

33 out of 44 indicators are available (75%) for Chile. Consideration of data availability shows that this country should foster data collection especially in regard to information on OC presence and activities. The Activities dimension scores were calculated using only 60% of the original indicators, whereas for the Groups dimension only 29% of the items were available. This lack of information may have affected the reliability of the results achieved. This situation, in comparison with the Mexican case, demonstrates the usefulness of reporting the percentage of the available information along with the scores obtained so that the results can be better interpreted. Indeed, on looking at the scores 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 requisite information was available, the Chilean one was calculated considering only about a half (60%) of the necessary data. Therefore, the Chilean results should be treated with caution because they are likely to change if more data are collected in the future.

Nevertheless, the other scores obtained show an encouraging situation for Chile. Although some OC groups are present and engage in several activities in the country, as denoted by the Groups and Activities dimensions scores, the information on the other dimensions highlights a set of social and administrative features able to counteract OC and its threats efficiently.

Apart from improving data collection, the main issues that the Chilean law enforcement agencies and policy-makers should address are low public confidence in the justice system and the presence of corrupt civil servants (i.e. police officers or judges) (Table 7).

**Table 7 Final scores for Chile**

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






















### 2.2.3 Colombia

In the case of Colombia 34 out of 44 indicators were available (about 77.3%). As already shown in the case of Chile, a certain lack of information emerged that may have distorted the values obtained for the five scores. Nevertheless, for almost all subdimensions at least one indicator was present, suggesting that the picture emerging from this analysis is substantially complete. The only subdimension without information available was the one related to corruptive behaviours of OC groups.

As for Mexico, the data reveal a significant presence and activity of OC groups in the country. In particular, considering the first two dimensions, 5 out of 6 subdimensions scored the highest value of 10, and the remaining one had a null value because of the lack of data. Regarding the Enablers dimension, the data show a rather problematic situation regarding socio-economic equality and government efficiency, whereas no useful information is available to assess the efficiency of the justice system. By contrast, the Colombian state's 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		
<b>GROUPS</b>				<b>6.7</b>	<b>57%</b>
Presence				10	50%
Modus operandi: violence				10	100%
Modus operandi: corruption				0	0%
<b>ACTIVITIES</b>				<b>10</b>	<b>70%</b>
Illegal markets				10	80%
Other criminal activities				10	67%
Investments in the legitimate economy				10	50%
<b>ENABLERS</b>				<b>4.2</b>	<b>79%</b>
Social and economic inequality				6.7	100%
Government efficiency				6	83%
Justice system efficiency				0	0%
<b>STATE RESPONSE</b>				<b>0</b>	<b>80%</b>
Effectiveness of law enforcement				0	50%
Resources devoted to counteracting OC				0	100%
Specific legislation				0	100%
<b>CIVIL SOCIETY</b>				<b>1.7</b>	<b>100%</b>
Society awareness				0	100%
Scientific awareness				0	100%
Citizen's voice				5	100%

### 2.3 Conclusion and critical points

The three above examples demonstrate how national scores can be an easy-to-use tools with which to provide a first assessment of the characteristics of the OC presence in a country. This method does not require extensive knowledge of statistical methods, and it does not require a huge amount of data. Moreover, the results obtained are directly comparable and useful to obtain a complete picture of the phenomenon in all the countries of Latin America. It should be borne in mind that the results can be considered a preliminary overview of the situation in each country that should be used to conduct more in-depth analysis of the main criticalities identified and suggest effective policies and interventions.

Obviously, the reliability of the results is largely affected by data availability. Indeed, the proposed method was created to produce a score independently of the number of items available for each subdimension. Nevertheless, the greater the completeness of the available data, the richer the information and the more consistent the final scores obtained. In this regard, as shown by the three examples, matching the final scores with the percentage of available indicators yields useful information on the areas in which the lack of information is more substantial and suggesting how data collection should be improved.

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

The national scores are useful for assessing the lack of information and for highlighting the presence of OC threats in a country. However, they can 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 the analysis seeks to overcome these limitations by creating a set of composite indicators at subregional level. As stated above, see subsection 1.4, composite indicators are powerful and valuable tools with which to describe and quantify complex phenomena.

Obviously, to reach this second level of analysis and construct the composite indicators, a country must 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.

This subsection describes a methodology with which to define a set of composite indicators measuring the different dimensions of OC in a country. Moreover, a practical example is provided on how the five composite indicators can be used to measure the OC presence and potential threats in the Mexican states.

The choice of Mexico is due two main criteria. The first is data availability: according to a preliminary exploration of the information available conducted in cooperation with the CoE, Mexico is one of the countries with a more precise and advanced system of data collection. Moreover, Mexico has a large number of subnational territorial units (32 federal entities)<sup>1</sup> ensuring the implementation of quantitative methods during the analysis. The second criterion is existing knowledge about OC in Mexico: several studies have already been conducted in that country to assess the characteristics of active OC groups. Therefore the results obtained in this study could be compared with those of other analyses to validate (or discuss) their soundness.

#### 3.1 Methodology for defining and validating the composite indicators

The purpose of a set of composite indicators is to summarize knowledge about the various 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 entails several methodological and theoretical choices. Different choices yield different final results and, possibly, different interpretations.

The methodology presented in this working paper follows the procedure proposed by the OECD (2008) and aims to fulfil 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.

---

<sup>1</sup> The Mexican federal entities comprise 31 states and 1 federal district. For simplicity, hereafter all these 32 entities are termed '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 dimensions of OC.
- **Statistical consistency:** the methodology chosen ensures that the selected variables composing the composite indicator are as statistically reliable as possible and fit the dimension that they have to measure.

The eight phases defining the methodology proposed are now briefly described. They are summarized in Figure 2. The following procedure was applied to construct 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"> <li>• Analysis of the existing national and international sources</li> </ul>
2 Data Treatment	<ul style="list-style-type: none"> <li>• Missing data imputation (regression imputation)</li> <li>• Calculation of the rates by 100,000 inhabitants (if needed)</li> </ul>
3 I° Validation: Internal Coherence	<ul style="list-style-type: none"> <li>• Principal component analysis</li> <li>• Selection of the relevant variables</li> <li>• Identification of the subdimensions</li> </ul>
4 Data Normalization	<ul style="list-style-type: none"> <li>• Standardization of the single indicators (z-scores)</li> </ul>
5 Subdimensions aggregation	<ul style="list-style-type: none"> <li>• Aggregation method: Arithmetic mean</li> <li>• Standardization of each subdimension indicator (z-scores)</li> </ul>
6 Weighting and final aggregation	<ul style="list-style-type: none"> <li>• Equal weights</li> <li>• Aggregation method : Arithmetic mean</li> </ul>
7 Ranking	<ul style="list-style-type: none"> <li>• Classification of the states according to their obtained values</li> </ul>
8 II° Validation: Sensitivity analysis	<ul style="list-style-type: none"> <li>• Comparing the obtained rank with the ones resulting from different normalization, aggregation and weighting methods</li> </ul>



### ***Phase 1. Data gathering***

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

Obviously, this assessment did not result in an ideal dataset. Therefore, in order to obtain an acceptable amount of information for each dimension and to construct the composite indicators, when possible, some proxy variables took the place of missing information. In the future, improvements in the data collection methods may enable a better definition of the original dataset and, consequently, greater precision of the resulting composite indicators.

A similar exploration of the available data was also carried out for other Latin American countries. However, the results obtained did not allow implementation of a sound and complete methodology in other contexts.

### ***Phase 2. Data treatment***

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

The first step involves imputation of the missing values. Indeed, four variables included in the dataset lacked some information (i.e. their value was unknown for some of the Mexican states). Others variables presenting a higher value of missing data were excluded from the analysis. In order to keep these variables in the analysis, a missing data imputation procedure was implemented. There are several possible ways to treat missing data. In this analysis, considering that the variables with missing information were logically associated with other variables in the dataset, a regression imputation was used. In particular, the missing values ( $y_i$ ) were substituted by the predicted values ( $\hat{y}_i$ ) obtained from a linear regression model where the dependent variable ( $Y$ ) was the variable hosting the missing information and the regressor ( $X$ ) was the variable considered most logically connected with the dependent.

$$\hat{y}_i = \alpha + \beta x_i$$

In particular, in the Mexican case presented in the next subsections, missing data regarding the number of active members of OC groups were imputed by considering as regressor the number of OC groups recorded in the state. Data on kidnapping were used to calculate missing information on extortion and human trafficking offences. Consequently data on extortion were used to fill the gaps of the kidnapping variables.

The authors suggest using a regression model to estimate the missing data because it appears to be the most reliable way to guess missing values. However, the regression results can be considered as consistent if the model meets some specific assumptions. Therefore, if the available information does not allow use of 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 to deal with missing data are:

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

- Use the average value of the cases (i.e. regions) that share at least one border with the missing one;
- Use the value of the case most similar to the missing one according to some socio-economic, demographic, criminal or physical characteristics;

The second step of the data treatment phase involves transformation of the raw data expressed in absolute value into a rate per 100,000 inhabitants. This transformation is necessary in order to enable more reasonable comparison of the prevalence of each phenomenon in the states regardless of their different sizes 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 (1° Validation)***

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

The tool used for this part of the process is Principal Component Analysis (henceforth PCA). Put 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 would fall outside the scope of this working paper.<sup>2</sup> For the purposes of this study, it can be stressed that identification of the relevant principal components<sup>3</sup> was useful for analyzing the correlations structure between the variables considered, and for detecting the subgroups of variables that are statistically related. In particular, these subgroups can be likened to the different subdimensions making up the composite indicators.

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

Moreover, the subgroups of the remaining variables represented the basis for the aggregation process. The aim was 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 caution is necessary. As in many other statistical techniques, violation of the statistical assumptions on which PCA relies may cause problems in the reliability of the results. However, in this case the use of PCA is not addressed to use of the resulting principal components (i.e. the aggregation method follows a different path, as described in the paper); nor is the aim to generalize the results obtained to other samples. On the contrary, the reason for using PCA here is merely 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 strict requirements and can be overlooked (Jolliffe, 2002). In the specific analysis described here, the only assumption that may have been problematic concerned the absence of extreme outliers in

---

<sup>2</sup> For more information see Dunteman (1989) or Jolliffe (2002).

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

the variables distributions. Nevertheless, almost all the outliers detected could be considered random (i.e. the authors considered a case as a non-random outlier if it presented abnormal values<sup>4</sup> in several variables). Therefore, the authors decided to avoid further modification of the variables so as not to lose information or increase the complexity of the analysis. In any case, according to the data available in each case, countries may decide to apply some data modifications or to skip this step and rely 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. It serves to overcome the problems connected with the differing nature of the original variables (e.g. different measurement units, variances, ranges, etc.). There are several methods with which to normalize 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 from 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 outcomes 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 the single variables have been normalized, they can be aggregated into composite indicators. However, given 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 necessary before the final aggregation. In particular, the single variables are aggregated together according to the subgroups emerging from the PCA results. This stage results in a set of composite indicators for each subdimension of the dimension considered.

As regards normalization, the aggregation process requires a methodological choice to be made on the best procedure to use. In this study, the authors used an arithmetic mean of the values of the single normalized variables for each state. Again, different choices lead to different results 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 to form the final composite indicator. For internal methodological coherence, the aggregation procedure is the same as adopted in Phase 5. The values obtained measure 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 are weighted equally, assuming that all of them contribute in the same way to definition of the dimension considered. However, it is possible to weight the subdimension's composite indicators

---

<sup>4</sup> 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.

in a different way. The different weights can be the results of mathematical procedures, as well as of theoretical reasoning. The 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 were 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 checks 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 by assessing how they are associated with the subjective judgments made in different phases of the methodology proposed (OECD, 2008). In particular, among the main steps are normalization of the data (Phase 4), the aggregation procedure (Phase 5 and Phase 6), and the weighting criteria of the different subdimensions (Phase 6).<sup>5</sup>

In order to raise awareness on the influence of the methodological choices taken, the final results for each state were compared with the ones obtained applying alternative procedures. The outcomes are a range of possible values expressing how the composite indicator is robust in analyzing a particular dimension in each of the states considered. This phase represents, on the one hand a validation procedure of the reliability of the composite indicators and, on the other hand, a method to orient future analysis by selecting the methodology that best fits the data and the required results, and by evaluating how improvement in the data quality and availability influence the robustness of the measurements. Table 9 describes the methodological choices taken and the alternatives considered.<sup>6</sup>

**Table 9 Phases involving methodological choices and possible alternatives**

<b>Phase</b>	<b>Method (in grey the one selected - in white the alternatives)</b>	<b>Code</b>
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

<sup>5</sup> 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 former 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 influences only 2 of the 5 composite indicators created.

<sup>6</sup> 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 to construct 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 to construct the composite indicators in Mexico**

Indicator	Variable	Sources	Year
<b>Groups dimension</b>			
Criminal groups active in the country	Cartel Presence per State (as of August 2011)	Guerrero-Gutiérrez (2011)	2011
Active members of criminal groups	Number of inmates for offenses related to organized crime (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 a 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 members of the civil society	Number of journalists killed	INEGI	2011
<b>Activities dimension</b>			
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	Produccion	Secretariado Ejecutivo	2012
Drug transportation	Transporte	Secretariado Ejecutivo	2012
Drug trafficking	Trafico	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
<b>Enablers dimension</b>			
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
<b>State response dimension</b>			
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
<b>Civil society dimension</b>			
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 subsections present the results obtained from the analysis of the Mexican data. In particular, one subsection for each dimension briefly discusses the final outputs. Before the results are set out, two considerations are needed. First, 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 in the enhanced precision and strength of the composite indicators. Second, the Mexican pilot should be considered 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, which 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 the presence of intentional homicides that can be directly or indirectly related to OC presence and denote a violent attitude of the criminal groups. The second subdimension is the number 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.<sup>7</sup>

<sup>7</sup> ANNEX 2 reports the scree plots calculated for this and the following dimensions.

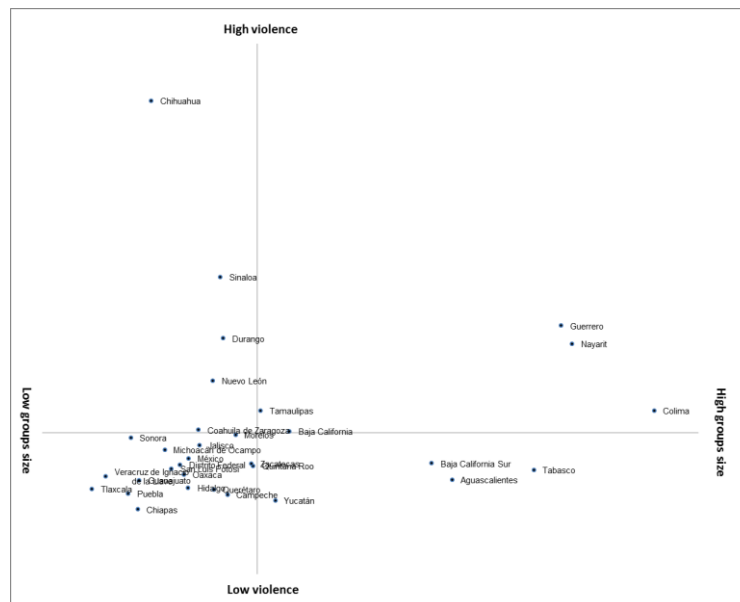


**Table 11 Correlations between the single variables and the principal components obtained**

Principal components analysis (Groups dimension)		
Variable	Violence	Groups size
Criminal groups active in the country	.242	<b>.675</b>
Active members of criminal groups	.056	<b>.799</b>
Intentional homicides	<b>.987</b>	-.070
Intentional homicides related to organized crime	<b>.960</b>	-.167
Intentional homicides committed with a firearm	<b>.986</b>	-.062
Intentional homicides targeting government personnel/representatives of institutions (e.g. politicians, policemen, judges)	<b>.924</b>	.095
Intentional homicides targeting members of the civil society (e.g. journalists)	<b>.955</b>	-.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 closely connected with the nature and characteristics of the various OC groups. For example, some states may present a relatively high level of violence perpetrated by few or small criminal groups, while others may denote a larger but more nonaggressive presence. This difference should also reflect different approaches in counteracting strategies by the national or local authorities. Indeed, a high level of group's size associated with a low level of violence may suggest a stable situation that should be addressed by focusing more efforts on OC activities. By contrast, when a high level of violence is present, specific interventions directly aimed at disrupting the criminal organization with military means 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).

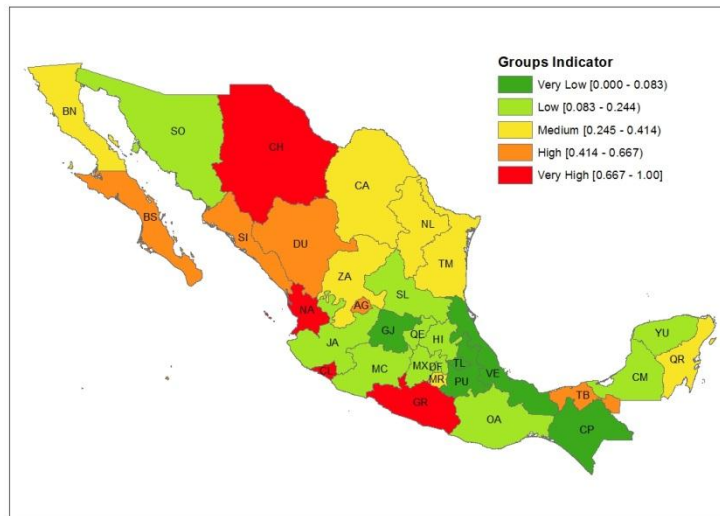
**Figure 3 Mexican states according to their Groups subdimensions values**



Despite 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 above. To enhance

the readability of the map, the values have been normalized using a Min-Max transformation<sup>8</sup> and they have been categorized into five classes using the Jenks Natural Breaks algorithm.<sup>9</sup>

**Figure 4 Final composite indicator results for the Groups dimension**



The map shows that Guerrero, Chihuahua, Navarrit and Colima are the Mexican states with the highest 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 correct interpretation of the composite indicator, two aspects should be stressed: firstly, when rates by inhabitants are used, the results obtained should be read as measuring relative and not absolute risk (e.g. two OC groups in a smaller state could be considered a greater threat than five groups of the same size in a bigger one). Secondly, these values are defined by considering the subdimensions jointly. Therefore, although some states are similar in their final scores, they may have very different situations. Colima and Chihuahua provide a clear example: the former has a high value for the Groups Size subdimension, whereas the latter is far more characterized by the Violence subdimension.

The following table reports the ranking obtained by means of the methodology proposed (ZEA) and compares it with those resulting from application of alternative methods (see subsection 3.1) (Table 12).

<sup>8</sup> This transformation assigns value 1 to the higher value of the distribution and 0 to the lower one, rescaling all the others accordingly. This procedure has been applied to draw each following composite indicator map.

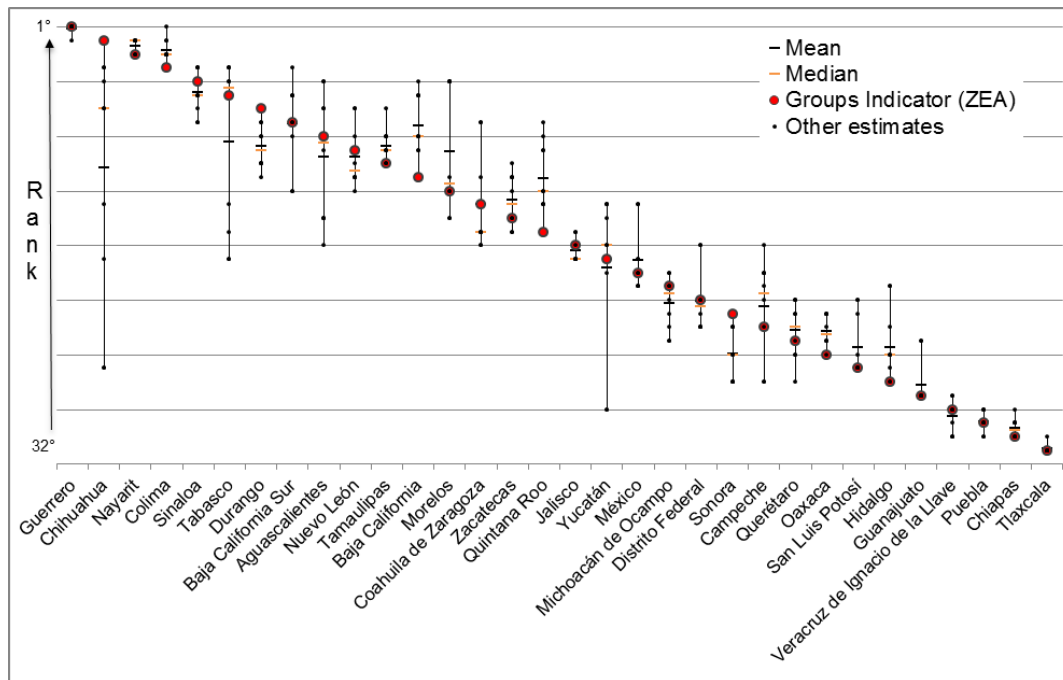
<sup>9</sup> The Natural Breaks method optimized by the Jenks algorithm has the merit of emphasising points of discontinuity in the distribution of a variable, minimizing the variance within each single class and maximizing the one between different classes.

**Table 12 Sensitivity analysis: final ranking and alternative 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	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	28	24	28	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 across the different methodologies. The main exceptions are Chihuahua, Yucatan and Tabasco, which present the largest ranges between the highest and the lowest rank calculated. Not surprisingly, both these states record contrasting values in the two subdimensions composing the final indicator. It is therefore 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) may 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

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

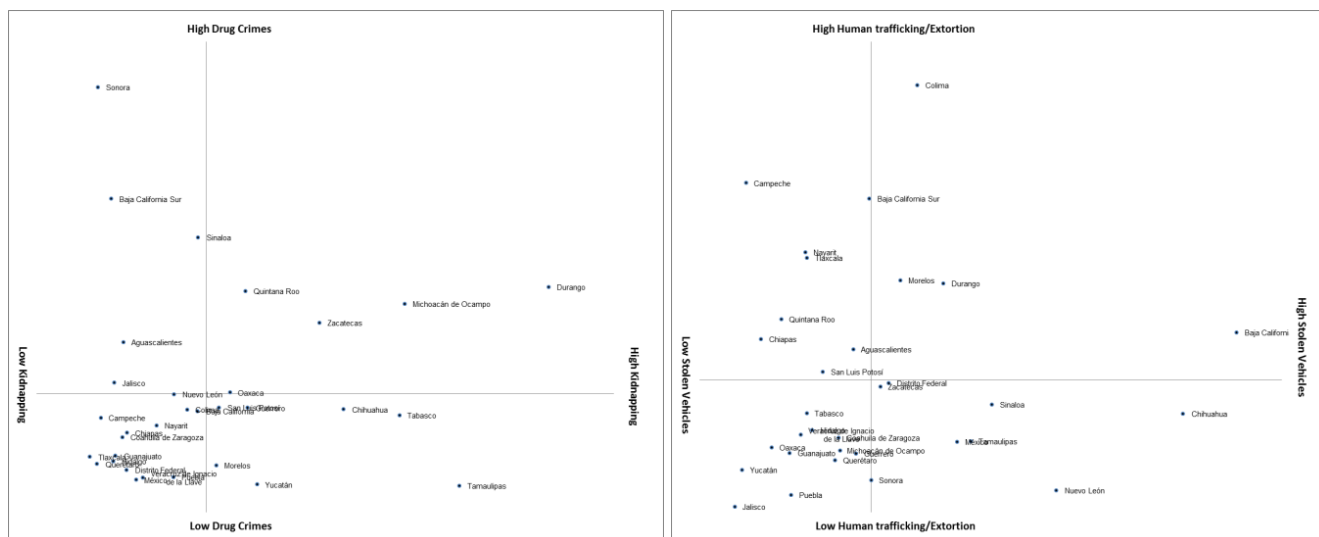
The first subdimension concerns all crimes related to drug production and trafficking, a core business of many OC groups in the region (UNODC, 2013). The second and third subdimensions relate to kidnapping, human trafficking and extortion, further typical OC activities (Europol, 2013; Asmundo & Lisciandra, 2008; UNODC, 2007; UNODC & World Bank, 2007). The fact that the data show a high correlation between human trafficking and extortion suggests that those activities, although different, are likely to be conducted in Mexico by the same OC groups. The fourth subdimension relates to the number of stolen vehicles, which may be resold or used for 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	<b>.845</b>	.210
Kidnapping	.167	<b>.802</b>	.160	-.366
Stolen vehicles	.257	.584	.075	.528
Drug production	<b>.669</b>	-.015	-.506	.082
Drug transportation	<b>.705</b>	-.463	-.239	-.045
Drug trafficking	<b>.547</b>	.110	.182	-.725
Drug selling	<b>.680</b>	.205	-.133	.311
Human trafficking related crimes	.300	-.626	<b>.629</b>	.072

Once again, the Mexican states present a wide variety of situations regarding criminal activities related to OC. Some states record high or low values on almost all the subdimension indicators (e.g. Durango or Puebla), whereas others show some peculiarities (e.g. Sonora in regard to drug crimes). The graphs below summarize the situations of the Mexican states in relation to the four Activities subdimensions (Figure 6). These results suggest that counteracting policies should be customized according to the main problems of each state. Moreover, since most of these activities involve illicit flows of goods or people, analyzing the states highly affected by a specific criminal phenomenon could help in reconstructing 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 is evident that the states in the North-West of the country are those where the criminal activities of OC groups are most relevant. This is likely to be due on the one hand to the significant presence of OC groups (as shown by the first composite indicator, see subsection 3.3.1) and, on the other, to closeness to the US border, which may enhance the criminal opportunities connected with the trafficking of goods and/or human beings.

Figure 7 Final composite indicator results for the Activities dimension

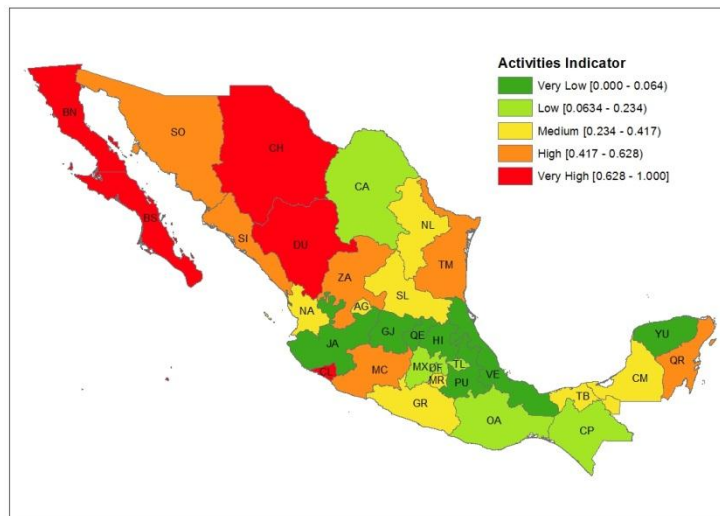


Table 14 and Figure 8 summarize the results of the sensitivity analysis conducted in order to analyze the influence of the methodological choices taken on the outcomes of the composite indicator. On comparing the different rankings obtained, the composite indicator for the Activities dimension seems slightly less stable than that for the Groups.

Table 14 Sensitivity analysis: final ranking and alternatives ones

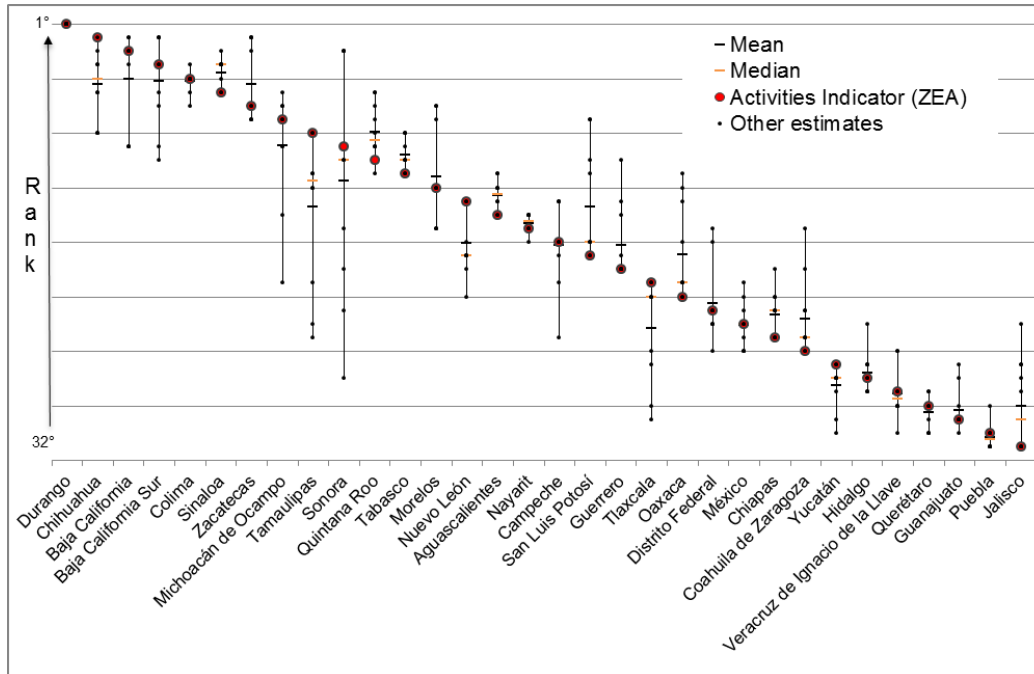
STATE	Rank ZEA	Other estimates									Median	Mean	Min	Max
		ZLA	MEA	MLA	IEA	ILA	REA	REG	RLA	RLG				
Durango	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Chihuahua	2	9	2	9	3	9	4	6	4	6	5	5.4	2	9
Baja California	3	10	3	10	2	10	3	2	4	3	3	5	2	10
Baja California Sur	4	2	4	2	4	2	7	10	6	11	4	5.2	2	11
Colima	5	5	5	5	5	5	6	5	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	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 marked 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 dimensions, 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, difficulties arise when an interpretation of the connections between these factors and the OC is required. Moreover, this dimension covers a huge range of different aspects and features of a country that cannot easily be summarized.

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

On considering these results, it should be borne in mind that there may be other subdimensions equally relevant to understanding the criminal opportunities in a country. However, the available data do not allow their proper exploration. For example, the authors tried to retrieve reliable information and data on 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 to avoid including possible distortions and creating problems in the transferability of the method, considering that the types of investments may

vary significantly among different OC groups or countries. This shortcoming may be remedied in the future by 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 on the three subdimensions. The scatterplots show that the Territory wealth subdimension has wider variability than the others. Indeed, the latter are characterized by a quite homogenous distribution among the mean value with few outliers (e.g. Baja California and Colima). Also in this case, states are likely to perform differently on the three subdimensions, revealing the peculiarities of their local situations.

**Figure 9 Mexican states according to their Enablers subdimensions values**

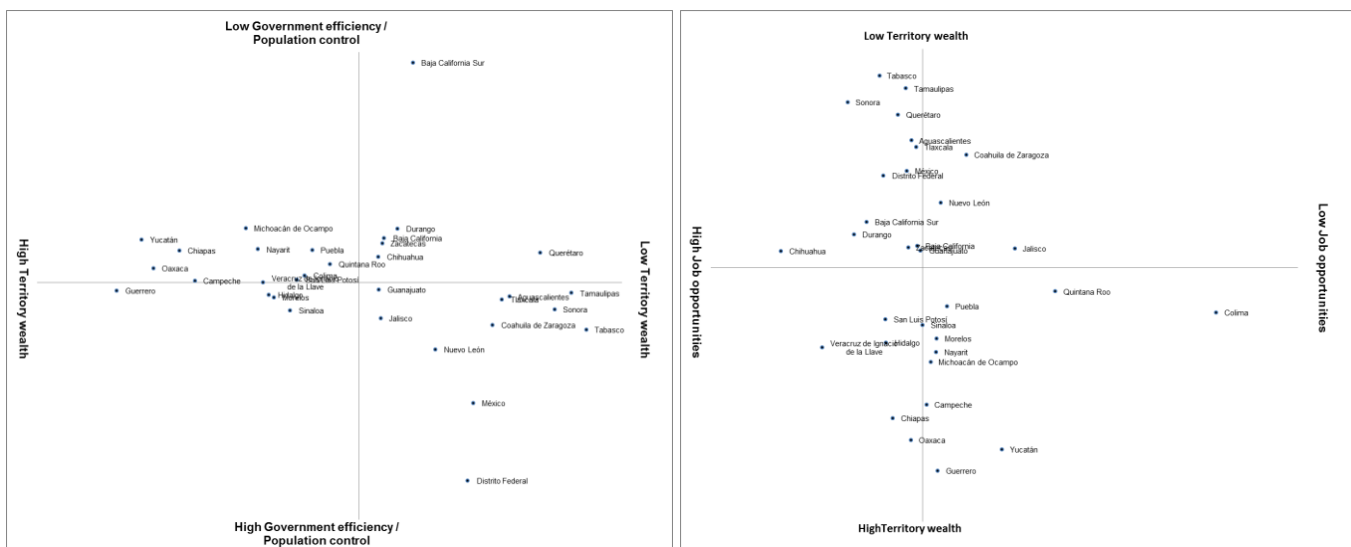
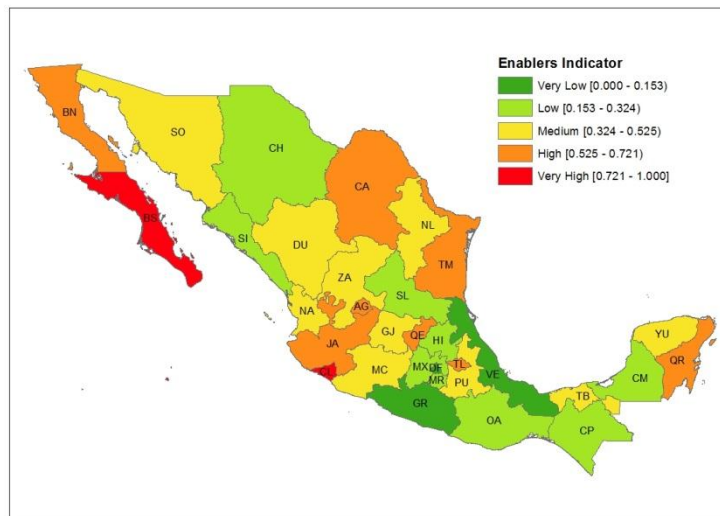


Figure 10 presents the composite indicator for the Enablers dimension obtained from merging the three subdimensions analyzed. Because this is an indirect measure of OC, since it does not evaluate the phenomenon *per se* but some contextual features that may enhance it, and considering that some relevant information is probably missing due to data availability, the results should be interpreted with caution.

**Figure 10 Final composite indicator results for the Enablers dimension**



However, it is interesting that some states recording high values on the previous dimensions present problematic situations from the enablers point of view, whereas other states like Guerrero and Chihuahua, record unexpectedly very low values. This may be due to 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 may have an ambiguous relationship with the presence of OC groups. For example, although poorer states are usually breeding grounds for OC groups, an affluent state can also be attractive to them by allowing more lucrative activities.

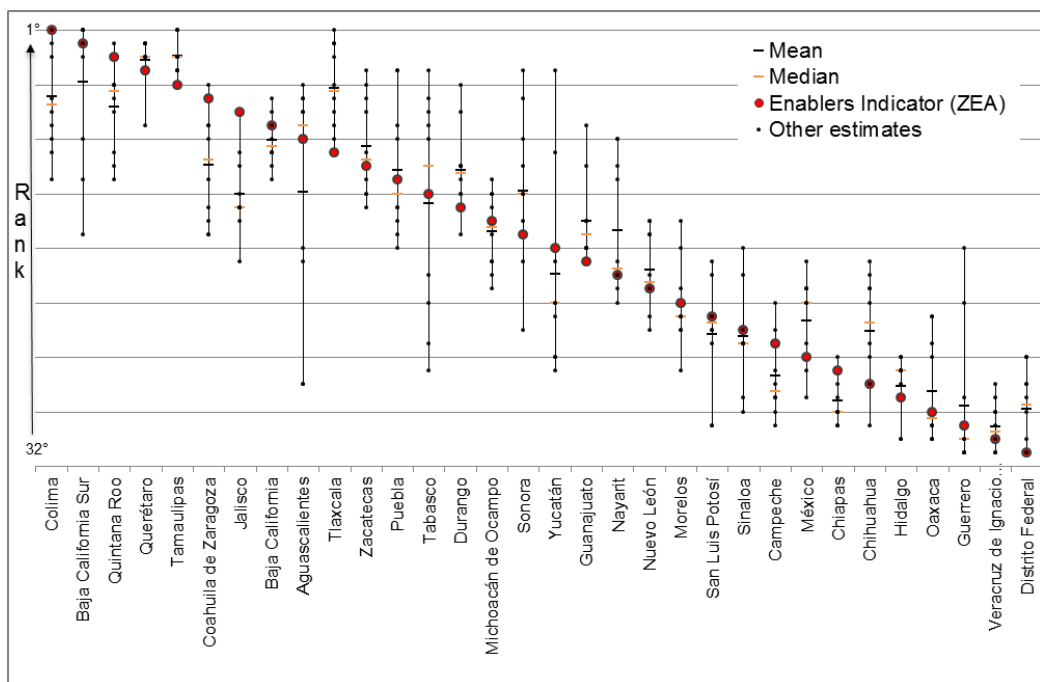
The sensitivity analysis conducted for this composite indicator does not produce encouraging results (Table 16). On average, the range between the maximum and minimum positions for each state, considering all the possible alternative rankings, is 11 – a wide interval for a total of 32 states. Moreover, this instability is not due to large variations in a small number of cases (as happened for the first two composite indicators), but it characterizes almost all the Mexican states (Figure 11). Therefore, the ranking obtained cannot be considered as entirely 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 for more precise and accurate information with which to refine and improve the correctness and accuracy of this composite indicator.

Table 16 Sensitivity analysis: final ranking and alternative 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

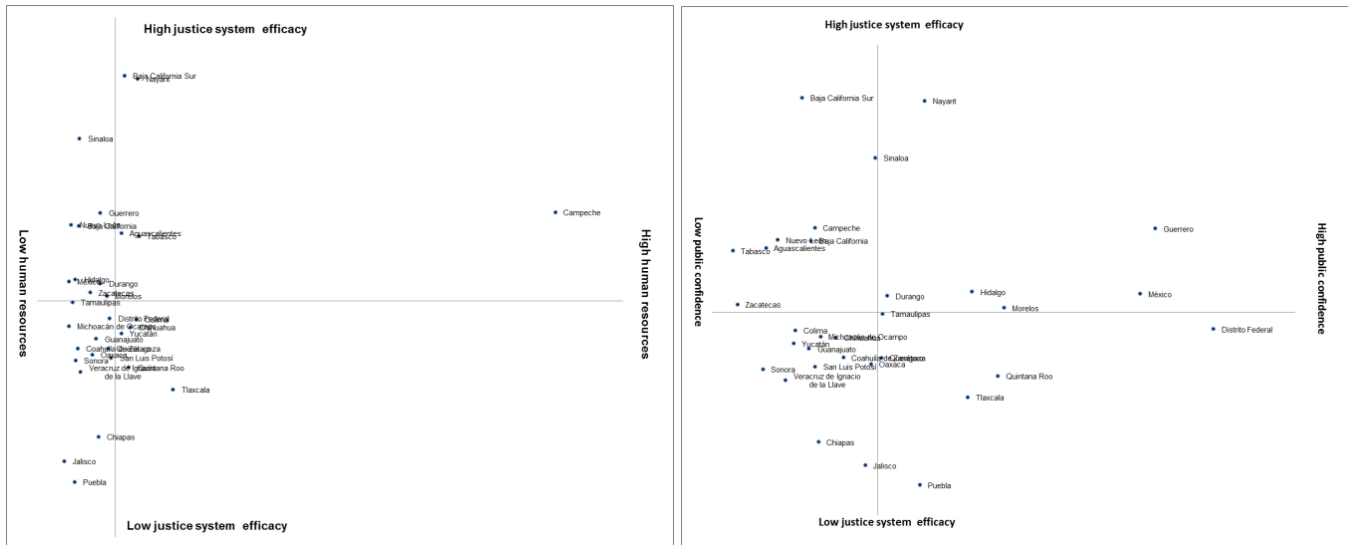
The fourth composite indicator again measures a contextual dimension of OC and is connected with the efficacy and efficiency of the state’s response to this threat: the higher the level and quality of the response, the lower should be the presence of OC groups. As shown in Table 8, six variables and three subdimensions have been identified. The first subdimension summarizes the human resources (e.g. police officers and specialized prosecutors) engaged in counteracting the phenomenon. The second refers to the justice system’s efficacy, whereas the third one concerns the confidence and trust that people have in 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	<b>.844</b>	.198	.247
Courtrooms	.075	<b>.587</b>	-.539
Specialized anti-organized crime prosecutors	<b>.730</b>	.247	-.465
Public confidence in law enforcement and courts	.394	.224	<b>.747</b>
Justice quality index	-.313	<b>.759</b>	-.055
Judges fairness	-.364	<b>.664</b>	.386

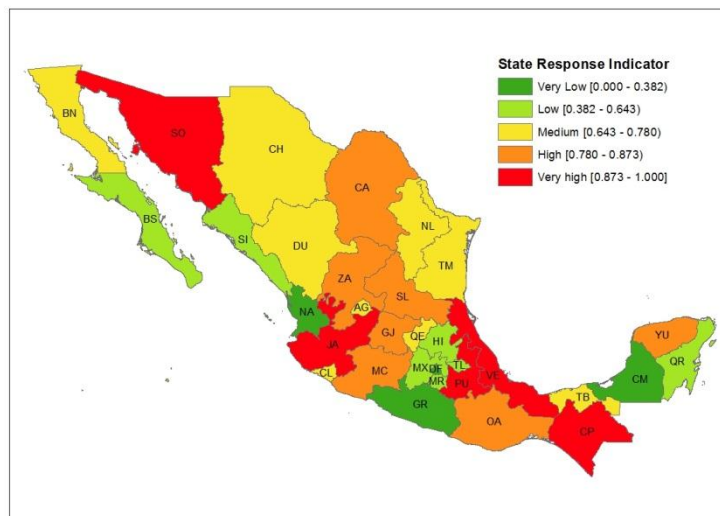
In regard to the different subdimensions, it is apparent from the scatterplots below (Figure 12) that the human resources indicator records similar values in most of the states with the sole exception of Campeche, which shows surprisingly higher values. The variability of the two other subdimensions presents less evident outliers; however, some states emerge as particularly problematic (e.g. Puebla, Jalisco and Chiapas for the justice system’s 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 states presenting positive conditions for this composite indicator are those 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 should be borne in mind that this composite indicator analyzes a contextual feature that may be related to OC, so that the picture expresses a risk of OC threat rather than the actual presence of criminal groups. However, this indication is not useless because it can be used to highlight existing vulnerabilities and anticipate the onset 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 positions according to the methodology used are significant for some cases (e.g. México and Tabasco especially). However, the composite indicators seem to perform well at least in identifying the higher and lower positions of the ranking. Also in this case, it is likely

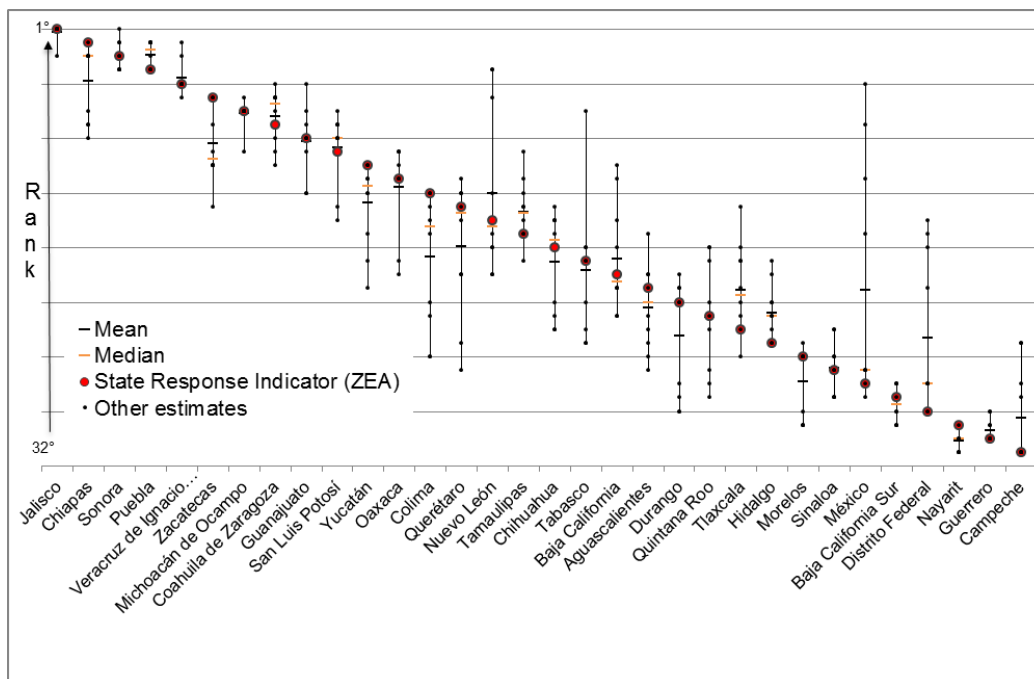


that new and more accurate information would lead to an improvement in the composite indicator's performance. Figure 14 summarizes the results obtained and the range of estimates for each state.

**Table 18 Sensitivity analysis: final ranking and alternative ones**

STATE	Rank ZEA	Other estimates										Median	Mean	Min	Max
		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 concerns civil society's awareness of and response to OC threats. Unfortunately, no information about the activism of social or political organizations against this phenomenon, nor systematic data on media coverage of this problem, are available. Consequently, the variables used for construction of this composite indicator comprise information about the social awareness and political participation of people in each state and their level of fear of crime, assuming that greater fear is associated with a lesser capacity to counteract criminal behaviours or abuses (Table 19).

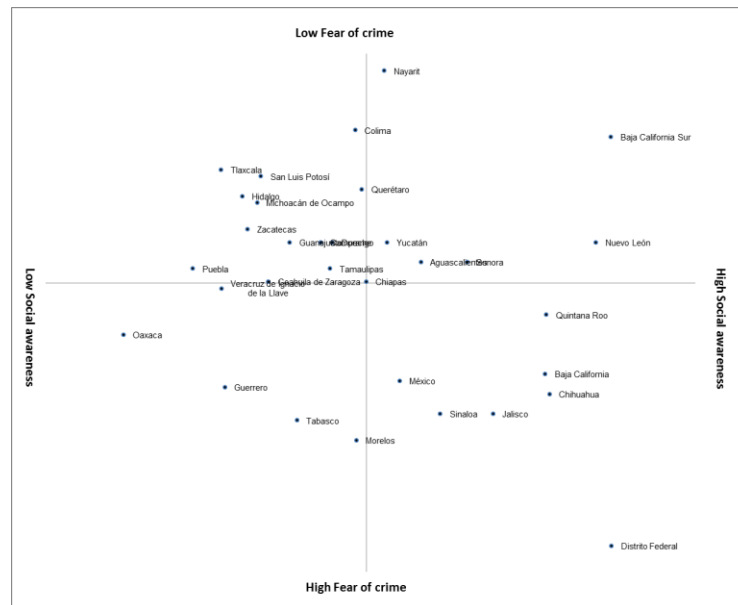
**Table 19 Correlations between the single variables and the principal components obtained**

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

As the scatterplot below shows clearly, the 32 Mexican states perform very unevenly on 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, which has the highest values for fear of crime and one of the highest levels of social awareness. However, this particular case can be explained by considering the peculiarities of this district, which comprises 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, which is almost certainly connected mainly with volume crimes rather than OC influence.

This example highlights that the values of this subdimension may be polluted by several factors distorting the final results. Hence more precise data should be collected to gain a more precise picture of the problem.

**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 most problematic situation are concentrated in the South-West areas of the country, although all the central states of Mexico present some criticalities on this dimension.

**Figure 16 Final composite indicator results for the Civil Society dimension**

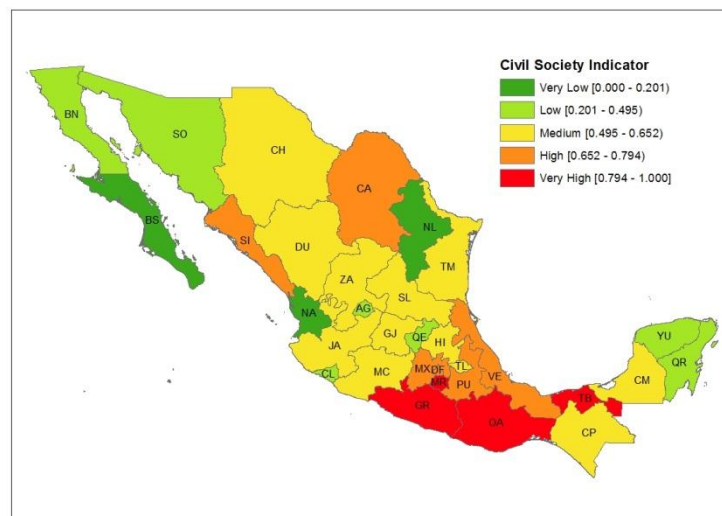
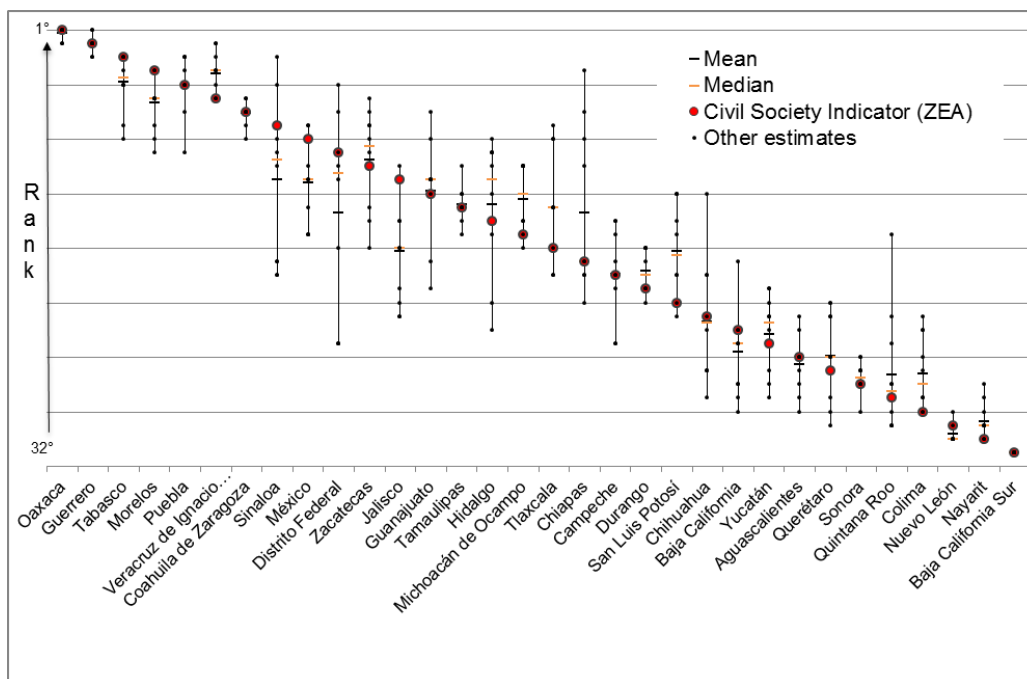


Table 20 and Figure 17 present the results of the sensitivity analysis conducted for this composite indicator by comparing alternative methodological choices. The analysis of the different rankings obtained reveals that the composite indicator seems to perform decently. Indeed, although some states record significant ranges in their position variation, the various 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 section has proposed a methodology for measuring the presence and threats of OC in a selected country by constructing a set of composite indicators revealing the extent and relevance of each single direct and contextual dimension of the phenomenon. This approach has four advantages. Firstly, it makes it possible to summarize a large amount of information. Secondly, it is a flexible methodology that can be adapted to the existing and available data and customized according to each country's specificities. Thirdly, it furnishes a clear picture of the various aspects of OC, focusing not only on current situations but also on potential future harms. Fourthly, a composite indicator at subnational level is essential for better assessment of local situations and for orienting policies and interventions.

For example, Table 21 reports the rankings of the 32 Mexican states on the five composite indicators created: in all cases, the higher the position in the ranking, the greater the risk connected to the corresponding dimension. Comparing the differing performances of the states 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 rankings 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

It is also of interest to compare how the different dimensions are related with each other. Table 22 shows the correlation matrixes of the five composite indicators obtained. Not surprisingly, the only positive and significant relationship is that between the two direct dimensions of OC (Groups and Activities), whereas the other seems to be more independent. The only other significant correlations are the negative associations between the Groups and State response dimensions, and the one between Civil society and Enablers. The former can be explained by considering that states with greater evidence of the phenomenon also have a high level of State response (recall 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 that to some extent problematic socio-economic conditions heighten the awareness of the inhabitants, making them more conscious of and less vulnerable to 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 caveat should be kept in mind: all the results are largely connected with, and affected by, data quality and quantity. The wide variations in the final rankings of some composite indicators recorded by applying alternative methodologies reveal that the consistent and reliable results are largely dependent on the type of information: the larger the number of precise variables available, the more precise, stable and sound is the composite indicator obtained (Table 23).

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

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



## Conclusion

This working paper has described a methodology developed to assess the characteristics of OC in Latin American countries starting from the available information and eventually orienting new strategies to counteract or improve knowledge about the phenomenon. As already stated in the introduction of this paper, the main focus of the study has been on methodology and on the steps that each country should follow to obtain reliable assessments of OC.

The main added value of the methodology proposed is that it goes beyond accounts of OC based only on a single indicator (e.g. homicides) and summarizes different kinds of information in a few composite indicators allowing analysis of how those single factors correlate, and comparison with other dimensions of the phenomenon. This approach takes a step forward with respect to the simple mapping of the single variables, since the resulting scores and indicators yield a picture of the OC presence that is far more complete and useful.

Moreover, although some of the results may not be surprising to local experts in the field, applying a standardized and transferable methodology is essential for monitoring the phenomenon's evolution better, and for creating a shared basis on which to discuss and eventually implement transnational counteracting efforts. Of course, many challenges and potential pitfalls arise in defining these scores and indicators. Three main issues should be mentioned: the first concerns the difficulty of defining OC and its dimensions due to its complexity and wide variability across contexts. The second concerns the characteristics and the amount of the information available: different data require different methodological approaches. The third issue is connected with the methods used for the measurement, which should be as coherent as possible in order to guarantee reliable and comparable results, and as flexible as possible so that they can be applied in different countries with different levels of data quality and availability. This working paper has suggested some ways to deal with these issues.

In regard to the first one, the authors drew on the existing literature on the topic to provide an extensive and detailed definition of OC. In particular, this paper suggested that separate analyses should be conducted on the different dimensions and subdimensions of OC in order to gain a more precise overview of its features and peculiarities. Five dimensions were identified, two of them direct (Groups and Activities), and three contextual (Enablers, State Response and Civil Society). These dimensions, their importance, and a set of subdimensions and potential indicators for each of them have been previously discussed in a working paper by Savona, Dugato and Garofalo (2012).

Dealing with the other two issues has been the main challenge addressed by this study. The solutions proposed are based on a multistep process. The first stage of this process is assessment of data availability. Thus, in cooperation with the experts of the CoE, the authors began with a preliminary exploration of the existing and available data in a set of selected countries. Examination of the results yielded three categories of countries: those with very little or almost no information; those with a significant amount of information at national level, but mainly qualitative; and those with a large amount of 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 by the authors (Savona, Dugato, & Garofalo, 2012), reliable data are the basis of all effective policies and actions by a country against OC. Hence a country unable to produce sufficient information to calculate at

least the national scores (Level 1) should rethink and improve its data collection. In this regard, the scoreboard and the proposed list of indicators should be used as guides for defining a roadmap intended to orient and improve the collection of data and information on OC in those countries. Another suggestion is to compare the national information with that collected by other countries in the region in order to develop common collection methods and enhance the comparability of the findings obtained.

For the other situations in which sufficient data are available, the authors have 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 sufficient information (both qualitative and quantitative) at national level that can be assessed using the specific scoreboard defined above. This methodology is easy to apply, and it can also provide an overview of the missing information. In the last category of countries, the available data enable definition of 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 yields a more precise overview and helps policy-makers or law enforcement agencies quantify the phenomenon and identify its local specificities by comparing different areas of the country. Obviously, the larger 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 to define these composite indicators requires several steps and methodological choices that have been discussed in this working paper.

In conclusion, the authors are aware that those proposed are not the only possible solutions, and that more refined and precise methodologies may be developed in the future. However, aside from statistical and methodological aspects, one of the main goals of this study has been to show that treating the available data with a sound methodology may be fundamental for obtaining systematic knowledge about OC and its features in a country, and this could be of major utility to local policy-makers and law enforcement agencies.

First, defining some measurements, although approximate, is important to shift the national and international debate on the topic from perception of the phenomenon to its quantification. Second, a systematic overview of the existing information could help each country in focusing on the areas in which to invest or enhance the collection of updated and reliable data. Finally, the authors believe that efforts to improve the quality and availability of data and to define better analyses are essential 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 it could also be successfully applied in the fight against OC, even more so considering the complexity of this problem.

## References

- Albanese, Jay S. (2000). The Causes of Organized Crime: Do Criminals Organize Around Opportunities for Crime or Do Criminal Opportunities Create New Offenders?. *Journal of Contemporary Criminal Justice*, 16(4), 409-423.
- 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/pftest1.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.

## Authors

### Marco Dugato

[marco.dugato@unicatt.it](mailto:marco.dugato@unicatt.it)

Researcher at TRANSCRIME, Joint Research Centre of the Università Cattolica del Sacro Cuore and the Università degli Studi di Trento. His main research fields are: crime statistics, urban security, organized crime, spatial risk assessment, public policies evaluation, well-being survey, victimization surveys, crime mapping and spatial analysis. He is Adjunct Professor of Professor of Methods and Techniques for Criminal Research at the Università Cattolica del Sacro Cuore in Milan.

### Marco De Simoni

[marco.desimoni@unicatt.it](mailto:marco.desimoni@unicatt.it)

Researcher at TRANSCRIME. Her main research fields are: organized crime, illicit trade in tobacco products and economic crimes. He is also a candidate of the International Ph.D. in Criminology at the Università Cattolica del Sacro Cuore in Milan.

### Ernesto Ugo Savona

[ernesto.savona@unicatt.it](mailto:ernesto.savona@unicatt.it)

Director of TRANSCRIME and Professor of Criminology at the Università Cattolica del Sacro Cuore in Milan. His research activity has centered on the following topics: analysis of crime statistics, law and social change, effectiveness of legislation, organized/economic crime and criminal justice systems, crime and economics and corruption. He has recently concentrated his research on developing a methodology to measure the impact of legislation.

## Acknowledgments

This working paper has been funded by the Center of Excellence in Statistical Information on Government, Public Security, Victimization and Justice established in Mexico City through the partnership between UNODC and the Mexican National Institute of Statistics and Geography (INEGI).

The authors want to thank the Center of Excellence for the active support in the data collection phase and for the suggestions in the revision of the working paper. In particular, special thanks go to: Salomé Flores Sierra Franzoni, Alejandra Gómez Céspedes, Daniela Andreatta and Juan Armando Torres Munguía.

**ANNEX 1**

**PRESENCE OF ORGANIZED CRIME ASSESSMENT - NATIONAL SCOREBOARDS**

ID	INDICATORS	ANSWERS		
		CL	CO	MX
		<b>COUNTRY:</b>		
<b>GROUPS DIMENSION</b>				
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
<b>ACTIVITIES DIMENSION</b>				
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
<b>ENABLERS DIMENSION</b>				
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
<b>STATE RESPONSE DIMENSION</b>				
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
<b>CIVIL SOCIETY DIMENSION</b>				
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

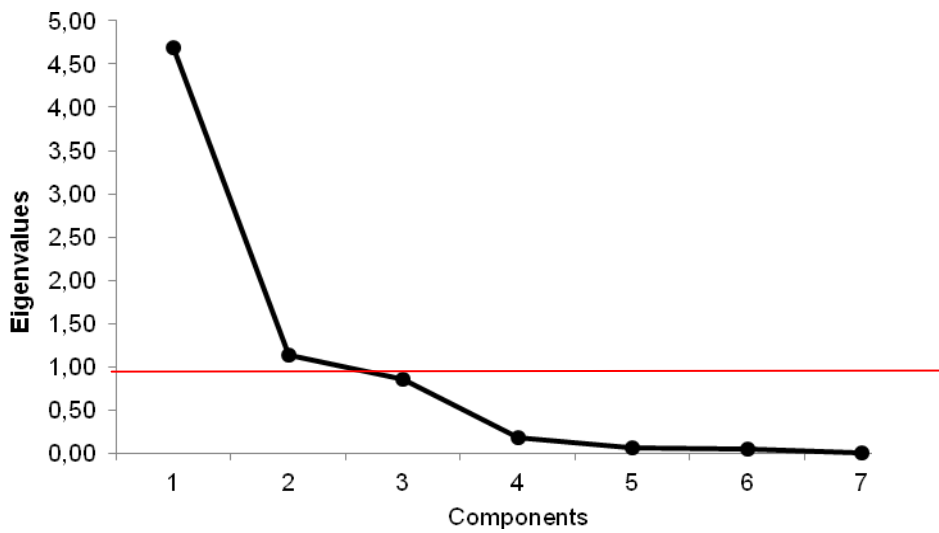
**P: Present - A: Absent - N/A: Not available**



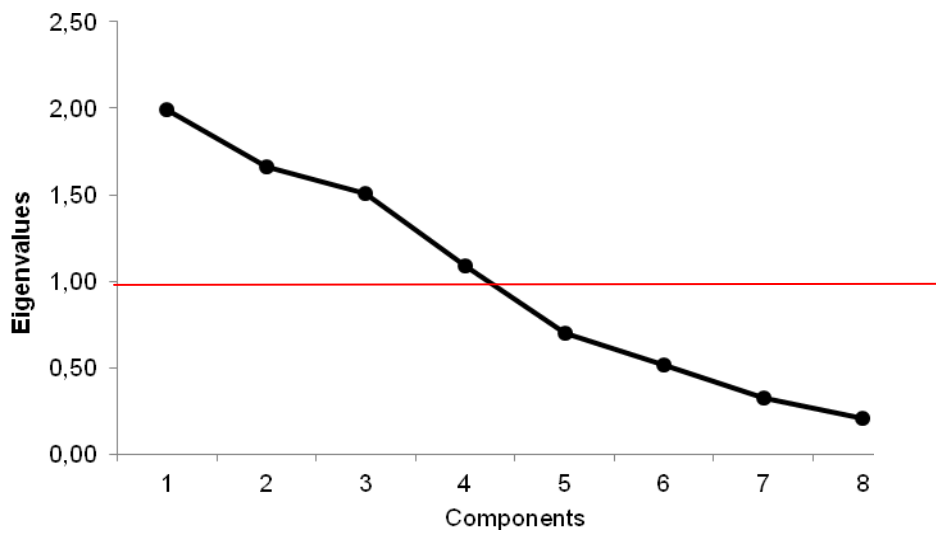
## ANNEX 2

### SCREE PLOTS for PCA

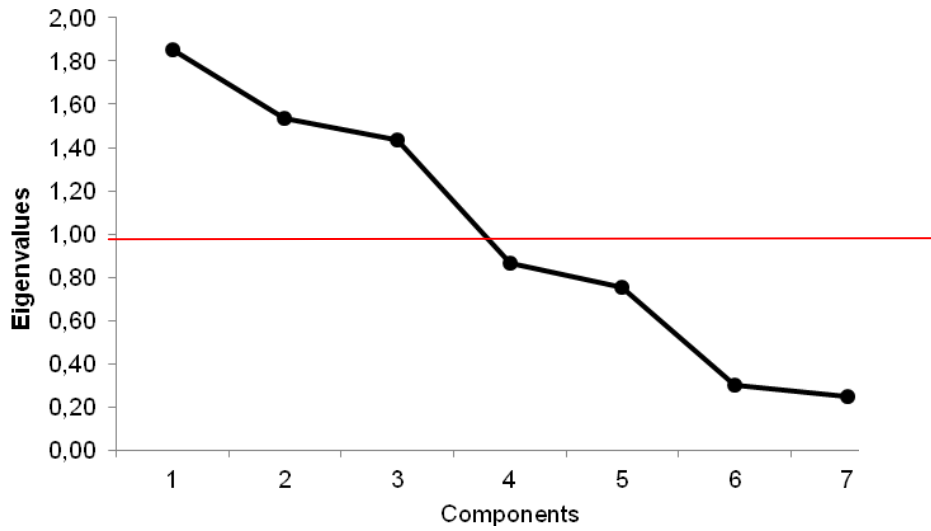
#### GROUPS DIMENSION



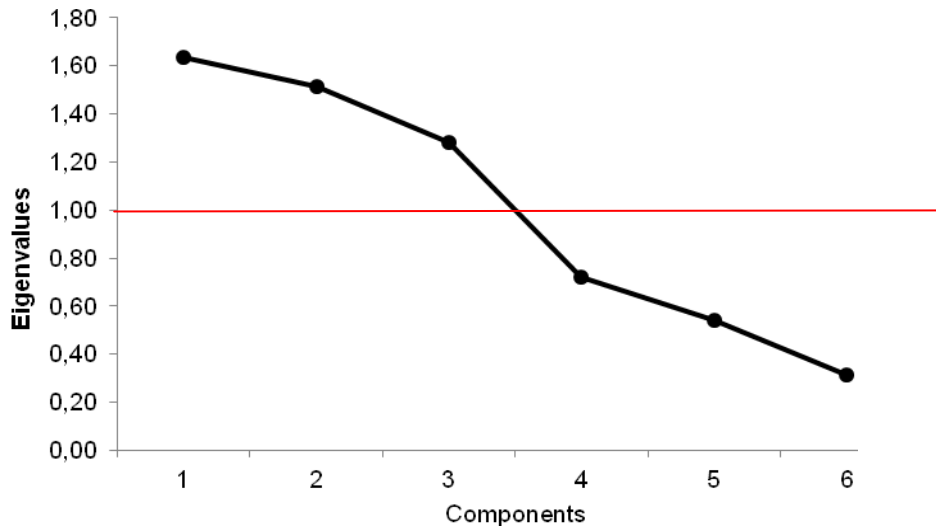
#### ACTIVITIES DIMENSION



### ENABLERS DIMENSION



### STATE RESPONSE DIMENSION



### CIVIL SOCIETY DIMENSION

