
Law Enforcement's Usage of Business Intelligence Collaboration

Ellen S. Kramer, MBA

Southern Connecticut State University
kramere2@southernct.edu

Abstract: In recent years, current events have often coined the term “officials are gathering business intelligence.” The purpose of this research paper is to gain an understanding of what business intelligence is and to investigate the collaborative usage of business intelligence within law enforcement.

First, the varied and many definitions and scopes of business intelligence will be explored and explained, with particular relevancy to law enforcement. The paper will then provide an overview of collaborative business intelligence practices within law enforcement. The paper will support current research, which suggests that law enforcement in the United States are using some form of business intelligence to assist with their cases and reported crimes. For investigators, this translates into an increase in closed cases.

The last part of the paper will focus on specific collaborative business intelligence tools that can be utilized by law enforcement. Numerous crimes are committed and linked to multiple locations and perpetrators. Collaboration tools can be used beneficially within departments and with outside agencies to identify patterns, trends, and relationships not normally discovered through individual analysis.

Keywords: business intelligence, BI collaboration tools, law enforcement

1. INTRODUCTION

The term Business Intelligence (BI) was first introduced into society in 1865 as an anecdotal phrase. It was used to describe the benefits of gathering and acting upon information as a competitive advantage. In 1958, International Business Machines (IBM) described BI as technology used to collect, analyze, and translate data into meaningful information, which should be acted upon before the competition. For the next two decades, interpretation of business intelligence data was stifled with limited access to fragmented data sources. In the 1980's, the power and potential of BI was unleashed with the birth of relational databases, decision support systems, and BI tools. These developments made it possible to gather and organize massive amounts of data from a single data source, saving time and money and streamlining analysis, translation, and decision-making processes. In the late 1980's, BI businesses cropped up in response to the growing interest to have more efficient BI tools. By the late 1990's and early 2000's, more simplified and user-friendly tools were developed, which provided greater functionality and productivity. Today business intelligence is all about Big Data and Analytics. Numerous software vendors have developed sophisticated products, which provide “reporting capabilities, dashboards, advanced visualization, and end-user self-service that are given the highest priority ... in enterprises focused on making BI a strategic foundation for growth” (Columbus, 2017, para. 7).

2. BUSINESS INTELLIGENCE DEFINED

It is essential, first, to establish the difference between “data” and “information.” Data, commonly referred to as raw data or unprocessed data, is data that has not been analyzed or processed. Data can be any character, text, words, numbers, symbols, pictures, sound, or video. Once the data is analyzed, processed, organized, or structured, it becomes information that is useful and meaningful. Information in

the context of law enforcement is defined as “pieces of raw, unanalyzed data that identifies persons, evidence, events, or illustrates processes that indicate the incidence of a criminal event or witnesses or evidence of a criminal event” (International Association of Directors of Law Enforcement Standards and Training, 2004, p. 9).

From its inception to present day, business intelligence has been defined using an array of buzzwords and technical terms. In its most simplistic form, “BI means the use of computing technologies for the identification, discovery, and analysis of business data” (Techopedia, 2017, para. 1). Expounding upon this foundational description, BI is often coined as an “umbrella term.” These definitions reference terminology such as applications, infrastructure and tools, and best practices to access and analyze information. Other explanations refer to BI as “a set of methodologies,” “getting the right information to the right people at the right time,” “a managerial philosophy,” “a system that turns data into information,” and “an architecture and collection of integrated operational and decision-support applications and databases.” Perhaps the most encompassing definition refers to business intelligence as “the various solutions for enhancing the overall business performance” (Big Data Made Simple, 2014, paras. 2-20).

From a law enforcement perspective, the definition of business intelligence is broadened to include criminalities, crime trends, security trends, extremists, and terrorists. One current definition of law enforcement intelligence is “the end product (output) of an analytic process that collects and assesses information about crimes and/or criminal enterprises with the purpose of making judgments and inferences about community conditions, potential problems, and criminal activity with the intent to pursue criminal prosecution or project crime trends to support informed decision making by [law enforcement] management” (Smith, 2014, p. 59).

With the advent of digital technologies, the collection, analysis, and sharing of global business data is referred to as “Intelligence-Led Policing (ILP)” or “criminal intelligence.” ILP activities are strengthened with the utilization of business intelligence data analysis. Information that is analyzed, credible, and reliable ensures that decisions are formulated based on factual criteria. For example, an analysis of crime trends using historical data can be used to predict the likelihood of further occurrences in a particular area. The International Association of Law Enforcement Intelligence Analysts (ALIEA, 2004) states that “taking information collected in the course of an investigation, or from internal or external files, [results in] ... arriving at something more than was evident before. This could be leads in a case, a more accurate view of a crime problem, a forecast of future crime levels, a hypothesis of who may have committed a crime or a strategy to prevent crime” (p. 12).

Comprehensive global business data can support and increase the effectiveness of ILP activities by transforming data into actionable information. Law enforcement agencies utilize four areas of analytics to identify, anticipate, and halt criminal activities. Investigative analysis detects linkages among seemingly unrelated enterprises or individuals. Strategic analysis proactively evaluates business connections and crime activity. Monitoring analysis proactively tracks businesses and individuals for suspicious or unusual activity. Predictive analysis identifies watch lists, sanctions, and recognizes patterns of unlawful business practices.

The International Association of Crime Analysts (IACA, 2014) supports “traditional definitions of tactical, strategic, and administrative crime analysis” (p. 1). Crime intelligence analysis refers to data analytics relating to individuals, organizations, and networks. Tactical intelligence analysis refers to the short-term assessment of investigative initiatives, tasks, and law enforcement resources. Strategic intelligence analysis refers to the long-term assessment of trends, hot spots which define areas of high occurrence versus areas of low occurrence, and problem analysis used to identify cause and effect. Administrative intelligence analysis refers to organizational analytics relating to the needs of agencies, government, and the community.

The Federal Bureau of Investigation (FBI) Office of Intelligence (OI) also provides a functional definition of business intelligence. Former FBI Deputy Assistant Robert Casey states “in the law enforcement/national security business, [intelligence] is information about those who would do us harm in the form of terrorist acts or other crimes, be they property crimes or violent crimes. ... [The FBI OI] produces both ‘raw’ (or un-evaluated intelligence) and ‘finished’ intelligence products (those that report

intelligence that has had some degree of analysis)”; (International Association of Directors of Law Enforcement and Training, 2004, p. 13).

Regardless of the multiple definitions, interpretations, and strategies surrounding business intelligence, a common theme resonates among organizations, industries, and individuals that define and utilize business intelligence. Empirical analysis must be performed on the data before it can be classified as intelligence or actionable information. Definitions often become problematic because of deep-rooted tradition and context upon which they have been built and understood within specific law enforcement agencies. As police agencies expand their reach of criminal activity analysis, both nationally and internationally, it is important that all parties involved adopt a common set of definitions and terms to minimize confusion, and provide a framework for working cohesively, efficiently, and productively.

3. COLLABORATIVE BUSINESS INTELLIGENCE WITHIN LAW ENFORCEMENT

Organizations are always on the lookout for a competitive edge, and this is no less true for law enforcement agencies, as they look to newer and better investigative tools. Currently, such agencies are embracing the use of business intelligence to improve outcomes and improve safety in their communities. Law enforcement has discovered unique ways of combining crime scene and demographic data to better analyze the evidence and make predictions about it to prevent future illegal activity. Although the terms business intelligence and analytics are often used interchangeably, there is a distinction (Foote, 2017). Business intelligence uses technology in order to enhance decision-making, while analytics is a broad term of collecting and storing data and has become a general term “covering data warehousing, enterprise information management, business intelligence, enterprise performance management, and governance” (Foote, 2017, para. 12). The next section will focus on the specific uses of business intelligence as it applies to law enforcement agencies.

3.1. Predictive Crime Mapping

Predictive crime mapping is one area where law enforcement agencies are utilizing business intelligence tools to gather and interpret relevant data in order to better predict (and prevent) not only crimes but also offenders. Law enforcement agencies’ databases have traditionally focused on integrating data nationally to include fingerprints, DNA, and other evidence collected during investigations. The focus has now shifted from crime scene evidence to resolving individual criminal activities, and it has recently been utilized to assess the appropriate use of law enforcement professionals and emergency vehicles, to identify potential reoffenders, and to anticipate new areas of criminal activity that can be reported to legislators (Kovacevic, 2018). For example, predictive crime mapping may help pinpoint where repetitive crimes occur and when they will most likely take place (Rosser, Davies, Bowers, Johnson, & Cheng, 2017). Fitterer, Nelson, and Nathoo (2015) piggyback on this assertion finding that offenders prefer to practice criminal behavior in areas known to be advantageous for their pursuits. Due to its perceived success and enhanced decision making, its popularity is growing. While such analytics are now practiced in the United States, other nations are taking notice and are beginning to develop their own similar measures (Kovacevic, 2018). They are using the data to create “predictive crime mapping,” in which data is used to create grid-like GPS maps that detail types of criminal activity and their dates, times, and locations (Kovacevic, 2018). This allows agencies to create interactive maps in order to redirect resources most efficiently and better predict when and where crimes will occur (Kovacevic, 2018). Predictive crime mapping allows agencies to more efficiently place officers and increase response rates (Leigh, Dunnett, & Jackson, 2019). In fact, in the United Kingdom, research shows that these predictive crime maps have allowed law enforcement to predict criminal activity 10 times more effectively than police alone (Kovacevic, 2018). The practice of predictive crime mapping will likely only become more widespread.

Predictive crime scene mapping involves more than crime scene data. It combines the crime scene data with demographic data in order to better predict instances of criminal behavior and the criminals, alike. Additionally, such data analytics are allowing law enforcement agencies to collect data on historical

criminal activity in order to identify those who may reoffend by focusing on the time, location, and victim characteristics to associate such activity with the responsible person (Kovacevic, 2018). While this practice is certainly not infallible or precise, it has shown to be effective in about 98% of individuals who present a low risk of reoffending (Kovacevic, 2018). With those at a high risk of reoffending, the success was slightly lower at 88% (Kovacevic, 2018). These results are encouraging, as they allow agencies to more accurately predict when and where crimes will occur (Kovacevic, 2018). It is anticipated that this trend will continue to grow as more data are collected and more agencies take part (Kovacevic, 2018).

3.2. The Case of the Los Angeles Police Department.

One specific agency is using data to not only predict criminal activity but also to rate the level of crime (Lapowsky, 2018). The Los Angeles Police Department, since 2011, has been collecting data on such criminal behavior using it to identify individuals who commit crimes over a two year period and rate the level of the crime using the statistics from the arrest records (Lapowsky, 2018). This has allowed the Los Angeles Police Department to more effectively monitor these individuals, as they are better able to predict reoffences (Lapowsky, 2018). Opponents of this practice, however, insist that “predictive policing” is simply a new tactic of racial profiling (Lapowsky, 2018). Experts believe that such algorithms are only as effective as the quality of the data entered into it (Lapowsky, 2018). They suggest that data entered into the system may be biased and have a direct and disproportionate impact on sentencing and bail (Lapowsky, 2018). Indeed, Jefferson (2018) found that such practices gave a sense of legitimacy to the practice, thus supporting increased use of such maps and their disproportionate relationship with people of color. In fact, research has shown that such measures increase the police presence in areas of reported crimes, and causes individuals in those communities to feel “targeted” by law enforcement (Lapowsky, 2018). The next section will look at law enforcement’s use of data analytics.

4. AREAS OF LAW ENFORCEMENT IMPROVEMENT THROUGH DATA ANALYTICS

Analytics are used in a variety of ways to collect and organize historical information, to anticipate market trends, provide more accurate advice, and to interpret that data in real time in order to get ahead of the competition (Foote, 2017). Criminal activity presents a huge economic cost to communities (Mills, 2017). Reducing crime therefore reduces costs. Using data analytics allows law enforcement agencies to more effectively predict and prevent crime from happening (Mills, 2017). Such analytics can also be used to interfere with cyber-crimes as well by collecting and interpreting data to track and coordinate malicious activity, effectively reducing costs in these crime ridden areas (Mills, 2017).

An interesting byproduct of the practice of using data analytics to predict and interfere with crime is that it can increase the amount of social services in communities that have been hit the hardest by disaster affected areas, such as flood zones, to map and monitor these locations (Mills, 2017). Such data can be used to create new areas of training for employees and involve nonprofit organizations in those areas to improve programs and services for the individuals directly affected by the disasters (Mills, 2017). These improved responses can mitigate the effects of the disasters through faster delivery of assistance to bring down unemployment and to provide job training and allocation of resources (Mills, 2017). Continued improvement in this area may lead to widespread global response to illegal activities (Mills, 2017).

5. PRACTICES OF PREDICTIVE POLICING

Some agencies operate on the assumption that predictive policing leads to reduced misdemeanor crimes, which could then in turn lead to reduced felonies (Haskins, 2019). Agencies use the data to create community maps that isolate criminal activity to individual locations and even houses (Haskins, 2019). These maps are created on the assumption that when certain crimes are committed at a particular time, they may be likely to occur again in the same pattern (Haskins, 2019). An overall timeline can be generated to look at communities through various timeframes to establish patterns and trends and to create a historical

record of criminal activity (Haskins, 2019). In fact, such maps can be used to distinguish high crime areas relative to low crime areas, thus allowing the appropriate allocation of resources to those areas (Kalantari, Ghezlbash, Ghezlbash, & Yaghmaei, 2019). One criticism of this approach is that it is inherently biased, as communities that are heavily patrolled will report disparate data (Haskins, 2019). “There really hasn’t been much external validation of whether the technology works, what it even means, what are you comparing it to, and there’s been a lack of research and science on that” (Haskins, 2019, para. 9). Yet proponents suggest that any reduction in crime positively impacts everyone, criminal and victim alike (Haskins, 2019). They also note that, while law enforcement has always used predictions to anticipate illegal behavior, data analytics and the use of predictive policing enhance those predictions (Haskins, 2019). Yet opponents have found cases where officers use the data to target specific individuals unnecessarily (Haskins, 2019). In fact, they allege that over policing in some areas could increase the likelihood of gun related deaths, as increased police presence often leads to higher rates of shootings (Haskins, 2019).

A popular use of predictive policing was the “broken windows” approach used widely from 1980’s and until 2012-2014 (Haskins, 2019). Officers in communities where “broken windows policing” used incidents of broken windows to pursue investigations into criminal activity and prosecuting low level violations, “such as public urination or intoxication as criminal rather than civil offenses” (Haskins, 2019, para. 24). Yet, upon investigation in 2016, “broken windows policing” was not found to be effective in reducing violent crimes and disproportionately impact people of color (Haskins, 2019).

6. PREDICTIVE POLICING PRACTICES: BENEFITS AND RISKS

6.1. Benefits

Predictive policing is defined as the use of collected data to more precisely predict the types of crime that are likely to happen as well as when and where they will occur (Meijer & Wessels, 2019). Such data are also used to predict potential victims of those crimes (Meijer & Wessels, 2019). An interesting aspect of such analytical practices is that law enforcement agencies are able to incorporate a wide variety of data, whereas traditional policing activities focused only on what was uncovered during the investigation (Meijer & Wessels, 2019). Research suggests that using broad forms of data to investigate and predict crime leads to improved decision-making and planning activities (Meijer & Wessels, 2019). Additionally, use of data analytics allows agencies to coordinate activities to predict criminal behavior by identifying known actors and removing factors leading to it (Meijer & Wessels, 2019). Little research, however, has supported this notion (Meijer & Wessels, 2019).

One specific area of improvement in applying predictive policing is that it allows agencies to use a wider range of historic crime data to more effectively and efficiently allocate resources and personnel (Meijer & Wessels, 2019). This is done through identification of areas of high crimes to predict where criminal activity is likely to take place (Meijer & Wessels, 2019). Such practices include identifying not only the areas of criminal activity but the times it most frequently takes place in order to anticipate and prevent it (Meijer & Wessels, 2019). This may lead to improved patrol routes and more effective distribution of law enforcement personnel (Meijer & Wessels, 2019). Predictive policing may also be useful in identifying potential offenders through the use of demographics and patterns of behavior (Meijer & Wessels, 2019). For example, one study used social media data and criminal statistics to distinguish otherwise lawful individuals who associate with known offenders and to what degree (Meijer & Wessels, 2019). Research on the efficacy of such practices remains limited, although two encouraging areas of success are the identification of types of behavior and improved police response to them (Meijer & Wessels, 2019). One study suggested that police placement in the community posed a reliable deterrent to illegal activity (Meijer & Wessels, 2019).

6.2. Risks

While law enforcement agencies will likely continue to pursue such data analytics, they do come with some identified risks. One such criticism is that, although entrenched in statistics, it remains impossible to fully understand the implications of them as a result of the divergent use of predictive policing models

(Meijer & Wessels, 2019). Errors in interpretation of the data can have disastrous consequences (Meijer & Wessels, 2019). Some experts suggest that the use of predictive policing indicates correlation but not causation (Meijer & Wessels, 2019). This may present agencies with conflicts through lack of transparency and accountability (Meijer & Wessels, 2019). Gemma (2018) cautions that agencies must critically evaluate the data to ensure it is appropriate for the mapping process. When officers do not fully comprehend what the data suggest, they may act in a manner inconsistent with the offense (Meijer & Wessels, 2019). Bennett Moses and Chan (2018) recommend agencies submit software to be vetted through reliable third parties to increase transparency in the use of predictive crime mapping in racially diverse areas. The research also suggests that focusing on known offenders could lead to disparate treatment encouraging discrimination, thus potentially leading to increased recidivism (Meijer & Wessels, 2019). The unintended consequences of predicted policing include over policing of some areas while areas of less crime and patrols experience greater economic advances leading to greater inequality (Meijer & Wessels, 2019). Finally, the use of individual social media and GPS data presents a threat to privacy and ethical treatment (Meijer & Wessels, 2019). Hardyns and Rummens (2018) discussed issues with the wide variety of data collected and the ethics of where and how it was harvested that could impact privacy concerns with the use of such data. These factors may compromise boundaries on what is appropriate and ethical (Meijer & Wessels, 2019). Researchers suggest that more training of police officers will be needed to counter such risks and to reestablish trust in communities (Meijer & Wessels, 2019). More research is needed in this area in order to truly understand predictive policing efficacy (Meijer & Wessels, 2019). One thing is, however, certain: unless law enforcement officers understand and correctly interpret the data, effectiveness and accountability will be undermined (Meijer & Wessels, 2019).

Another critique of predictive policing and the use of data analytics are the relationships between the law enforcement agencies and the corporate entities providing the data, entering into undisclosed agreements and using proprietary information, issues of transparency with regard to the entire process remain an issue (Haskins, 2019). The privatization of the data collection also raises concerns about accountability and transparency (Haskins, 2019). One study found that many law enforcement agencies relied on a single data technology company, further suggesting lack of transparency and accountability (Haskins, 2019). This single entity reported storing data indefinitely unless asked to purge it by individual law enforcement agencies, potentially leading to the use and sale of the data (Haskins, 2019). Additionally, users of such data analytics are reliant upon the technical support technicians who may or may not have the agency's best interests at heart (Haskins, 2019). Opponents of such practices also note that it is still a very new use of technology, yet it is given priority over traditional policing activities; too much is still unknown (Haskins, 2019).

7. CONCLUSION

Predictive policing is defined as the use of collected data to more precisely predict the types of crime that are likely to happen as well as when and where they will occur (Meijer & Wessels, 2019). Predictive policing is becoming more and more popular and will continue to expand in its application, as its effectiveness is far too tantalizing to abandon. Communities are always looking to enhanced and improved crime prevention strategies. Agencies have found that they are able to coordinate a wide range of data to more effectively evaluate the circumstances surrounding the crime thus improving decision-making and planning. Predictive policing also allows for agencies through the identification of the actors and removing opportunities to reoffend. Some suggest that it may also help better construct patrol routes and officer placement through the use of demographics and trends. A noted benefit was the suggestion that the appropriate placement of officers in communities decreased criminal activity. Opponents of such practices, however, have a laundry list of objections, including bias, racism, errors, discrimination, privacy, ethics, over-policing, security, its application, and issues with transparency and accountability in their application and the use of private corporations to supply the data. While current research and practices on predictive policing is promising, it is clear that further research is needed to fully understand the implications and

ramifications of it, especially as it relates to the application of policing activities and the accountability and transparency of them.

8. REFERENCES

- [1] Bennett Moses, L., & Chan, J. (2018). Algorithmic prediction in policing: Assumptions, evaluation, and accountability. *Policing & Society*, 28(7), 806-822. doi:<http://dx.doi.org/cosc.idm.oclc.org/10.1080/10439463.2016.1253695>
- [2] Big Data Made Simple. (2014, July 25). What is business intelligence? 20 popular definitions. Retrieved from <http://bigdata-madesimple.com/what-is-business-intelligence-20-popular-definitions/>
- [3] Columbus, L. (2017, August 31). 2017 state of business intelligence and predictive analytics. Retrieved from <https://www.forbes.com/sites/louiscolumbus/2017/08/31/2017-state-of-business-intelligence-and-predictive-analytics/#27502e4647a0>
- [4] Dun & Bradstreet. (2011). Business intelligence: A critical data layer for intelligence-led policing. Retrieved http://www.dnb.com/content/dam/english/dnb-solutions/risk-management/business_intelligence_a_critical_data_layer_for_intelligence_led_policing.pdf I did not see an in-text citation for this source.
- [5] Fitterer, J., Nelson, T. A., & Nathoo, F. (2015). Predictive crime mapping. *Police Practice & Research*, 16(2), 121–135. <https://doi-org.cosc.idm.oclc.org/10.1080/15614263.2014.972618>
- [6] Foote, K. D. (2017, September 14). A brief history of business intelligence. Retrieved <http://www.dataversity.net/brief-history-business-intelligence/>
- [7] Gemma, G. C. (2018). Exploring the ethical, organisational and technological challenges of crime mapping: A critical approach to urban safety technologies. *Ethics and Information Technology*, 20(4), 265-277. doi:<http://dx.doi.org/cosc.idm.oclc.org/10.1007/s10676-018-9477-1>
- [8] Gartner. (2018). Business intelligence (BI). Retrieved from <https://www.gartner.com/it-glossary/business-intelligence-bi/>
- [9] Hardyns, W., & Rummens, A. (2018). Predictive policing as a new tool for law enforcement? Recent developments and challenges. *European Journal on Criminal Policy and Research*, 24(3), 201-218. doi:<http://dx.doi.org/cosc.idm.oclc.org/10.1007/s10610-017-9361-2>
- [10] Haskins, C. (2019). Dozens of cities have secretly experimented with predictive policing software. Retrieved from https://www.vice.com/en_us/article/d3m7jq/dozens-of-cities-have-secretly-experimented-with-predictive-policing-software
- [11] International Association of Directors of Law Enforcement Standards and Training. (2004). Understanding contemporary law enforcement intelligence: Concept and definition. Retrieved from <https://www.iadlest.org/Portals/0/Files/Documents/DDACTS/Docs/Understanding%20Contemporary%20Law%20Enforcement%20Intelligence.pdf>
- [12] Jefferson, B. J. (2018). Predictable policing: Predictive crime mapping and geographies of policing and race. *Annals of the American Association of Geographers*, 108(1), 1–16. <https://doi-org.cosc.idm.oclc.org/10.1080/24694452.2017.1293500>
- [13] Kalantari, M., Ghezelbash, S., Ghezelbash, R., & Yaghmaei, B. (2019). Developing a fractal model for spatial mapping of crime hotspots. *European Journal on Criminal Policy and Research*, 1-21. doi:<http://dx.doi.org/cosc.idm.oclc.org/10.1007/s10610-019-09411-9>
- [14] Kovacevic, A. (2018). Police are using big data to predict future crime rates. Retrieved from <https://www.smartdatacollective.com/police-are-using-big-data-to-predict-future-crime-rates/>
- [15] Lapowsky, I. (2018). How the LAPD uses data to predict crime. Retrieved from <https://www.wired.com/story/los-angeles-police-department-predictive-policing/>
- [16] Leigh, J., Dunnett, S., & Jackson, L. (2019). Predictive police patrolling to target hotspots and cover response demand. *Annals of Operations Research*, 283(1-2), 395-410. doi:<http://dx.doi.org/cosc.idm.oclc.org/10.1007/s10479-017-2528-x>
- [17] Meijer, A., & Wessels, M. (2019). Predictive policing: Review of benefits and drawbacks. Retrieved from <https://www.tandfonline.com/doi/full/10.1080/01900692.2019.1575664>
- [18] Mills, M. (2017). Using big data to improve law enforcement. Retrieved from <https://datafloq.com/read/using-big-data-to-improve-law-enforcement/3485>
- [19] Rosser, G., Davies, T., Bowers, K., Johnson, S., & Cheng, T. (2017). Predictive crime mapping: Arbitrary grids or street networks? *Journal of Quantitative Criminology*, 33(3), 569–594. <https://doi-org.cosc.idm.oclc.org/10.1007/s10940-016-9321-x>
- [20] Smith, R. A. (2014, Spring/Summer). Law enforcement intelligence: Its evolution and scope today. *Intelligence: Journal of U.S. Intelligence Studies*, 20(3), 59. Retrieved from <https://www.afio.com>
- [21] Techopedia. (2017). Business intelligence (BI). Retrieved from <https://www.techopedia.com/definition/345/business-intelligence-bi>
- [22] The International Association of Crime Analysts. (2014, October 2). Definition and types of crime analysis [white paper]. Retrieved from https://www.iaca.net/Publications/Whitepapers/iacawp_2014_02_definition_types_crime_analysis.pdf