

Predictive Policing: Current and Future Policing

Harry Seldadyo¹, Eko Rudi Sudarto², Ahrie Sonta³

^{1,2,3}College Lecturer of Indonesian Police Science, Indonesia

ekosudartoinp@gmail.com

Abstract

In the era when everything is moved by data, policing efforts are necessary and important for self-adaptation. Predictive policing is in these dynamics of data-based policing to do prediction and to take the action which can change certain outcome to the expected result. Nevertheless, the existing literature usually discuss predictive policing in technical micro dimension. This writing fulfils the gap which has smaller attention from the literature that is the discussion on each meso and micro dimension which has tactical and strategical characteristics. As a result, the complete and integrative perspectives can be contributed to discourse of predictive policing.

Keywords

Predictive policing; policing effort; integrative perspective



I. Introduction

This era is data era. Private and public sectors are demanded to build and move their policies above data. Even, in many situations categorized as wicked problems where the optimum solution is difficult to find (Veenstra & Kotterink, 2017), data are greatly needed as the guidance stick to the direction of the needed solution. Data-driven policy currently becomes inevitable demand to be the standard practice in various organization entities. Organization must have a goal to be achieved by the organizational members (Niati et al., 2021). The success of leadership is partly determined by the ability of leaders to develop their organizational culture. (Arif, 2019).

Data also have entered police science and policy arena. In the previous years, police science and policy literature were coloured by various new methodologies which were driven by data – one of which is predictive policing. This writing especially conducted literature observation on the concept of predictive policing. Usually, predictive policing is discussed in the micro dimension of technical crime prevention. (Tayebi & Glässer, 2016), for example, mentioned “predictive policing uses data science to identify potential targets for criminal activity with the goal of crime prevention.” In *Criminal Futures: Predictive Policing and Everyday Police Work*, Egbert and Leese (2021, p.3) also mentioned technical terms, “Predictive policing involves police officers, morning briefings, patrol cars, election campaigns, data protection, and gut feelings as much as it involves data and algorithms.” Development is a systematic and continuous effort made to realize something that is aspired. Development is a change towards improvement. Changes towards improvement require the mobilization of all human resources and reason to realize what is aspired. In addition, development is also very dependent on the availability of natural resource wealth. The availability of natural resources is one of the keys to economic growth in an area. (Shah, M. et al. 2020)

Nevertheless, this writing considers micro dimension is not sufficient. It is in line with (Egbert & Leese, 2021) who also stated, “Studying predictive policing as a socio-technical system means to pay attention to a multiplicity of technical, human, organizational, cultural, political, ethical, legal, and – not least – economic elements that matter in the production and prevention of criminal features.” Therefore, there are other areas aside from micro dimension. Thus, this writing also aims at increasing the thought challenge on the concept of predictive policing to the broader dimension, they are meso and macro dimensions, which are practically empty in police science literature. If the micro dimension is technical, meso and macro dimensions are each tactical and strategical. Therefore, this writing aims at contributing to the creation of the more comprehensive – and also integrated predictive policing repertoire.

II. Review of Literature

2.1 Definition and Concept: Micro Dimension

As a terminology, predictive policing has been self-explanatory. In the substance, the term contains meaning about the capacity to do a prediction of an event in the policing area. The diction of ‘event’ is used here to broaden predictive policing discourse from micro dimension and the following technical actions, towards meso and macro dimensions and also the tactical and strategical actions which are closely attached. “The following actions’ is a predictive response to change the outcome (Beck & McCue, 2009) to the expected result. This is the primary proposition taken by this writing: dimension coverage expansion. Nevertheless, before jumping far to the dimension expansion towards meso and macro dimensions, it is necessary to overview first how predictive policing is put in the discourse of micro dimension.

In this writing, micro dimension is utilized to put predictive policing in the arena of technical crime prevention. This is in line with the definition determined by (Bratton et al., 2009) on predictive policing that is all policing strategies or tactics which develop and use information and further analysis towards forward-thinking crime prevention. (Bakke, 2018) also determined the definition of predictive policing with similar perspective, that is the implementation of analysis technique to identify where crime potentially occurs and who the perpetrator is. The similar perspective is shown by (Perry, 2013) who pronounced predictive policing as using analysis technique – especially quantitative technique – to identify police intervention target to prevent crime, finish past crime, or track crime perpetrator and victim.

Various analysis techniques in predictive policing exactly depend on data (Pearsall, 2010a), so that the perspective can be understood if (Pearsall, 2010b) defines predictive policing as data utilization from various different sources, analyse them, and use the result to anticipate, prevent, and respond crime which will occur more effectively by using statistical prediction. In short, the key words for predictive policing in this micro dimension are ‘event prediction’ (outcome) and ‘the following technical action’. ‘The following technical action’ is executed by police organization internally.

If data becomes the determinator heart of predictive policing, the put assumption is data regularity. This is crime behavioural pattern which is recorded in data through various analyses. In this regularity pattern assumption, crime data are considered as not moving randomly. In other words, in statistic perspective, as mentioned by (Perry, 2013), it means that ‘crime is predictable’. This is also in line with the Norwegian Board of Technology (2015, p.26) who stated that, “...for certain types of crime it is not entirely random where and when offences take place – meaning in some cases it ought therefore also to be

possible to make predictions based on risk analyses.”(Wortley et al., 2008) The repeated crime offences are captured and mapped as a regularity pattern – and through this pattern prediction is done on the assumption that ‘the future is like the past’ (Bennett Moses & Chan, 2018).

Various statistical analyses are used to explore and find the existing regularity patterns – trends, structure, grouping or clustering, correlation, and others. Beside the prediction on when crime occurs, predictive policing also does prediction on other things. (Tayebi & Glässer, 2016) divided predictive policing into four classes of prediction. First is predicting offenders. This is crime action prediction by the offender based on the historical data of the offender. Second is predicting victims: predicting the individual who potentially becomes crime victim and the risk situation for the potential victim. Third is predicting criminal collaborations that is prediction on the existence of future collaboration among crime offenders. Fourth is predicting crime locations. It is prediction on crime locus both individually and aggregately. Meanwhile, (Ferguson, 2017) observed the evolution of predictive policing in three parts. ‘Predictive policing 1.0’ refers to the property of crimes, ‘Predictive policing 2.0’ refers to the places of crime with violence. ‘Predictive policing 3.0’ refers to people involved in crime. (Uchida et al., 2014)

Next, through the use of statistic software or certain algorithm creation – including the development of complex mathematic equation series – a prediction on the time, offender, collaboration among the offenders, and the location of the crime occurs. In this spot, predictive policing utilizes technology to achieve the targeted accuracy degree (van Brakel & de Hert, 2011). In the journey, predictive policing is also supported by machine-learning or artificial intelligence (AI), (McDaniel & Pease, 2021) so the regularity patterns and the following prediction accuracy is getting reliable.

Currently, the big data also have become the attention in predictive policing. Big data by Ferguson (2017b) are considered to be able to answer four key questions in predictive policing, they are (1) whom we police, that is prediction target on certain person/people, (2) where we police, that is location-based policing, (3) when we police, that is real-time observation and investigation, and (4) how we police, that is how policing is done based on digital data extraction. Big data can be sourced from various public record. In Indonesian police data management, public record is saved in SIM, STNK, BAP, SKCK, and other data. Of course, it is possible to link public record in police’s hands and public record in other governmental organization units, such as KTP, passport, NPWP, court verdict, even including geospatial data collected by Badan Informasi Geospasial (Geospatial Information Organization) and financial flow data from bank account to others recorded by PPATK. The link among big data is not only able increase predictive policing accuracy but also create data integration towards a single data system – which is currently known as ‘Satu Data Indonesia’.

Through this overview, predictive policing is truly potential to cover the arena outside crime issues. Traffic management, for an instance, is greatly appropriate to be in predictive policing. Traffic high frequency data with consistent regularity pattern is an important source in policing action in traffic flow management – including traffic accident minimization or even prevention. Mass demonstration or forest and land wildfire which have cyclical pattern from the time are also included in the coverage of predictive policing. Data of financial transaction movement of bank accounts which have or are potential to be profiled by certain crime, such as radicalism and terrorism, also contain certain pattern which can be explored by predictive policing. Even, the digital data of the recorded people’s mobility, for example by Google Mobility Index or telecommunication network, take a significant position in predictive policing. Such data are not only useful in normal

situation but also in pandemic situation when the policy of mobility and crowd limitation is applied – which the violation on the policy is considered as law violation. It is clear that in micro dimension predictive policing is technical. Data from various sources, including in various forms, be it in the form of searching, creating, recording, and sensing processes. Predictive policing utilizes these data to do a prediction on the outcome, which is followed by policing action.

III. Result and Discussion

3.1 Meso Dimension

Can predictive policing be isolated and limited only in micro and technical dimensions? If predictive policing in the essence is policing effort which moves in sequential-cyclical way from data, analysis, prediction, and action, predictive policing can also work in meso dimension which is tactical. In addition, if in micro dimension predictive policing practically works in their own environment, in meso dimension predictive policing tactically works by involving stakeholders through multi-stakeholdership – an actor network which links their interest and motivation (co-interest and co-motivated actors).(Sacchetti & Tortia, 2014)

The implementation of multi-stakeholdership approach, of course, needs the complete mapping on who can be defined as stakeholder. (Biderman & Scheirer, 2020) gave interesting note about this, “Any person who produces data used in a model, uses a model, or whose life is impacted by the outputs of a model is a stakeholder. This especially includes groups who are undervalued and underrepresented in the design process.” Even though Biderman and Scheirer define stakeholder in the context of machine-learning algorithm disposition technique, the interpretation can be broader and exceed the technical matters of algorithm. For predictive policing, the ability to map stakeholders in the limitation by Biderman and Scheirer needs to be developed. To be exact, the ability to do stakeholder analysis is the key requirement in predictive policing in tactical meso dimension.

Next, together with the ability to do stakeholders mapping, predictive policing in this dimension develops tactical ability to build communication and negotiation, transfer ideas or care, and also define the agendas among the stakeholders. As the result, multi-stakeholders are not only a group of spontaneous, loose, and unstructured stakeholders but also become an organized institutional network which serves their interest and motivation. Such multi-stakeholdership stands above: (1) administrative network where each agent depends on each other, (2) interest network where each agent supports each other in agenda formulation, and (3) rules which both limit and give incentive for agents’ interaction who are network supporters.(Brugha & Varvasovszky, 2000) It is an important note that tactical characteristic in meso dimension is not only imagining but stands above the fact that organization resources and authorization tend to be limited. Therefore, organization’s communication, ideas, and agendas need to be distributed among the stakeholders, so that they do not become the burden on certain individual’s shoulder. In daily practice, this becomes a serious challenge, remembering that ‘mutual interest’ is public good which is always hitched by free-rider problems.

In regular data behaviour, for example highway traffic management, predictive policing certainly has micro-technical dimension. However, moreover, in meso dimension, predictive policing on traffic can be shifted to the direction of vehicle density control in highway. In many big cities in Indonesia, it is known that the number of vehicles grows exponentially, while the road length shifts linear-declivous, even tends to be flat. It means

that flow control technical management is no more adequate to be implemented. The necessity is vehicles' number and density control tactical dimension. Of course, police cannot move independently in this dimension because highway traffic problem is not only in police domain. This is the role of predictive policing in meso dimension that is build multi-stakeholdership attitude. Thus, if in predictive policing micro-technical dimension police can act by empowering their own environment, in meso dimension police tactically needs to define and gather other stakeholders to create network which includes co-interest and co-motivated actors.

Similar situation can also be met on forest and land wildfire with cyclical and spatial data behaviours. Satellite data can record forest and land wildfire locus coordinate – which, of course, can be compared to concession holder data – in certain period gap. Based on the data, the prevention of forest and land wildfire technically can be done. Nevertheless, these micro-technical-dimensioned acts need to be completed with meso-tactical-dimensioned policing. It means that the stakeholder of forest and land wildfire needs to be defined and multi-stakeholdership be developed. In this perspective, predictive policing plays its tactical role in forest and land wildfire prevention.

3.2 Macro Dimension

In line with the stronger data-based decision-making tradition, predictive policing becomes a necessity today and in the future. The macro dimension of predictive policing strategically does prediction on the landscape and anatomy of future crime and non-crime offences which can be guaranteed to be more complex in '5V' (volume, velocity, variety, veracity, and value) and in '2F' (format and face). Future crime typology – for example the one which is identified by Department of Justice, Canada – can be noted from several things that are currently growing right now, they are computer-based crime, information and science crime, identity theft, crime with the more sophisticated organizations, and foreign crime. It is important to be noted that extraordinary crimes do not stay static but they keep adapting to the social and economic environment changes. At the same time, drugs also synergize with technology in three aspects: cultivation, pharmacy, and distribution (digital, network-based). It still needs to be added by the consistent tendency that law and regulation are always left behind the offence.

Meanwhile, future non-crime offences which are in the policing arena are anti-social behaviour, hate, social disaggregation, transportation and accident – including the tasks in peacekeeping police scheme.(Kenny, 2016) It is also important to observe community construction activity (discipline and policing) to capture, map, and create predictions on changes which currently occur and will occur in society in demography composition, social mobility and geography mobility, relation and behaviour among individuals.

Predictions on the future offences cannot stand alone but they need to be supported by a strategic planning. Like the usual strategic planning in general, predictive policing is also a part of a vision and the grand plan's derivative. It means that there is a series of follow-up actions as the explanation of the vision and grand plan. This series includes the determination of objective, coverage, delivery, milestone, resource, and action plan. In this context, aside from building future prediction as mentioned before, the necessity which is directly felt is the execution of the series of the follow-up actions. The internal side of predictive policing requires the organization management system and physical and non-physical infrastructures – including the personnel who has competencies and skills. The external necessity covers relation construction with the sources of data and information, knowledge, technology, and even funding.

This overview shows the macro-strategic dimension of predictive policing is a preparedness. The essence of preparedness is investment in capacity expansion. It is no more a necessity but it changes to a requirement. Investment is moved towards technology mastery and can be identified from now. Some of them are data analytics, artificial intelligence, blockchain, robot and automation, drone, biometric, virtual reality, cloud, and so forth.(Jones & by Deloitte, 2015) Technical research – even also social – in policing become the intimate part in this investment.

Finally, it can be said that, in all dimensions, predictive policing is an anticipation step of potential negative outcomes to prevent the occurrence. At the same time, predictive policing is application action on the occurred potential positive outcomes. Data are the heart; technology is the vein.

IV. Conclusion

The civilization is moving and changes apply to every aspect. The most serious challenge for police organization in this moving era is keeping police organization to stay relevant. This challenge is real so that the respond of this challenge needs to be executed in real. In the moving era to execute the challenge, police takes the stance as the learning organization (Geller, 1997) – organization which keeps in the learning cycle: understanding new things, increasing competencies and skills, taking actions: next they understand new condition, re-increasing competencies and skills, re-taking actions, and so on until in the new cycle process police organization is in the higher position compared to the previous spot. This is in line with the statement of (Walsh & Vito, 2018) about learning organization as an organization which “...actively engages, evaluates, and adapts by continually assessing its environmental demands and operational methods. It learns from its own and the similar experiences of other organizations in order to adjust and respond to the environmental demands it faces.”

Each era has their own signature characteristics. Currently and in the future, the most significant signature is mutual triangle relation among technology, data, and policy decision. Predictive policing is inside the triangle room. Predictive policing explores data, develops analysis, finds pattern, and then determines the action. Future offences are predicted – with data as the material and technology as the pillar. In the entire process, predictive policing takes three characteristics: technical, tactical, and strategic. In these three characteristics, predictive policing works on an issue, be it a crime or non-crime. In crime, predictive policing prevents the occurrence of the crime. For non-crime aspect, similar characteristics are also implemented: prevention for negative event so that the event does not occur; and support for positive event so that the event occurs.

In the three dimensions – micro, meso, and macro – predictive policing places police organization to be relevant to current and future era. In micro dimension, the utilization of data and technology is the main colour of current and future era. In meso dimension, multi-stakeholdership becomes the characteristic, not only internal crossed-force collaboration but also with other stakeholders outside police organization. This is followed by tactical ability development to communicate and negotiate, stream ideas and care, and also determine agendas among the stakeholders. In macro dimension, crime and non-crime offences in the future will change very fast. It happens together with the community changes. Predictive policing strategically detects what and how the change occurs, and then prepares a series of internal and external actions to anticipate the changes.

“Can our police ... find ways to work smarter, not just harder?”

William A. Geller (1997)

References

- Arif, S. (2019). Influence of Leadership, Organizational Culture, Work Motivation, and Job Satisfaction of Performance Principles of Senior High School in Medan City. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*. P. 239-254
- Bakke, E. (2018). Predictive policing: the argument for public transparency. *NYU Ann. Surv. Am. L.*, 74, 131.
- Beck, C., & McCue, C. (2009). Predictive policing: what can we learn from Wal-Mart and Amazon about fighting crime in a recession? *Police Chief*, 76(11), 18.
- Bennett Moses, L., & Chan, J. (2018). Algorithmic prediction in policing: assumptions, evaluation, and accountability. *Policing and Society*, 28(7), 806–822.
- Biderman, S., & Scheirer, W. J. (2020). Pitfalls in machine learning research: Reexamining the development cycle.
- Bratton, W., Morgan, J., & Malinowski, S. (2009). The need for innovation in policing today.
- Brugha, R., & Varvasovszky, Z. (2000). Stakeholder analysis: a review. *Health Policy and Planning*, 15(3), 239–246.
- Egbert, S., & Leese, M. (2021). *Criminal futures: Predictive policing and everyday police work*. Taylor & Francis.
- Ferguson, A. G. (2017). Policing Predictive Policing, 94 *Wash. UL Rev*, 1109, 1122–1144.
- Geller, G. (1997). Horizontal subsurface flow systems in the German speaking countries: summary of long-term scientific and practical experiences; recommendations. *Water Science and Technology*, 35(5), 157–166.
- Jones, K., & by Deloitte, B. (2015). Ready or not? Is HR ready for analytics. *Workforce Solutions Review* (November).
- Kenny, D. E. (2016). *A force for good: Exploring the future of non-crime policing*.
- McDaniel, J. L. M., & Pease, K. (2021). *Predictive Policing and Artificial Intelligence*. Routledge, Taylor & Francis Group.
- Niati, D. R., Siregar, Z. M. E., & Prayoga, Y. (2021). The Effect of Training on Work Performance and Career Development: The Role of Motivation as Intervening Variable. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, 4(2), 2385–2393. <https://doi.org/10.33258/birci.v4i2.1940>
- Pearsall, B. (2010a). Predictive policing: The future of law enforcement. *National Institute of Justice Journal*, 266(1), 16–19.
- Pearsall, B. (2010b). Predictive policing: The future of law enforcement. *National Institute of Justice Journal*, 266(1), 16–19.
- Perry, W. L. (2013). *Predictive policing: The role of crime forecasting in law enforcement operations*. Rand Corporation.
- Sacchetti, S., & Tortia, E. (2014). Multi-stakeholder governance. A social enterprise case study. *International Journal of Cooperative Management*, 7(1), 58–72.
- Shah, M. et al. (2020). The Development Impact of PT. Medco E & P Malaka on Economic Aspects in East Aceh Regency. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*. P. 276-286.
- Tayebi, M. A., & Glässer, U. (2016). Social network analysis in predictive policing. In *Social Network Analysis in Predictive Policing* (pp. 7–14). Springer.
- Uchida, Y., Takahashi, Y., & Kawahara, K. (2014). Changes in hedonic and eudaimonic well-being after a severe nationwide disaster: The case of the Great East Japan

- Earthquake. *Journal of Happiness Studies*, 15(1), 207–221.
- Van Brakel, R., & de Hert, P. (2011). Policing, surveillance and law in a pre-crime society: Understanding the consequences of technology based strategies. *Technol. Led Policing*, 20, 165–192.
- Veenstra, A. F. van, & Kotterink, B. (2017). Data-driven policy making: The policy lab approach. *International Conference on Electronic Participation*, 100–111.
- Walsh, W. F., & Vito, G. F. (2018). *Police leadership and administration: A 21st-century strategic approach*. Routledge.
- Wortley, R., Mazerolle, L. G., & Rombouts, S. (2008). *Environmental criminology and crime analysis*.