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Technical Paper
INTERACTIVE CRIMINAL STATISTICS FOR TRACKING AND TRACING

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INTRODUCTION

STATISTICS: STATIC OR NOT?

In the public administration statistics tend to be treated often in a stepmotherly way, as a kind of additional luxury to satisfy the political audience or curious researchers, but not as a valuable 'knowledge source'. As a matter of fact, statistics are often produced in a way the average private bookkeeper does so since time immemorial: collecting the totals of incoming and out-going units of processing and putting them in columns to be added. The units of processing may be divided into (sub) categories, which are presented in tables as an extra refinement, but in essence, these are just similar additions. The results of this 'bookkeeping' are used to recount roughly the total turnover of the entity, be it a private firm, a school or the administration of justice. Indeed, across time and countries there is a remarkable similarity in the quantitative output of this bookkeeping tradition and the way it is used. The author compared recently the annual reports of Financial Intelligence Units of four countries, supposedly new, modern institutions, and noticed the same way of using quantitative material as can be observed in older institutions, such as ministries of Justice.

This way of using figures is as such not wrong and represents a convenient way of presenting the rough totals of the annual turnover of an administrative (or private) entity and the identifiable sub-units. This may be appropriate for assessing workload and output. However, this represents a rather *static* and shallow use of the quantitative aspects of the activities of the entity: the presented tables are little more than column-wise additions of simple frequencies. An improvement by more quantitative refinement does not change things as long as the output is still used 'column by column' without making connections between them. This is one of the main reasons why despite all efforts official statistics remain so similar (and so shallow). It is also the reason of the lack of transparency of such statistics: one cannot 'penetrate' them and carry out secondary analyses let alone track and trace what happened to the input of data; in our field criminal cases concerning economic crime and corruption. An example is given in Annex I, map 2.

Adding a more dynamic element is required, but breaking through the static use is not easy: connecting elements must be identified. In statistical terms: there must be (a) *counting unit(s)* that connects the various statistical outputs. Within complex administrative bodies with virtually independent sub-units, such as the law enforcement system, this requires a careful selection and definition which is to be maintained by all sub-units involved. If that is not guaranteed, the statistics become non-transparent and tend to fall apart in unconnected and therefore static sub-units. For example, the definition of 'criminal case' at the Prosecution Office may be different from that of the Court, which makes a joined measurement of the workload by counting cases no longer possible. Conse-

quently the two sub-units must be treated separately as two separate 'frequency columns'. This is the traditional static bookkeeping pointed out at the beginning.

2. WHAT TO COUNT?

Given the present documentation on the state of the art of the Technical Paper, it seems that the choice of the counting unit tends toward the system used in the UK: the criminal event as recorded by the police and captured by the Crime Reference Number (hereinafter 'CRN'). To this CRN two annotations are appropriate. In the first place, this is a police system that may not necessarily apply equally conveniently to all units of the total system of law enforcement, including the courts from basic to the Supreme Court. In the second place, it may more be practical for the 'usual' crime with one-event and one-perpetrator situations. However, complex and ramified cases, such as economic-financial crime, participation in a criminal organisation or (higher-level) corruption may be spread over many regions and are likely to involve many perpetrators. Consequently the same event may be observed by more than one police/detective unit leading to the same event(s) to be recorded but with a different 'crime-event number'. That is not a problem as long as long as this numbering is considered *local* registration task of which the output is later or in real time unified in a central computer which will then become the storage place for the CRN. This is feasible, but begs the question of its location: is this a police matter or does it go beyond that?¹

Given the nature of the targeted criminal offences and the intended use of tracing and analysis, the responsibility must be put at an agency that is more centrally located. For handling the CRN allocated to core counting unit(s) the Public Prosecution Service should be considered as the best situation agency for a number of reasons. It receives all police reports concerning suspicions of criminal offences. It also receives reports from private citizens and enterprises as well as from supervisory and regulatory agencies. Hence, it is the entrance of all events that could be qualified as 'criminal'. But it is also the only gate to the Courts by deciding on a criminal charge.

a) When starts the CRN and the counting?

What is the 'event' to which a CRN will be allocated? To be precise: an 'event' is a narrative in a report on which a prosecutor takes a decision. That narrative can be about anything and it is the prosecutor who determines whether its content has a criminal law relevance. Therefore, the first prosecutorial decision determines the allocation of the CRN to the reported event. (It remains to be seen whether one should maintain this proposed name 'Crime Reference Number' as it is used in the UK police practice.) More important is the principle that the CRN is connected to the prosecutor's decision as stipulated by articles 5-7 of the Criminal Procedure Code, also when that decision is negative,

¹ This is often a problem with ramified fraud and drug smuggling cases, leading to several detective squads surveying the same criminal groups and executing uncoordinated house searches.

namely *not* to initiate a prosecution. This is of relevance in complex economic crime and corruption cases that may start with seemingly insignificant allegations which only gets significance if connected later on.² Therefore, the proposed decision rule determining the allocation of the CRN will be:

- *Every report of an event on which the prosecutor takes a decision obtains a CRN.*

Hence, at this stage the outcome of the decision can be: initiating the prosecution or not. If no prosecution is initiated, the information attached to the CRN may consist of:

- The CRN, containing the date, code number of the prosecution office and the order number;
- The criminal article allegedly applicable to the event; if more articles apply, the article with the highest maximum sentence is inserted;
- The number of persons allegedly involved.

When one or more persons are identified and mentioned as potentially involved (but not qualified as suspects), the question arises whether at this stage (a) name(s) should be attached to the CRN. This depends on one's view on the function of (statistical) databases. It is the author's view that in a statistical database there is no place for names, whether of natural or legal persons. If persons are identified they must function as 'counting units' and must be indicated by anonymising *name keys*. Name key and real name can be connected but by an authorised officer only. Where at this stage no law breaking has been determined, the protection of privacy should prevail.

No further action being taken, the registration ends at this stage and an electronic copy is forwarded to the Statistical Office and to a central point in the Prosecution Service. In terms of database construction these entries constitute the '*complaints database*'. It can be used for strategic purposes, for example to identify what kinds of complaints are submitted where and concerning what kind of 'events'. Single complaints can also be 'revived' if related complaints are filed concerning the same 'event'.

b) Counting within the 'chain' of criminal law procedures

In case the prosecutor decides to a prosecutorial action, the CRN remains with what has become by this decision a *criminal* case. If no suspect can be connected to the criminal event, the case stops and the form is again forwarded to the Statistical Office and the central point in the Public Prosecution Service. If one or more suspects (as defined according to article 2, sub 1 of the Criminal Procedure Code) are connected to the criminal event, (a) *unique* person number(s) or 'name key' is allocated. This can consist of the date of birth and two letters of his first name and family name (or a randomly assigned unique number). As suggested above, it is for privacy reasons recommendable that the database which is developing from this point onwards will not contain recognizable family names.

² This would result in several initially unconnected CRNs to be fused later.

It goes without saying that the name key, together with the CRN stay with the case. Both are required because one person can figure in various cases, while one case can have a number of suspects, as is the case in corruption cases (at least the corrupted person and the corrupter) or economic crime cases. Selecting a CRN marked by 'multiple offenders' must yield a display of all suspects involved. On the other hand, selecting a multiple offender must produce all his connected CRNs.

The method elaborated in the previous sections implies that we have now two connected counting units in what will be the *judicial* database:

- The criminal event under the CRN;
- The suspect under his/her name key.

If there were no specific criminal procedural peculiarities, two counting units would be sufficient to follow the progress of the criminal event as well as the suspect. However, within the judicial system procedures are not always straightforward. Suspects who together have figured in one criminal event can be indicted and brought to trial together or be split up and tried separately. Different cases, with different CRNs can also be fused and brought to trial together under one court number. This implies that for keeping track of the handling of a criminal event plus suspect it will be practical to adopt a *judicial processing number*, whether it is called a court or prosecution number. This number is allocated to a case as soon as the prosecutor decides to pursue a further prosecutorial steps. This identifier, together with the CRN and the name key will remain connected through all the phases of criminal processing: first instance, appeal and cassation.

So we have three unchangeable numbers:

- The criminal event under the CRN;
- The suspect under his/her name key;
- The judicial processing number (prosecution or court number)

Together they enable to trace what happened to a criminal event, the connected suspect(s) and criminal case during the judicial processing in its consecutive phases till their finalisation.

This is in agreement with the lay-out of Annex IV and chapter 7 of the Technical Paper 'Assessment of the Current State of Play with Regard to Statistics on Corruption and Economic Crime and Suggestions for Creation of the Benchmarking system aimed at measuring progress and level of efficiency of tracking/handling of corruption/economic crime cases', but it constitutes also a technical extension compatible with existing IT systems. The Annex IV starts with a case number, which we reserve for the judicial processing number. Preceding this case number we propose the criminal event number (the very start) and then the suspect name key. The variables (columns) are also extended and are mainly in accordance with the excel file layout of the Statistical office of Serbia. Basically, this broadened lay-out encompasses the essentials of the Technical Paper proposals while linking up with the system in use (but under-exploited).

3. PRACTICAL IMPLICATIONS

a. Statistical use

The statistical potential of the database created along these lines is substantial. It does not only enable the tracing of individual events, suspects and cases, it also allows a between-unit comparison or benchmarking based on the same counting units. For example, focusing on the counting unit 'person' (suspect or defendant), comparisons can be made between clusters of characteristic (typologies) or on outcome (dependent) variables such as *sentencing* (lenient or severe courts) or *processing time* (slow or fast courts). In that case the database would be used for a *judicial system monitoring* in a much more detailed and transparent way than is possible at present. It goes without saying that all accept the same definition of counting units as well as the related variables *and* that there will be a strict supervision of the accuracy of the data input.

The section above mentions 'characteristics' and 'variables', which is basically the same: each counting unit is a carrier of characteristics/variables. The criminal event has a date, number of persons involved and a Criminal Code 'name'; persons have a whole string of characteristics and a criminal case has numerous criminal law features. Because each is attached or attributed to one *unique* counting unit³, they can be added, mutually (cor)related and cross-compared. Further statistical analysis depends on the *measurement level* of these individual characteristics, ranging from ratio (age, prison sentence/fine) to nominal level (type of offence, profession).

An important aspect of this way of database building is that it always allows returning to the basic *raw* data at individual input level. This is a precondition for the preparatory mandatory task of database cleaning and later reliability checks. The iron rule must be: *no analysis without raw data cleaning*. One can say that the raw data collection is the 'mother database' and the first cleaned database the first 'daughter'. Both remain untouched during the following processing: one can create, transform or recode all the material on copy databases, but the original mother and daughter remain unalterable.

The importance of this was underlined in two research projects carried out by the author.

In the first one, a current research on criminal assets recovery, it appeared that by making subsets and calculating averages on the time variable one subset produced *negative* processing times. Inspection revealed a mistake in data input: end date and the preceding date of processing had been switched, resulting in a remarkable shorter total processing time (to the delight of the head of the unit).

³ This seems an over obvious observation about something that will never happen. But reality is different, in particular with multiple offending. E.g., two convicted perpetrators are sentenced to repay their illegal gains and consequently for each the same sum is entered resulting statistically in a doubling of the amount. The same multiplication was observed with confiscated assets having more owners, the value in the database being multiplied by the number of defendants to whom the whole sum of the assets was attributed.

Another example was the confiscation database as used since 1994. Strange high numbers raised suspicion after which the 34.000 records (lines) were inspected one by one. It appeared that the police officers made calculation errors in the conversion of currencies to the Euro and in addition, shifted the comma one or two places to the right, multiplying the confiscation by a factor 10 or 100. Needless to say: with these figures the confiscation policy looked very successful.

These errors (negative times, comma inflation) went unnoticed for more than a decade, because the management used the databases in the static way described in the introduction: as columns for adding only frequencies to grand totals while nobody fractured the database by clustering into subsets, cross-breaking and variable comparison.

Statistical analysis can of course be carried out on all the variables and is naturally 'question driven'. The analysis does not need to be restricted to descriptive statistics. Testing of hypotheses and correlating variables can be part of a routine analysis. For example: are single offender bribery cases processed faster than multiple offender cases? And: is that the case for all the courts? There is only one restriction in this ongoing fracturing and breaking down: after a couple of breakdowns the subset become too small for real statistical analysis and one arrives at the level of single cases. The analysis of the corruption database of the Statistical Office is a good example of this eventual outcome.

b. The administrative process

Given that this paper will not elaborate in detail the terms of reference of the information systems capable of handling specific information input and flows of data, an outline for the administrative process will be presented. For this we have to take the present way of working as a point of departure. The available 'data carriers' consist at present of SK I - IV forms. These are filled after the prosecution or the trial phase of a case has been finished. This is a separate activity from typing/inserting the criminal file. The filling of the SK forms and the typing of the criminal file (in a Word document) are usually carried out by different staff. One may consider whether it would be feasible to bring these tasks in one hand by attaching a digitalised new SK to the Word file and assigning the task of filling this form to the administrative person who also manages the criminal file. It is to be expected that this will lead to a reduction of errors as the person managing the file is assumed to be better informed. Therefore: *the file managing and data entry will be in the same hand*. When a form has to be submitted to the Statistical Office, a copy will be sent by e-mail while the original remains with the criminal file.

Without further speculating on the administrative changes required for a new form of data management, it is important to point out that they all have to serve the *database reliability*. As the examples in the previous sections underline, inaccuracy affects the whole database and all the conclusions and statements deduced from it. This implies that irrespective of the administrative structure, the '*error and omission management*' must be an integer part of the overall data management.

4. HOW THE SYSTEM COULD WORK

In section 3 the proposal was made to integrate the new data entry form with the criminal file, such that it will 'travel' with the file through the whole criminal procedure. At fixed intervals (once or twice a year) and after finalisation of the case (or a phase) an electronic copy will be sent to the Statistical Office. As the Statistical Office is mainly a surveying institution, the question arises whether there should be a central point for 'tracking, tracing and analysis' within the judicial agencies. This is a matter of preference: whoever has access to the (raw) database can carry out any analytic service. As the database uses only numbers and name keys, also private institutions, such as universities, can perform such tasks.

Irrespective such considerations, it may have an added value to use the constructed database 'indoors' for own tracing and analytical purposes. It has already been suggested that the allocation of the first core identifiers (CRN and person key) starts with the prosecutorial decision. One can also reflect on the fact that the prosecutorial policy in the field of organised (economic) crime and corruption is the competence of the special prosecutor office, which makes it more practical to assign such a task to this department. Whatever choice will be made, the competent prosecution office can use the assembled information for:

- Tracking and tracing categories of cases or even single defendants or events;
- More detailed regional or national analysis;
- Trend analysis over the years.

Example of analysis and 'filtering out' CRNs

Let us assume that the (cleaned) database has the excel shape as proposed in the addendum I. The data collection has been going on for a year and is carried out by the *file managers* of the prosecution offices and the courts. There are four moments of sending an excel copy of the filled form SK*new to the Statistical Office and the '*Analytical Unit*' of the Special Prosecution Office:

- (a) Standard: 31 January in the state in which it is;
- (b) when the case is finalised by the prosecutor;
- (c) when a court has pronounced a verdict in first instance;
- (d) after verdicts in each of the appeal phases.

During the whole procedural journey the original excel file remains with the criminal file to be complemented after each new procedural phase.

In answer to the question which institution should be responsible for cleaning the raw database it has been decided that the Statistical Office would be the responsible authority. Irrespective of all the temporary working files, the Statistical Office issues *the* officially cleaned database which has exclusive authority. This is sent to the Special Prosecution Office before 1 April to overwrite all other temporary working files.

As is clear by now, the database consists of a long drawn-out *Excel file* with the CRN as the indentifying first variable of the rows: each row is one CRN + following variables. As the CRN also contains the time tag, the time span of the database is also determined. All is now in place, but working with an excel file consisting of a few thousand records is cumbersome, so the file will be converted into an *SPSS* database.

The second identifier is the name key and later, the third identifier will be the court number. What is the first thing we want to know if we have a database of about 5.000 rows? Given that the database is restricted to cases of economic crime and corruption/offences against official duty, the first ordering or breakdown is according to the *categories of these offences*, which results in a normal *frequency distribution table*: absolute numbers and relative frequencies. That is a first check for determining the 100% and a check for missing values on the offence variable, but otherwise little informative. Next one wants to know how or from whom the complaints originated. This can be found out by the next breakdown presented in table 1.⁴

Table 1
Who reported what kind of offence?

		article Crim Code * Who applied criminal report								
		Crosstabulation								
		Who applied criminal report								
		Citi- zen vic- tim	Other citi- zen	enter- prise	In- spec- tion	Po- lice/M ol	Other direc- torate	In-line RPO	Other	Total
Abuse of office	Count %	2042 51%	322 64%	861 64%	36 95%	3589 68%	171 66%	102 82%	229 71%	7352 62%
Law breaking court	Count %	1546 39%	111 22%	51 4%	0 0%	124 2%	46 18%	3 2%	28 9%	1909 16%
Uncon- scien- tious service	Count %	116 3%	26 5%	47 4%	0 0%	153 3%	10 4%	2 2%	26 8%	380 3%
Illegal payment or dis- burse- ment	Count %	4 0,10 %	0 0%	2 0,1%	0 0%	5 0,10%	0 0%	0 0%	0 0%	11 0,09%
Fraudu- lent service	Count %	8 0,2%	2 0,4%	6 0%	0 0%	40 1%	3 1%	0 0%	3 1%	62 1%
Embez- zlement	Count %	150 4%	15 3%	330 25%	1 3%	796 15%	20 8%	10 8%	20 6%	1342 11%
Offence by civ. servant	Count %	10 0,3%	2 0,4%	28 2,1%	0 0,0%	87 1,7%	2 0,8%	0 0,0%	1 0,3%	130 1,1%

⁴ These examples are derived from the analysis of the raw databases of 2007-2009 which the Statistical Office was so kind to make available for the corruption research project. Also for constructing the new SK*new we drew heavily on the Statistical Office excel file and code book.

Influence trading	Count	9	8	3	0	8	1	0	0	29
	%	0,2%	2%	0%	0%	0,2%	0%	0%	0%	0,25%
Taking bribe	Count	60	12	9	1	230	4	0	10	326
	%	2%	2%	1%	3%	4%	2%	0%	3%	3%
Giving bribe	Count	28	7	4	0	214	2	7	6	268
	%	1%	1%	0,3%	0%	4%	1%	6%	2%	2%
Disclosure of official secrets	Count	1	0	1	0	7	0	0	0	9
	%	0,0%	0,0%	0,1%	0,0%	0,1%	0,0%	0,0%	0,0%	0,1%
440	Count	0	0	0	0	4	0	0	0	4
	%	0,0%	0,0%	0,0%	0,0%	0,1%	0,0%	0,0%	0,0%	0,0%
Total = 100%	Count	3974	505	1342	38	5257	259	124	323	11822
	%	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0

This table provides valuable clues for a directed tracing: first we see that citizens and police launch most complaints and the citizens complain most of all about abuse of office and law breaking by staff of the courts and public prosecution offices. If these citizen complaints about the courts are considered of special interest, one can form a subset consisting of 'law-breaking court' which consists of all the relevant cases with all the variables, beginning with the CRN. That may still be insufficient informative as it lacks a target variable which may be the 'type of decision'. So the next breakdown is: 'who submitted crime report' against 'type of decision'.

Table 2

				The type of decision and reasons				Total
				Dismissal report	Disrupt investigation	Halting investigation	Indictment	
Law breaking court	Who submitted Crime Report	Citizens	Count	1587	0	9	51	1647
		%		96%	0%	1%	3%	100%
		Enterprises/entities	Count	50	0	1	0	51
		%		98%	0%	2%	0%	100%
		Police/MoI	Count	92	1	3	26	122
	%		75%	1%	2%	21%	100%	
	Directorate/PPO	Count	47	0	0	2	49	
	%		96%	0%	0%	4%	100%	
	Other	Count	28	0	0	0	28	
	%		100%	0%	0%	0%	100%	
	Total	Count	1804	1	13	79	1897	
	%		95%	0%	1%	4%	100%	

A further breakdown is not possible because one of the two variables (who reports and decision outcome) has no values for further cross-tabling, though one can draw in a third variable, such as processing time or the code of the prosecution office. However, the absolute numbers will soon become too small for statistics. Still, each cell can be inspected at the level of the single CRN or name key: the string of variables after the CRN reveals (a) the profile of the case and (b) its individual 'processing history'.

In this example we worked from amalgamated data by a breakdown procedure to the individual CRN. Can one also work in a reverse order: from the individual CRN to the profile and its processing history? That is possible, but cumbersome and of limited informative value, such that one will soon feel the need to compare the traced individual case with cases of a similar or a different type. That implies that one will have to do the analysis and typology outlined above after all.

In the same way one can use the prosecution/court tags for the benchmarking of the prosecution offices and court, *e.g.* against the national average. Concerning policy developments across time one can use the time variable.

The database can also be used as a *managerial* tool to guard the temporal aspects of the case processing: at fixed time intervals one can easily check which cases are still pending by making a selection on the *decision variable* (= 999 or 'missing') followed by a frequency table of the CRNs.

CONCLUSION

The outline above has taken into account the present situation and advocates to dovetail in what is functional at present by extending what works properly now, instead of considering a complete overhaul. Ambitious IT programmes have a sad history of exalted ambitions, high expenses and miserable failures. So what has been suggested here is a bit simpler. An update of the information carriers of the Statistical Office, joined at the tail of the criminal file, an officer who manages the physical file and two institutions for the higher-level management: the Statistical Office and the Special Prosecutor (or any other competent department). The author advises strongly against extension of this structure unless it is technically unavoidable.

The author also proposes to carry out a *feasibility experiment* in a limited number of prosecution offices and courts, for example in the Belgrade region. To this end one can start with cases which were recorded at the prosecution offices from 1 January 2013 onwards. That would imply working back with existing files for testing the user-friendliness of the instrument, the validity of the variable descriptions and the most functional and convenient task allocation. The expenses for such a feasibility experiment are very modest: no extra staff and no other IT application but excel, which is free available with Microsoft Office.

Apart from all technical aspects, implementation technicalities and database responsibility, the question remains what added value the output of such an instrument will have. At this point some modesty is appropriate: Statistics do not change the world; they make only some outlines visible. But without this visibility much of the intended changes will be ill-directed or even sometimes *ad random*. The approach outlined in this Technical Paper and also in Van Duyne and Stocco (2012) is in the first place intended to raise questions and to look for precise answers. Naturally, two important questions concern (a) developments over time and (b) regional patterns: “changes in time and space”, which is exactly what the anti-corruption policy is about. However, to determine the changes, one has to set a *baseline* or determine a *zero measurement*. Without such a zero measurement statements about progress may be just wishful speculations. Determining a zero measurement is not only setting a point in time and space: it forces to specify the target variable and to research its methodological implications, which entails including adjacent variables. For example, if the anti-corruption policy aims at awareness rising, the target variable is ‘incoming complaints’ at the prosecution office. Then the adjacent variable is ‘prosecution decisions’ because it is the next in line variable: if the inflow of complaints increases (success indicator for awareness) but the prosecution rate remains the same or declines, there is a serious question to be answered. Likewise, if the prosecution rate goes up (again success), but the conviction rate remains stable or declines, there are again grounds for raising questions: are the courts clogged or is the prosecution service driven to prosecute as many cases as possible (also weak ones) to reach targets?

What does this imply for statistical work? It implies that one cannot just do statistics as a kind of ‘tables producing craft’. Each table is the end product of a measurement or data manipulation under which there is a theory about the reality. Doing statistics forces one to a disciplined and transparent thinking of the targeted reality. That alone would already be an indication of progress in fighting corruption and economic crime.

Addendum I

Excel database files

MAP 1: Prototype of proposed data entry form

MAP 2: Example of a column-wise statistics

MAP 3: Section from the Statistic Office raw database used during the corruption research by the author. Counting unit: defendant.