 doi:10.20944/preprints202203.0366.v1

Performance evaluation of integrated public security areas: Application of the PROMETHEE II method in the Brazilian context

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Abstract

Purpose: This research aims to model a police agency ordering problem based on criteria that measure the performance of operational and logistical variables, using a multicriteria method.

Design/methodology/approach: The multicriteria method PROMETHEE II was used, which with the aid of the Visual PROMETHEE software, emulated the systematized data in the impact matrix and produced the final ordering of the most efficient police agencies in equalizing the operational, logistical, financial, and human resources applied in the combating crime and reducing criminal indices.

Findings: The results confirmed that the resources made available to police agencies located in different municipalities in the metropolitan region of the state of Rio de Janeiro are better applied by managers compared to police units in the capital of Rio de Janeiro.

Research limitations/implications: As implications of the research, it can be inferred that the use of multicriteria methods in modelling problems in public security can contribute to the rationalization of the use of available resources to fight crime in large cities. Research has shown that it is possible to use the multicriteria methodology in ordering police agencies that best equalize the available resources.

Practical implications: The practical impact of this research lies in optimizing the resources available to law enforcement agencies in the fight against crime in general.

Social implications: The results can influence the decision making of the local government in the allocation of resources, as well as offering sectors of the economy information relevant to local development.

Originality/value: The results of the MCDA analysis can be used to help police agencies in Rio de Janeiro, Brazil to be more efficient. In addition, the application of MCDA can be a new approach to measuring the efficiency of police services.

Keywords: Military Police, Efficiency, Police performance, Productivity, Decision making, Multicriteria, PROMETHEE II, MCDA

1. **Introduction**

Maintaining public order is one of the central collective assets of modern society. Fighting crime is a crucial role of the state in contemporary societies. In addition to providing healthcare, education, and other social welfare services, the state should ensure the preservation of citizens' assets and physical integrity. Social conflicts arising out of deviant behaviour are managed in modern societies by public organisations specialised in implementing mechanisms of social control. From an institutional standpoint, contemporary democratic states seek to maintain order through obedience to various legal institutions, which establish the parameters of their power to act. Thus, as stated by (Sapori, 2007; Basilio, 2009; Basilio, 2010a; Basilio and Riccio, 2017), under this view, in a democratic state of law, the highest order is enforced by law.

Because the fight against crime has been nationalised, the state is responsible for crime prevention through proactive policing, investigating and collecting evidence against potential perpetrators of crimes; through the trial of those individuals with the goal of finding the truth; and through exacting punishment by imprisoning those found guilty and duly convicted. Hence, the institutional arrangement of public security is a complex organisational and legal system, which in turn is divided into subsystems with their own unique characteristics, albeit coordinated by the division of labour and the complementarity of functions. In general, this system encompasses the Police, the judicial subsystem, and the prison subsystem (Sapori, 2007; Basilio, 2010b). However, this complex structure requires human, logistical, and financial resources to carry out its activities. On the other hand, National States have limited resources, arising from taxes charged to citizens. From this perspective, common to several countries around the globe, the study of the performance of police agencies becomes paramount, about the optimization of their available resources used to fight crime and disorder in a different way general.

The performance of police organizations is in interest of not only the police administrators, but also the citizens (Akdogan, 2012). The efficiency of police organizations in a neighborhood can be a measure of success for the organization, and the administrators for that department, but it means more to the citizens living in that neighborhood. It means a safer place to live for them; it also means a quality of life. However, it is hard to measure the performance of police departments because police officers do a variety of tasks. Although police officers are supposed to prevent and investigate crimes, there are many other duties for them. These tasks are the hidden part of the iceberg for police organizations in many countries including Brazil.

Asmild et al. 2012 asserts that the productivity measurement is as important in the public sector as it is in the private sector since it can highlight strengths and weaknesses in current practices, show potential and directions for improvements and ultimately may lead to better utilisation of the resources spent on providing public services. In this paper, we consider the police services delivery in a city with a population of several millions. Police services are characterised by being multidimensional in nature, consisting of many different functions that are difficult to quantify, are measured in different ways and for which objective and well-defined prices are not given. This makes defining and estimating the productivity for police work difficult.

Generally, Data Envelopment Analysis (DEA) has been used to measure the productivity of police units in a number of studies (Thanassoulis 1995; Carrington et al. 1997; Nyhan and Martin 1999; Sun 2002; Diez-Ticio and Mancebon 2002; Drake and Simper 2000, 2001, 2002, 2003a,b, 2004, 2005a,b; Barros 2006, 2007; Verma and Gavirneni 2006; Goltz 2008; Gorman and Ruggiero 2008; García-Sánchez 2007, 2009; Wu et al. 2010; Asmild et al. 2012). However, the purpose of this paper is to use a multicriteria method (Basilio et al., 2022) to order police agencies, based on specific criteria, which include variables that measure operational, logistical, financial, and human resources. We believe that the result of the ordination indicates the agencies that best equalize the available resources.

The present study was conducted from 2019 to 2020 and examines the public security context of the state of Rio de Janeiro, Brazil. Since 2009, the state has subdivided its territory into 39 integrated public security areas (IPSAs) (Basilio *et al*., 2018; Basilio and Pereira, 2020a). The territorial division is heterogeneous and some IPSAs are responsible for law enforcement in one or several cities. Conversely, in the state capital, IPSAs correspond to one or several neighbourhoods. Police activity is complex and diverse, as stated by (Basilio and Riccio, 2017; Riccio and Skogan, 2018, Basilio and Pereira, 2020b). Therefore, considering the diverse contexts of each of the 39 IPSAs. These researchers seek an answer to the following question: How can the government identify the police agencies that best use the resources available to fight local crime? In this sense, a model was developed based on the decision analysis of multiple criteria, introducing 13 criteria corresponding to variables that measure the operational, logistical, financial, and human resources. Therefore, thirty-nine IPSA were used as alternatives. The data matrix inserted in the model was generated from data collection in the open database of the Public Security Institute (ISP). The method used PROMETHEE II, which ranked the 39 IPSA in Visual PROMETHEE software. The result reveals that the police units with the best performance are those that are in the interior of the State of Rio de Janeiro. In the state capital, the opposite occurs, as illustrated in the thermal map. The results can influence the decision making of the local government in the allocation of resources, as well as offering sectors of the economy information relevant to local development.
This research study is divided into five sections. The first section is the introduction in which the research problem, objective and summaries of the method are applied, and partial findings are presented. The second section is the literature review. The third section describes the method. The fourth section describes the numerical application of the model. The fifth section covers the discussion of results and final considerations.

2. Literature review

This section presents the fundamental concepts that guide this study. Importantly, it aims not to cover all subjects but to provide essential information for understanding the research, context, and results.

2.1 An overview of studies that address efficiency in police structures

Efficiency is an important and desired term in the corporate world. In a complex world with scarcity of resources, being efficient is something that occupies a relevant position in the minds of managers, because being efficient is synonymous with survival. In the context of public administration, being efficient means that public resources, which have their genesis in the

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payment of taxes by the citizen, are being converted into public services and policies for the welfare of the citizen. In this scenario, we have the police agencies, which are concerned with an overview of guaranteeing life, the right to come and go, and people's assets. Thus, measuring the efficiency of police agencies is important and has an impact on society. Over the past few years, numerous researchers have conducted research on this topic, as we will see below.

In 1991, Cook et al. measured the efficiency of highway maintenance patrols in Ontario, Canada. In Ontario, 244 patrols were working on highways and each patrol was responsible from their province, which was scattered to some fixed number of lane kilometers. The authors used seven variables to assess efficiency: 1) area served factor; 2) average traffic served; 3) pavement rating change factor; 4) accident prevention factor; 5) maintenance expenditures; 6) capital expenditures; and 7) climatic factor.

Thanassoulis (1995) applied DEA to measure the performance of police forces in England and Wales. Violent crimes, burglaries, other crimes, and officers were used as inputs. He employed violent crime clear-up rate, burglary clear up rate and other crime clear up rate as outputs. The researcher then compared those efficient units with other inefficient units and showed the possible improvements areas for those inefficient units.

Carrington et al. (1997) assessed the performance of police services in New South Wales (NSW). They used a two-staged study; in the first stage they measured the efficiency of all police patrols and then used Tobit regression to analyze external factors affecting the variation in technical efficiencies across patrols. In the first stage where they used DEA, police officers, civilian employees and police cars were used as inputs whereas offences, arrests, summons, major car accidents, and kilometers traveled by police cars were used as outputs. Based on results of the study, the authors recommended that NSW police districts should reduce the usage of inputs by13.5 percent.

Barros (2006) used panel data of the Portuguese Public Security Police on 33 precincts for the years 2000, 2001 and 2002 to estimate the productivity change in terms of technical efficiency and technological efficiency. The author used 14 variables in the measurement process, as follows: number of police officers, cost of labor, cars, other costs, theft, burglaries, car robberies, and drug related crimes were employed as inputs whereas outputs were set as clear-ups of thefts and burglaries, clear-ups of car robberies, clear-ups of drug-related crimes, search operations, traffic-stop operations, and minor offences.

Akdogan (2012) developed his research in Turkey, based on his study The Turkish National Police organization. The researcher used 10 variables to measure the efficiency of police stations in Ankara: the number of personnel, the number of police vehicle, the population of the precinct, the area of the precinct (meter square), the number of critical entities in the precinct (such as schools, hospitals), the number of incoming documents (both judicial and managerial), the number of incidents occurred in the precinct, the number of processed judicial and managerial documents, the number of outgoing documents, the number of solved incidents . The results showed that ten out of 19 police stations in Ankara were efficient.

In their research work, Asmild et al., (2012) developed a model for evaluating police units. Asmild et al., (2012) conducted interviews with senior police officers, which led to the division of the variables used in the model in three distinct groups, related to: law enforcement; answer for emergencies; and crime prevention. In preliminary analyzes, the authors considered the variable workforce or number of personnel assigned to each function as a common variable in each of the models. Then he listed the specific variables related to enforcement law, which are: the number of arrests, the number of other cases worked and the rate of resolution of cases. For the answer to emergency model, the variables are the percentage of time available, the number of answered calls and the inverse of the response time (or the response speed). The crime prevention model initially considered the inverse of the crime rate, the percentage of time on patrol and the number of times people are stopped and interviewed.

Asif et al. (2018) makes use of DEA to measures police efficiency in the city of Lahore, which is a large metropolitan city of Pakistan. The researchers used eight variables: number of investigators; total staff; number of police vehicles; operating expenditures; average response rate to reported crimes / emergencies; crime clearance rate; number of processed judicial and managerial documents; and the number of staff serving at critical entities.

DEA has been very popular in measuring police efficiency worldwide, see e.g., in the UK (Drake and Howcroft, 1994; Drake and Simper, 2004, 2005), Portugal (Barros, 2007), Slovenia (Aristovnik et al., 2013), Guatemala (Alda, 2014), Mexico (Alda, 2017), Peru (Alda and Dammert, 2020), Israel (Hadad et al., 2015), the USA (Gyimah-Brempong, 1987; Gorman and Ruggiero, 2008), India (Verma and Gavirneni, 2006), and Spain (Diez-Ticio and Mancebon, 2002), among many others. The mentioned studies are only representative and all use DEA. We differentiate our study from others by developing a structured structure that is based on various measures of efficiency in order to provide valuable information on the measurement of police performance, using a multicriteria method.

2.3 Description of the PROMETHEE II method

The literature identifies seven types of methods that integrate the PROMETHEE family (Brans and Vincke, 1985; Brans et al., 1986), as recorded in recent research: PROMETHEE I (Makan and Fadili, 2020); PROMETHEE II (Almeida and Costa, 2002; Basilio et al., 2018); PROMETHEE III (Urli et al.,2019); PROMETHEE IV (Albuquerque and Montenegro, 2016); PROMETHEE V (Ghandi and Roozbahani, 2020); PROMETHEE VI (Alencar and De Almeida, 2011); and PROMETHEE GAIA (Anwar and Rasul, 2019).

The PROMETHEE II method (Brans and Vincke, 1985) consists of constructing an outranking relation of values (Vincke, 1992), (Bouyssou and Roy, 1993). As Fontana and Cavalcante (2014) states, PROMETHEE II is a relatively simple ranking method in design and application compared to other multicriteria analysis methods. It is well suited to issues in which a finite number of alternatives should be ranked considering criteria. This method stands out since it seeks to involve concepts and parameters, which have some physical or economic interpretation, easily understood by the decision maker.

Behzadian *et al.*, (2010), in their research, analyzed 217 papers identifying studies that applied the PROMETHEE method. As a result, the authors identified that the method was used for decision making in the following fields of study: Environment Management (Ozdemir *et al.*, 2020); Hydrology and Water Management (Zamani *et al.*, 2020); Business and Financial Management (Basilio *et al.*, 2018); Chemistry (Mohammed *et al.*, 2018); Logistics and Transportation (Liao *et al.*, 2018); Manufacturing and Assembly (Bhalaji *et al.*, 2020); Energy Management, Social (Rezaei-Malek *et al.*, 2019), and Public Security(Basilio *et al.*, 2020).

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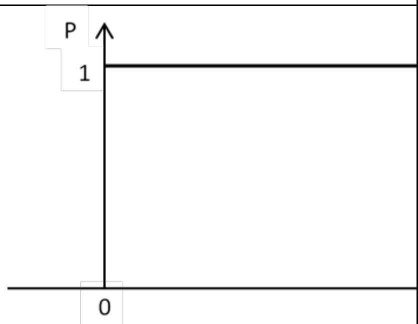
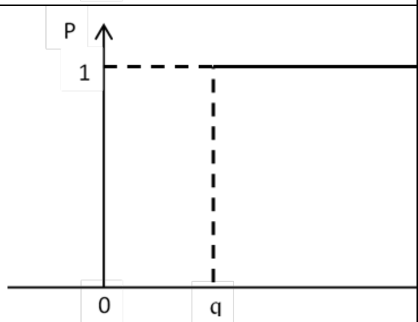
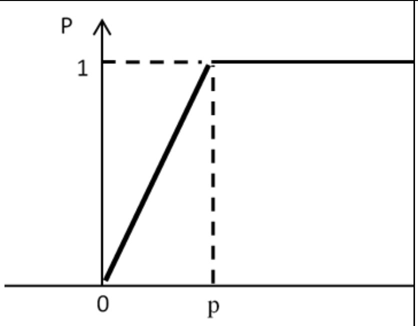
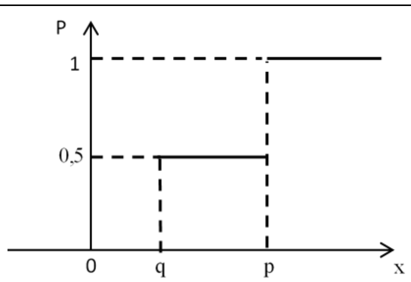
The method is implemented in five steps. In the first step, there is a function showing the preference of the decision-maker concerning the share "a" compared with the share "b". The second step consists in the comparison of the suggested alternatives to the pairs for the preference function. The PROMETHEE proposes the six following types (shapes) of preference functions, as shown in Table I:

Table I Types of preference function

Type	Generalized criterion	Condition	Quantification of preference	Parametr to fix
Type I – Usual preference function		$g(a)-g(b)>0$ $g(a)-g(b)\leq 0$	$P_j(a,b)=1$ $P_j(a,b)=0$	-
Type II – U-shape preference function		$g(a)-g(b)>q$ $g(a)-g(b)\leq q$	$P_j(a,b)=1$ $P_j(a,b)=0$	q
Type III – V-shape preference function		$g(a)-g(b)>p$ $g(a)-g(b)\leq p$ $g(a)-g(b)\leq 0$	$P_j(a,b)=1$ $P_j(a,b)=[g(a)-g(b)]/p$ $P_j(a,b)=0$	p
Type IV – Level preference function		$\lvert g(a)-g(b)\rvert>p$ $q<\lvert g(a)-g(b)\rvert\leq p$ $\lvert g(a)-g(b)\rvert\leq q$	$P_j(a,b)=1$ $P_j(a,b)=\frac{1}{2}$ $P_j(a,b)=0$	p,q

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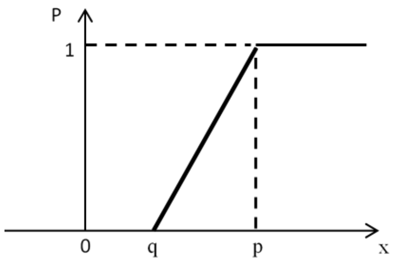
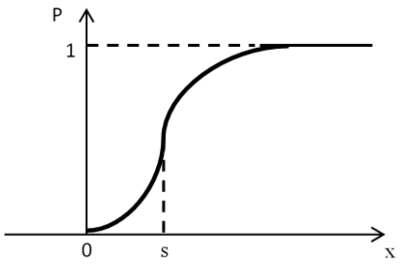
Type V – Linear preference function		$\lvert g(a)-g(b)\rvert > p$ $q < \lvert g(a)-g(b)\rvert \leq p$ $\lvert g(a)-g(b)\rvert \leq q$	$P_j(a,b) = 1$ $P_j(a,b) = \frac{[\lvert g(a)-g(b)\rvert - q]}{(p-q)}$ $P_j(a,b) = 0$	p,q
Type VI – Gaussian preference function		$g(a)-g(b) > 0$ $g(a)-g(b) \leq 0$	$P_j(a,b) = 1 - e^{\left\{\frac{-(g(a)-g(b))^2}{2s^2}\right\}}$ $P_j(a,b) = 0$	s

As a third step, the results of this comparison are presented in an evaluation matrix as the estimated values of each criterion for each alternative. The classification is performed in two final steps: a partial ranking in the fourth stage and then a total ranking of alternatives in the fifth step, as represented in Figure 1.

Step 1. Determination of deviations based on pair-wise comparisons

$$d_j(a,b) = g_j(a) - g_j(b) \quad [1]$$

Where $d_j(a,b)$ denotes the difference between the evaluations of a and b on each criterion.

↓

Step 2. Application of the preference function

$$P_j(a,b) = F_j[d_j(a,b)] \quad j=1,\dots,k \quad [2]$$

Where $P_j(a,b)$ denotes the preference of alternative a with regard to alternative b on each criterion, as a function of $d_j(a,b)$.

↓

Step 3. Calculation of an overall or global preference index

$$\forall\, a,b \in A, \quad \pi(a,b) = \sum_{j=1}^{k} P_j(a,b)\, w_j \quad [3]$$

Where $\pi(a,b)$ of a over b is defined as the weighted sum p(a,b) of for each criterion, and w_j is the weight associated with jth criterion.

↓

Step 4. Calculation of outranking flows/ The PROMETHEE II partial ranking

$$\varphi^+(a) = \sum_{x \in A} \pi(a,b) \quad [4] \quad \text{and} \quad \varphi^-(a) = \sum_{x \in A} \pi(b,a) \quad [5]$$

Where $\varphi^+(a)$ *and* $\varphi^-(a)$ denote the positive outranking and negative outranking flow for each alternative, respectively.

↓

Step 5. Calculation of net outranking flow/ The PROMETHEE II complete ranking

$$\varphi(a) = \varphi^+(a) - \varphi^-(a) \quad [6]$$

Where $\varphi(a)$ denotes the net outranking flow for each alternative.

Figure 1 Stepwise procedure for PROMETHEE II.

Source: Prepared by the authors based on (Basilio *et al*., 2018).

2.4 An overview of public security in the study region

The research was developed in the southeast region of Brazil, in the state of Rio de Janeiro. The state has an estimated population of 17,264,943 inhabitants spread across an area of 43,696 km^2, which results in a population density of 395 inhabitants/km^2. It is subdivided into 92 municipalities. The state's main economic activities are industry, tourism, services, and mineral extraction (petroleum). These activities generate a gross domestic product of the order of BRL 659.137 billion, which generates a per capita income of BRL 39,826. The Human Development Index (HDI) of the state is 0.761.

Based on public security data reported by the Public Security Institute (Instituto de Segurança Pública – ISP) in 2019, in Rio de Janeiro there is a rate of 23 intentional homicides per 100,000 inhabitants. The rate of motor vehicle theft is 541 vehicles per 100,000 people. The pedestrian robbery rate per 100,000 inhabitants is 702. The ISP monitors a portfolio of 43 types of police occurrences.

The police force responsible for proactive policing is allocated to 39 integrated public security areas, as described in (Basilio *et al*., 2020, Basilio *et al*., 2021). The current in the public security policy of Rio de Janeiro is focused on reducing three strategic indices: the violent death index; the street robbery index; and the motor vehicle theft index. In contrast to the American model, in which each police institution performs both proactive policing and criminal investigation work, the model is split in Brazil. Article 144 of the Federal Constitution of 1988 listed the institutions active in public security and indicated their competencies. Accordingly, the Military Police are responsible for proactive policing in states and federal districts, while the investigation service is the responsibility of the Civil Police (Riccio and Skogan, 2018). Since January 4, 2019, the military police of the State of Rio de Janeiro have been elevated to the status of Secretary of State, becoming the State Secretariat of Military Police - SEPM, which has given more autonomy for managers to formulate and conduct public policy in terms of protecting people's lives and assets. In 2020, the Military Police of the State of Rio de Janeiro executed a budget of approximately 5.7 billion BRL (1,15 billion US$), for the maintenance of 44,653 police officers, and a fleet of 4,472 radio patrols.

3. **Method**

The problem-solving method of this research study is divided into five stages, which are described in Table II.

Table II Description of the methodology

Process Steps	Title	description
1	Identification of the alternatives to be introduced in the model	In this phase, based on the bibliographical and documentary research will be identified the policing strategies applied in the fight against the criminal demand in a specific area of policing. In the proposed model, policing

		strategies will be the alternatives for combating crime available from the managers of the police agencies.
2	Identification of the criteria	The criteria that will integrate the model will be the criminal demands that more often occur in an area of policing.
3	Obtaining the matrix of evaluation of alternatives versus criteria	In this phase, the application of a questionnaire to the specialist in the area of public security will be constructed as an impact matrix of policing strategies in the reduction of certain crimes. The values of this matrix will be the evaluation values of the strategy versus criminal lawsuits.
4	Application of the PROMETHEE II method	In this step, the data regarding the alternatives and model criteria will be emulated in the PROMETHHE II method, based on the protocol described in section 2.3, with the aid of Visual PROMETHEE Software version 1.4.0.0. At the end of this stage, the final rank of policing strategies will be obtained in view of the demand considered in the context studied.
5	Construction of the thermal efficiency map	In this step, after obtaining the model solution using the PROMETHEE II method, a georeferenced thermal map will be built, where managers, the government and society, will be able to directly observe police units that show signs of inefficiency. The thermal map will be divided into four colors: red for units considered to be highly inefficient; orange to moderately inefficient; Light Green to moderately efficient; and Dark green for Strongly Efficient.

4. Numerical application

Stage 1: Identification of alternatives for introduction in the model

This stage deals with the identification of the alternatives to be inserted in the proposed model. In this study, we will use thirty-nine police agencies that are responsible for the execution of the radio patrol service throughout the State of Rio de Janeiro. As recorded by Basilio et al., (2019) the territory of the State of Rio de Janeiro, is divided into integrated regions of public security (IPSRs). IPSRs are subdivided into IPSAs (Integrated Public Security Areas), as illustrated in Table III. IPSAs operate in the tactical-operational field and apply physical boundaries corresponds to a Military Police Battalion and may involve at least two and at most six Police Department (PD).

Table III Division of the state of Rio De Janeiro

	Region	PMERJ	PCERJ	IPSA
1st IPSR	Capital (the south and center and part of the northern zone)	1st APC	1st APD	1, 2, 3, 4, 5, 6, 13, 16, 17, 19, 22, 23
2nd IPSR	Capital (the west and part of the northern zone)	2nd APC	2nd APD	9, 14, 18, 27, 31, 39
3rd IPSR	Baixada Fluminense	3rd APC	3rd APD	15, 20, 21, 24, 34, 40
4th IPSR	Niteroi and Região dos Lagos	4th APC	4th APD	7, 12, 25, 35
5th IPSR	Sul Fluminense	5th APC	5th APD	10, 28, 33, 37
6th IPSR	Norte Fluminense	6th APC	6th APD	8, 29, 32, 36

 doi:10.20944/preprints202203.0366.v1

7th IPSR	**Região Serrana**	**7th APC**	**7th APD**	**11, 26, 30, 38**

In this sense, as alternatives to the developed model, we will use the set of thirty-nine IPSA, which are decision-making units (DMU) that we will identify as follows: $A_1^n = \{a_1, \ldots, a_n\} \rightarrow A_1^{39} = \{a_1, \ldots, a_{39}\} \rightarrow A_1^{39} = \{ IPSA_2, IPSA_3, IPSA_4, IPSA_5, IPSA_6, IPSA_7, IPSA_8, IPSA_9, ,IPSA_{10}, IPSA_{11}, IPSA_{12}, IPSA_{14}, IPSA_{15}, IPSA_{16}, IPSA_{17}, ,IPSA_{18}, IPSA_{19}, IPSA_{20}, IPSA_{21}, IPSA_{22}, IPSA_{23}, IPSA_{24}, IPSA_{25}, IPSA_{26}, IPSA_{27}, IPSA_{28}, IPSA_{29}, IPSA_{30}, IPSA_{31}, IPSA_{32}, IPSA_{33}, IPSA_{34}, IPSA_{35}, IPSA_{36}, IPSA_{37}, IPSA_{38}, IPSA_{39}, IPSA_{40}, IPSA_{41}\}$.

It is worth explaining that the police agencies identified as $IPSA_1$ and $IPSA_{13}$ are not part of the list, as they were disabled by the command of the Military Police of the State of Rio de Janeiro for more than ten years, and the policing areas corresponding to these agencies were integrated into other surrounding areas. As well, their denominations, for local cultural reasons, were no longer implemented.

Stage 2: Identification of criteria

At this stage, based on the literature review, we identified thirteen criteria for introducing the proposed model to order police agencies by efficiency. We categorize the criteria into two groups: Operational and Logistic. The operational group included criteria related to criminal indices, such as: Intentional Lethal Crimes (C1); Cargo Theft (C2), Street Theft (C3), Vehicle Theft (C4),. In the logistical group, variables related to the resources made available to each police agency in 2019 were included, such as: Annual Payroll Value (C5); Annual Fuel Consumption (C6); Percentage of Police Contingent applied to Operational Activity (C7); Annual Cost of Food for the police contingent (C8); Police contingent rate 100 thousand / inhabitant (C9); Police contingent rate in conditions of immediate employment (C10); Number of police operations carried out (C11); Number of vehicles (C12); Amount of ammunition available (C13).

Stage 3: Construction of the matrix to evaluate alternatives versus criteria

At this stage, after identifying the criteria and alternatives, the researchers collected, from April 20 to May 15, 2020, data on the open base of the public security institute (https: //www.ispvisualizacao.rj. gov.br:4434/) and built Table IV, which corresponds to the evaluation matrix that will be used in the construction of this model.

Table IV Evaluation Matrix

Alternative	Criteria												
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
IPSA2	4	11	963	138	31.150.157	195.156	0,65815	446.584	163,51	107,62	14	35	379
IPSA3	18	50	1.151	366	42.006.748	290.560	0,65609	472.356	104,57	68,61	151	50	11.685
IPSA4	26	57	1.752	341	45.979.903	255.315	0,65991	432.765	376,34	248,35	4	43	3.642
IPSA5	32	38	4.249	165	40.854.215	222.026	0,71995	402.416	665,05	478,8	3	45	2.245
IPSA6	7	17	933	226	60.979.111	234.127	0,65082	455.931	114,81	74,72	9	38	4.779
IPSA7	26	129	1.012	429	30.556.956	367.407	0,66087	451.421	79,08	52,26	737	64	26.086
IPSA8	31	5	189	25	60.200.782	464.932	0,71819	496.141	154,47	110,94	35	84	512
IPSA9	22	43	1.677	507	86.405.035	236.947	0,6115	329.378	111,62	68,26	163	36	5.874
IPSA10	10	6	20	3	69.202.405	350.047	0,70775	283.111	240,18	169,99	45	87	188
IPSA11	13	3	50	6	41.465.931	205.231	0,71326	347.670	166,23	118,56	1	57	786
IPSA12	25	26	580	223	70.779.078	444.650	0,72284	434.483	133,96	96,83	349	81	10.392
IPSA14	27	87	1.064	403	54.135.433	286.817	0,56987	338.941	99,35	56,62	198	36	9.265

IPSA15	32	106	1.050	389	24.785.277	284.438	0,73205	472.006	95,72	70,07	266	64	10.170
IPSA16	18	86	789	274	27.563.270	175.823	0,69259	401.484	89,47	61,96	46	37	21.804
IPSA17	8	15	370	53	34.788.375	135.039	0,61848	273.836	139,76	86,44	23	26	2.784
IPSA18	15	18	609	120	58.291.111	316.800	0,70563	375.584	106,77	75,34	59	62	20.059
IPSA19	6	1	814	10	35.113.707	134.537	0,69227	417.855	187,66	129,91	0	24	1.576
IPSA20	31	35	979	319	25.508.189	233.773	0,674	424.292	79,01	53,25	247	105	6.272
IPSA21	24	114	1.046	484	49.203.338	114.159	0,60519	397.733	91,89	55,61	73	50	5.119
IPSA22	25	76	1.359	238	71.309.022	199.096	0,63947	355.914	146,93	93,96	81	48	31.009
IPSA23	10	1	537	40	35.072.193	201.751	0,65257	524.703	205,95	134,39	0	43	3.480
IPSA24	32	23	471	139	35.019.414	232.659	0,65307	295.541	93,85	61,29	230	46	9.223
IPSA25	38	6	285	52	41.373.558	371.148	0,64819	288.547	130,14	84,36	53	98	8.985
IPSA26	8	7	59	8	40.912.305	182.796	0,70927	219.391	123,41	87,53	107	43	210
IPSA27	10	14	293	60	69.772.648	205.271	0,66667	294.630	67,22	44,81	32	33	132
IPSA28	28	5	114	22	67.254.214	240.585	0,7108	346.765	144,78	102,91	49	62	1.274
IPSA29	14	2	26	2	30.551.480	317.360	0,73862	357.725	350,2	258,67	338	60	116
IPSA30	9	2	28	3	30.692.460	189.085	0,72035	336.806	169,04	121,77	5	52	60
IPSA31	15	10	740	143	53.556.122	190.142	0,58993	348.669	164,88	97,27	0	56	293
IPSA32	30	7	332	52	33.261.290	331.754	0,74739	486.035	142,07	106,18	120	77	1.959
IPSA33	43	22	131	67	41.725.205	209.881	0,68841	543.726	166,07	114,32	19	55	8.501
IPSA34	32	14	335	79	59.014.406	269.799	0,73844	233.262	115,85	85,55	20	32	1.653
IPSA35	36	29	464	187	39.683.712	277.904	0,70504	306.271	107,96	76,11	63	54	6.046
IPSA36	20	2	13	10	29.550.998	203.235	0,67864	265.902	383,05	259,95	13	42	128
IPSA37	24	2	80	12	29.983.303	180.550	0,66086	388.656	184,99	122,25	70	40	344
IPSA38	34	8	30	11	36.804.431	113.573	0,76232	404.965	228,37	174,09	32	39	157
IPSA39	41	49	609	509	39.265.730	114.148	0,66115	309.464	75,7	50,05	92	53	10.758
IPSA40	10	34	394	193	29.598.214	160.112	0,53708	457.549	57,2	30,72	23	34	523
IPSA41	12	129	1.291	760	31.875.619	251.437	0,6568	420.716	103,78	68,16	174	55	27.296

Stage 4: Application of the PROMETHEE II method

In this step, the data referring to the actions described in stage 1, the criteria registered in stage 2, and the decision matrix inserted in table IV, will be introduced in Visual PROMETHEE software version 1.4.0.0. At this moment, two questions need to be modelled by the decision-maker: the first refers to the weight to be applied in each criterion. The second refers to the preference function to be used in each criterion. Regarding the weight of the criteria, the researchers assigned different weights for each criterion, depending on the evaluation of the decision makers of the studied police agency, as recorded in Table VI. Regarding the preference function, the choice of a good preference function depends on the scale of the underlying criterion, as stated by (Mareschal, 2018). In this sense, the literature considers three types of cases: a) A continuous numerical scale (real numbers); b) The discrete numerical scale (small integer numbers); and c) A qualitative scale (few ordered levels). Mareschal (2018), presents a protocol to identify the most appropriate preference function, according to Table V.

Table V Procedure for selecting a preference function

Case	Convention	Preference function suggestion
If the criterion has a continuous numerical scale	If you want to introduce an indifference threshold (and	Consider using a Type V Linear preference function.

	thus neglect very small differences).	
	If you want that even very small differences play some role in the PROMETHEE computation.	Consider using a Type III V-shape preference function.
If the criterion has a discrete numerical scale or a qualitative scale	If the number of possible values is small (<= 5) and if the values are perceived as quite different from each other.	Consider using a Type I Usual preference function.
	If the number of possible values is larger or if you want to have a weaker degree of preference for smaller diferences.	Consider using a Type IV Level preference function.

Source: Adapted from (Mareschal, 2018).

Note: This procedure does not include the Type II (U-shape) and Type VI (Gaussian) preference functions. In practice, the Type II preference function is seldom used. Type VI can be used as an alternative to the Type V preference function.

According to the procedures for choosing the preference function discussed in Table V, and considering that the evaluation matrix inserted in Table IV, the researchers adopted the Type III V-shape preference function for the criteria {C1, ..., C4 }, and the Linear Type V preference function for criteria {C5, ..., C13}, as shown in Table VI.

Table VI Model parameters

Preferences	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
Objective	min	min	min	min	min	max	max	min	max	max	max	max	max
Weight	7	5	2	3	7	5	9	7	2	2	5	2	3
Unit	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Scale	R	R	R	R	R	R	R	R	R	R	R	R	R
Preference function	V-shape	V-shape	V-shape	V-shape	Linear	Linear	Linear	Linear	Linear	Linear	Linear	Linear	Linear
Thresholds	absolute	absolute	absolute	absolute	absolute	absolute	absolute	absolute	absolute	absolute	absolute	absolute	absolute
Q: Indifference	n/a	n/a	n/a	n/a	13.740.898	73.294	0,04304	170.171	124	89	153	17	8.224
P: Preference	21	75	1.510	2.622	31.105.026	167.356	0,09909	301.073	225	162	281	38	16.496
S: Gaussian	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

After identifying the preference function for each criterion, the data related to criteria and actions were entered in Visual PROMETHEE Software, according to Tables IV and VI. After inserting the data, formulas [1] to [6] were applied, as shown in Figure 1. Emulated the data, Visual PROMETHEE Software produced the following outputs as results: Table VII records the synthesis of the flows for each according to each of the criteria used in the model.

Table VII Criteria flow

Unicriterion flows	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
IPSA2	0,7155	0,2544	-0,2169	0,0169	0,2825	-0,1852	-0,0887	-0,0228	-0,0907	-0,0897	-0,1365	-0,2456	-0,1642
IPSA3	0,1729	-0,2347	-0,3414	-0,0723	0,1447	0,1644	-0,1061	-0,0529	-0,1085	-0,1155	-0,0426	-0,1078	0,0845
IPSA4	-0,2093	-0,3277	-0,7059	-0,0625	0,0546	0,0096	-0,0738	-0,0146	0,7997	0,7189	-0,148	-0,1654	-0,1313

IPSA5	-0,4687	-0,0793	-1	0,0064	0,165	-0,0947	0,2885	-0,0026	1	1	-0,1493	-0,1454	-0,1364
IPSA6	0,6228	0,1811	-0,197	-0,0175	-0,4531	-0,0573	-0,1489	-0,0308	-0,1057	-0,1111	-0,1419	-0,208	-0,1277
IPSA7	-0,2093	-0,9028	-0,2493	-0,097	0,2897	0,6006	-0,0657	-0,0267	-0,1226	-0,1272	1	0,1566	0,88
IPSA8	-0,4323	0,3239	0,2948	0,0612	-0,4257	0,8984	0,2764	-0,0985	-0,0969	-0,0861	-0,1178	0,6729	-0,1612
IPSA9	-0,015	-0,1439	-0,6702	-0,1275	-0,865	-0,0478	-0,4658	0,0139	-0,1066	-0,1157	-0,0257	-0,2318	-0,1224
IPSA10	0,5201	0,3123	0,4012	0,0698	-0,6473	0,5007	0,2022	0,0567	0,0663	0,09	-0,1096	0,7318	-0,1687
IPSA11	0,3972	0,347	0,3824	0,0686	0,1546	-0,1521	0,2414	0,0066	-0,0886	-0,0779	-0,1517	-0,0063	-0,1552
IPSA12	-0,1617	0,0705	0,0368	-0,0163	-0,6777	0,8558	0,308	-0,0153	-0,103	-0,1011	0,7296	0,6065	-0,0066
IPSA14	-0,2569	-0,6982	-0,2838	-0,0868	-0,1966	0,1456	-0,7904	0,0101	-0,1112	-0,1241	0,0831	-0,2318	-0,07
IPSA15	-0,4687	-0,8161	-0,2745	-0,0813	0,366	0,1336	0,3732	-0,0524	-0,1131	-0,1144	0,4245	0,1566	-0,0207
IPSA16	0,1729	-0,6902	-0,1017	-0,0363	0,3217	-0,241	0,1168	-0,0024	-0,1163	-0,1202	-0,109	-0,2193	0,7682
IPSA17	0,589	0,2056	0,1758	0,0502	0,2423	-0,3811	-0,4069	0,0737	-0,1015	-0,1051	-0,1277	-0,411	-0,1337
IPSA18	0,3095	0,1688	0,0175	0,024	-0,3579	0,2992	0,1873	0	-0,1078	-0,1106	-0,1005	0,1053	0,6925
IPSA19	0,6554	0,3702	-0,1182	0,067	0,2388	-0,383	0,1155	-0,0086	-0,0702	-0,0621	-0,153	-0,4574	-0,1437
IPSA20	-0,4323	-0,0414	-0,2275	-0,0539	0,3528	-0,0585	0,0301	-0,0112	-0,1226	-0,1265	0,3178	0,8972	-0,1199
IPSA21	-0,1128	-0,8519	-0,2719	-0,1185	-0,0324	-0,483	-0,5197	-0,0016	-0,115	-0,1248	-0,088	-0,1078	-0,1266
IPSA22	-0,1617	-0,5877	-0,4791	-0,0222	-0,6866	-0,1727	-0,2433	0,0035	-0,0996	-0,1024	-0,0806	-0,1228	0,9065
IPSA23	0,5201	0,3702	0,0652	0,0553	0,2393	-0,1641	-0,135	-0,1709	-0,0438	-0,0555	-0,153	-0,1654	-0,1316
IPSA24	-0,4687	0,1074	0,1089	0,0165	0,2398	-0,062	-0,131	0,0403	-0,114	-0,1207	0,2274	-0,1378	-0,072
IPSA25	-0,6667	0,3123	0,2321	0,0506	0,1562	0,6208	-0,171	0,0488	-0,104	-0,1055	-0,1046	0,8584	-0,0833
IPSA26	0,589	0,3007	0,3767	0,0678	0,164	-0,223	0,2129	0,2239	-0,1053	-0,1047	-0,0619	-0,1654	-0,1682
IPSA27	0,5201	0,2179	0,2268	0,0475	-0,6585	-0,152	-0,0179	0,0414	-0,1318	-0,1327	-0,1203	-0,2757	-0,1702
IPSA28	-0,3033	0,3239	0,3422	0,0623	-0,6089	-0,0356	0,2241	0,0069	-0,1002	-0,0948	-0,1071	-0,1053	-0,1475
IPSA29	0,3534	0,3586	0,3974	0,0702	0,2898	0,3024	0,4254	0,0032	0,7066	0,7671	0,7076	0,0551	-0,1706
IPSA30	0,5551	0,3586	0,3962	0,0698	0,2881	-0,2056	0,2911	0,011	-0,0865	-0,0738	-0,1468	-0,0865	-0,172
IPSA31	0,3095	0,266	-0,0692	0,015	-0,1764	-0,202	-0,6485	0,0062	-0,0897	-0,1008	-0,153	-0,0251	-0,1661
IPSA32	-0,391	0,3007	0,201	0,0506	0,2585	0,3887	0,4954	-0,0781	-0,1009	-0,0912	-0,0553	-0,5063	-0,1389
IPSA33	-0,8045	0,1196	0,3315	0,0447	0,1498	-0,1355	-0,0999	0,2331	-0,0888	-0,0825	-0,1314	-0,0426	-0,1027
IPSA34	-0,4687	0,2179	0,199	0,04	-0,3837	0,0631	0,424	0,1763	-0,1055	-0,1053	-0,1303	-0,2932	-0,1427
IPSA35	-0,6065	0,0337	0,1136	-0,0023	0,185	0,0997	0,1831	0,0291	-0,1075	-0,1101	-0,0972	-0,0589	-0,1213
IPSA36	0,0802	0,3586	0,4056	0,067	0,3014	-0,1591	0,0553	0,0896	0,8179	0,7726	-0,1375	-0,1742	-0,1703
IPSA37	-0,1128	0,3586	0,3635	0,0662	0,2967	-0,2284	-0,0658	0	-0,0729	-0,0731	-0,0911	-0,1905	-0,165
IPSA38	-0,5401	0,2891	0,3949	0,0666	0,2219	-0,4861	0,609	-0,0034	0,0167	0,114	-0,1203	-0,1992	-0,1695
IPSA39	-0,7519	-0,2218	0,0175	-0,1283	0,192	-0,4831	-0,0634	-0,0265	-0,1252	-0,1288	-0,0715	-0,0739	0,0176
IPSA40	0,5201	-0,0288	0,1599	-0,0046	0,3009	-0,287	-0,9175	-0,0324	-0,1425	-0,153	-0,1277	-0,2607	-0,161
IPSA41	0,4398	-0,9028	-0,4341	-0,2265	0,2737	-0,0028	-0,1001	-0,0097	-0,1089	-0,1158	-0,0006	-0,0426	0,8919

Then, Table VIII presents a complete ranking. With the application of formula 4, the positive flow was obtained, recorded in the fourth column. Likewise, with the implementation of formula 5, the negative flow, represented in the fifth column, was obtained. With the results of positive and negative flows, the partial ranking result was obtained, as shown in Figure 2. Applying formula 6 resulted in the complete flow. It registered in the third column of Table VIII and illustrated in Figure 3. As a result, we have IPSA29 as the first in the ranking, followed by IPSA30, in third place by IPSA26. Figure 4 clearly illustrates how the classification is distributed and records the criteria in which police agencies perform better or worse, compared to one agency with the others. The IPSA29 in 92.3% of the criteria was better than the other 38 agencies analyzed. Obtaining only a negative result in criterion C13. Both IPSA30 and IPSA26 were efficient in 53.84 of the evaluated criteria. Figure 4 illustrates clearly how many criteria had a positive flow in the evaluation, alongside the other police agencies, as well as registering the criteria that had a negative flow, that is, that were surpassed by other agencies in the peer comparison. Figure 4 also shows the direct relationship between the weight of each criterion and the result. Figure 5 illustrates the existing relationship, considering the parameters used, between evaluated police agencies, it is also observed that IPSA29 stands out in isolation from the others.

Table VIII The PROMETHEE complete ranking

Multicriteria flows	Rank	Phi	Phi+	Phi-
IPSA29	1	0,2359	0,3116	0,0758
IPSA30	2	0,1399	0,1847	0,0448
IPSA26	3	0,1397	0,1838	0,0441
IPSA32	4	0,1152	0,1938	0,0786
IPSA11	5	0,107	0,1542	0,0472
IPSA10	6	0,1069	0,2069	0,1
IPSA12	7	0,0993	0,2349	0,1356
IPSA18	8	0,0896	0,1709	0,0813
IPSA7	9	0,0883	0,2382	0,1499
IPSA19	10	0,0805	0,1566	0,0761
IPSA2	11	0,0685	0,1496	0,0811
IPSA8	12	0,0487	0,181	0,1323
IPSA38	13	0,0387	0,1625	0,1238
IPSA23	14	0,0355	0,1347	0,0992
IPSA20	15	0,0298	0,1437	0,114
IPSA25	16	0,0251	0,1495	0,1244
IPSA36	17	0,0213	0,1811	0,1597
IPSA16	18	0,0189	0,143	0,1241
IPSA37	19	0,0164	0,1088	0,0924
IPSA15	20	0,0138	0,17	0,1562
IPSA41	21	0,0119	0,1524	0,1405
IPSA17	22	0,009	0,1381	0,129
IPSA34	23	-0,0043	0,1354	0,1396
IPSA3	24	-0,0044	0,1058	0,1102

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IPSA35	25	-0,0129	0,0985	0,1115
IPSA24	26	-0,0164	0,1024	0,1188
IPSA27	27	-0,0167	0,1212	0,138
IPSA6	28	-0,0225	0,1124	0,1348
IPSA28	29	-0,0382	0,1015	0,1397
IPSA40	30	-0,081	0,1249	0,2059
IPSA33	31	-0,0819	0,0768	0,1587
IPSA31	32	-0,0938	0,0859	0,1797
IPSA5	33	-0,1029	0,1394	0,2424
IPSA39	34	-0,1245	0,0683	0,1928
IPSA4	35	-0,1463	0,101	0,2474
IPSA22	36	-0,1619	0,0806	0,2425
IPSA9	37	-0,2077	0,0544	0,2621
IPSA14	38	-0,2106	0,0574	0,268
IPSA21	39	-0,2138	0,0418	0,2556

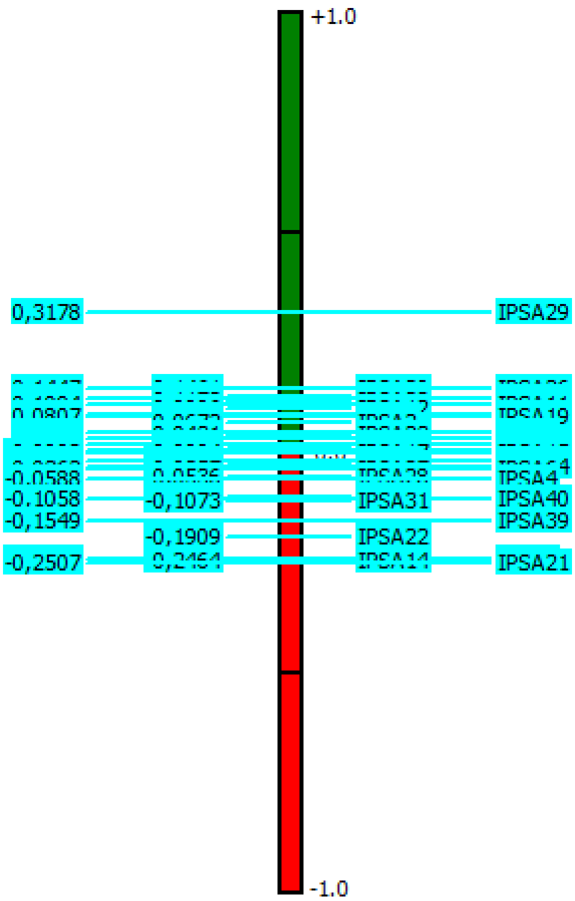

Figure 2 PROMETHEE II complete ranking

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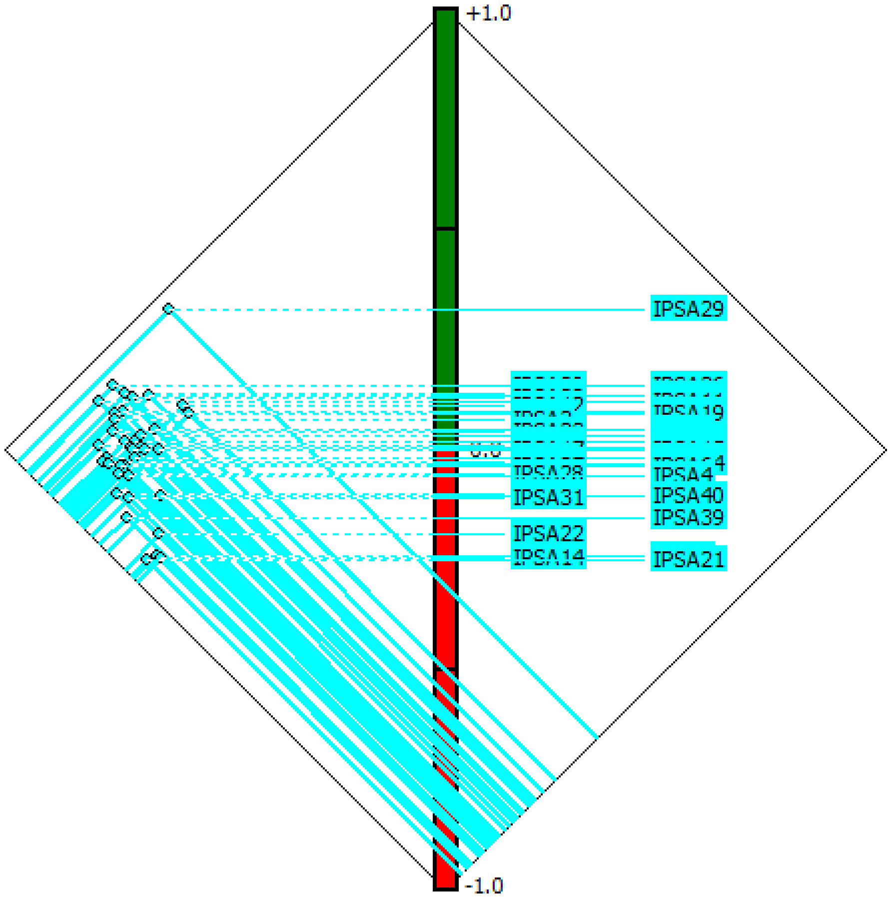

Figure 3 PROMETHEE Diamond

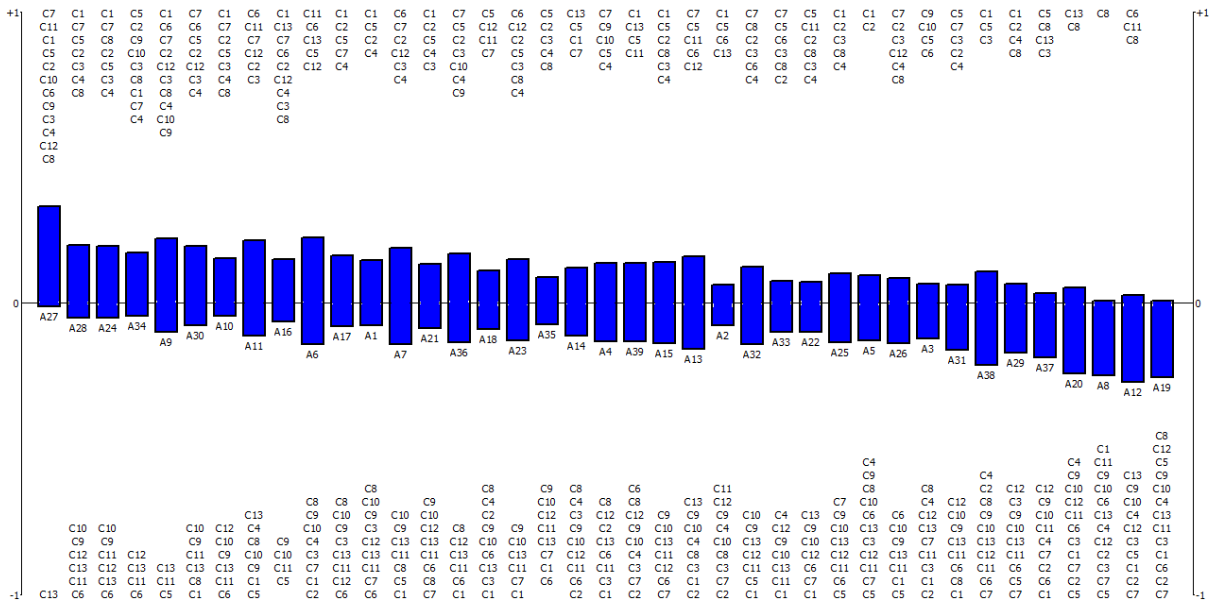

Figure 4 PROMETHEE Rainbow

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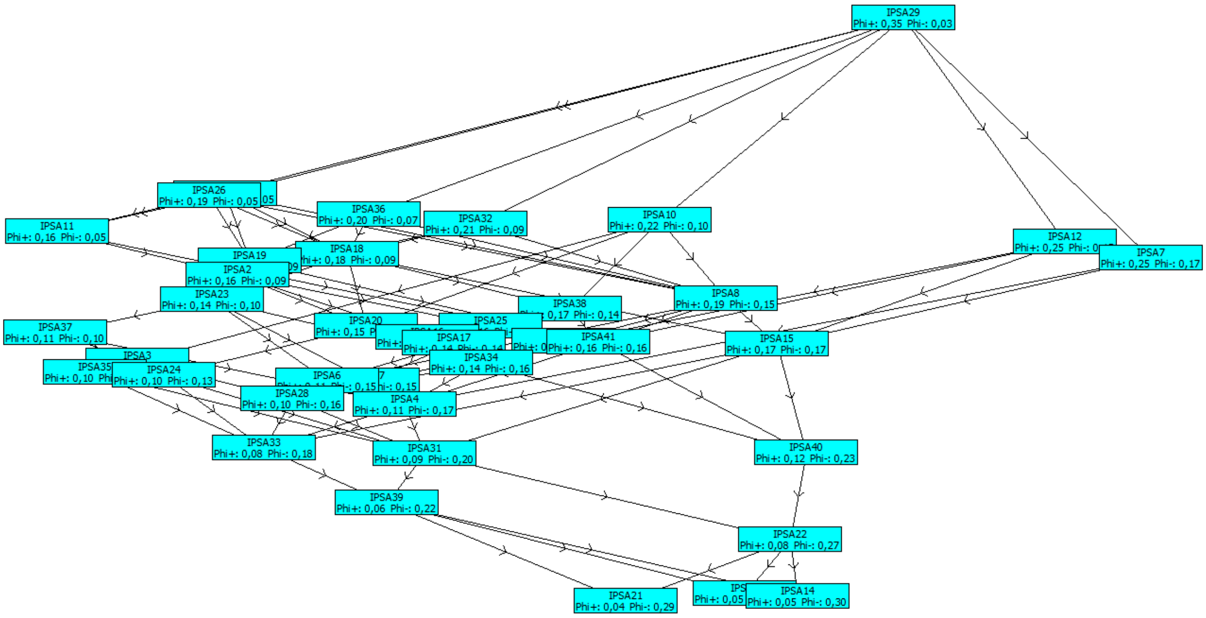

Figure 5 PROMETHEE Network View

Stage 5: Construction of the thermal efficiency map

After identifying the ranking of police agencies based on the 13 proposed criteria, the classification was made into four subgroups. For this grouping, the Quartile statistical measure applied to the final flow constant in the third column of Table VIII was used. After identifying the segmentation points, the police agencies were grouped and assigned a specific color, which will be used to identify the agencies in the thermal map of Figures 6 and 7. The classification colors are as follows: red for units considered to be highly inefficient; orange to moderately inefficient; Light Green to moderately efficient; and Dark green for Strongly Efficient. The data resulting from this step are recorded in Table IX.

Table IX Categorization of law enforcement agencies by their level of efficiency compared

Cluster	Quartile	Interval Phi	Police Agencies	Thermal color
Strongly Efficient	4º	(0,2359,...,0,0745)	{IPSA29; IPSA30; IPSA26; IPSA32; IPSA11; IPSA10; IPSA12; IPSA18; IPSA7; IPSA19}	
moderately efficient	3º	(0,0745,...,0,0138)	{IPSA2; IPSA8; IPSA38; IPSA23; IPSA20; IPSA25; IPSA36; IPSA16; IPSA37; IPSA15}	
moderately inefficient	2º	(0,0138,..., -0,0596)	{IPSA41; IPSA17; IPSA34; IPSA3; IPSA35; IPSA24; IPSA27; IPSA6; IPSA28}	
highly inefficient	1º	(-0,0596,...,-0,2138)	{IPSA40; IPSA33; IPSA31; IPSA5; IPSA39; IPSA4; IPSA22; IPSA9; IPSA14; IPSA21}	

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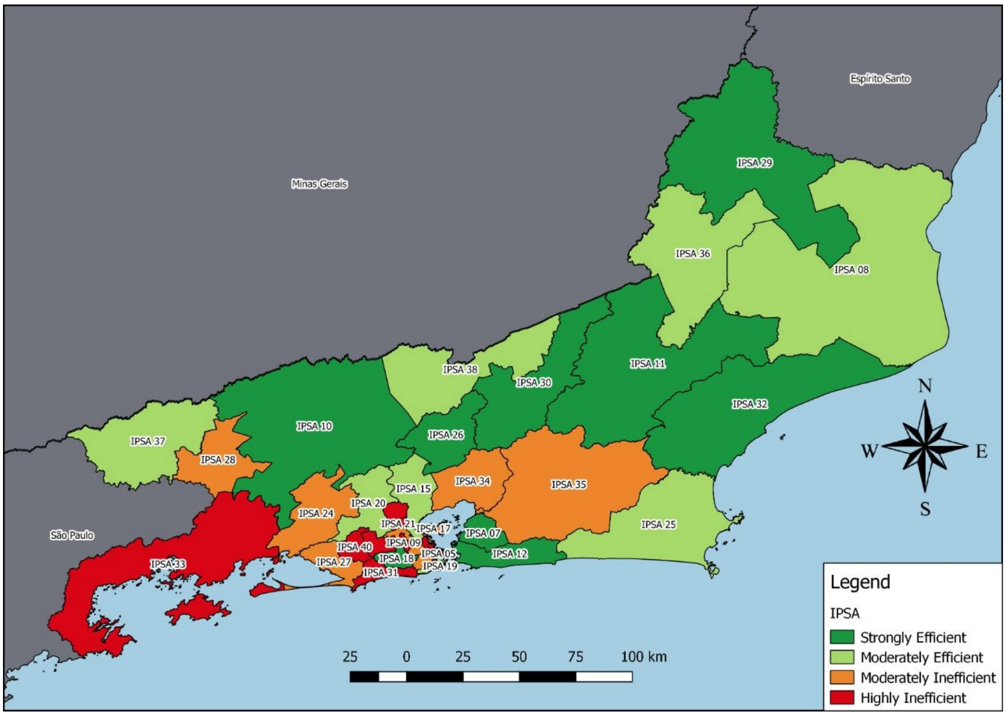

Figure 6 Thermal map of the 39 IPSA distributed in the State of Rio de Janeiro, Brazil

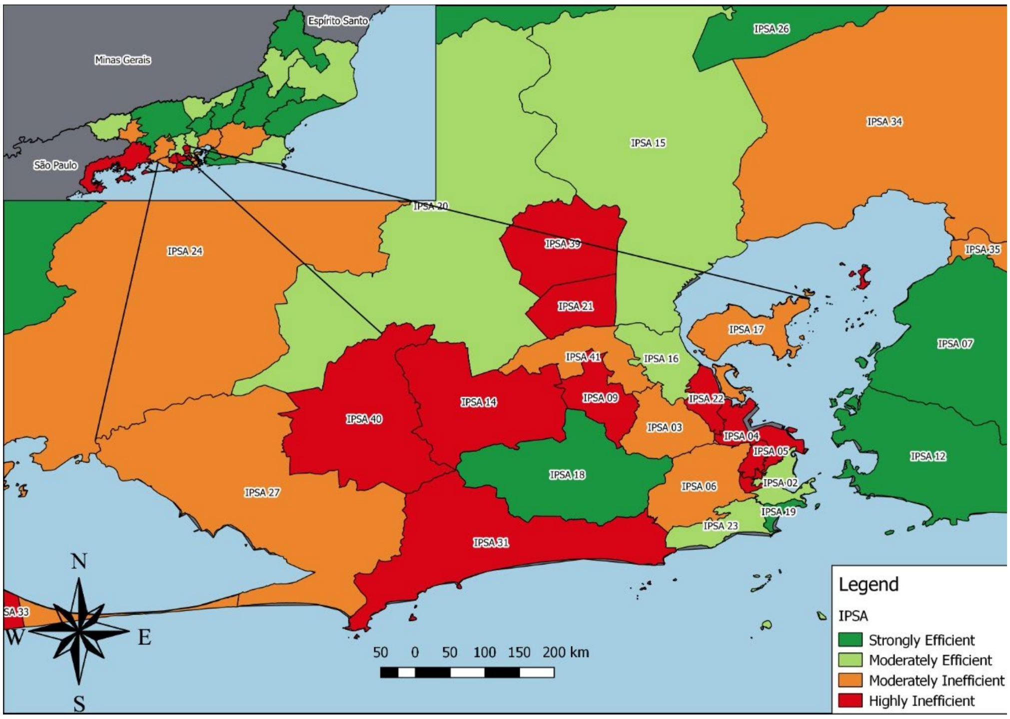

Figure 7 Thermal map of IPSA located in the Capital of the State of Rio de Janeiro

5. Discussion of results and final remarks

The activities that orbit the area of public security, more precisely the police agencies, which are charged with enforcing the law, are complex and challenging. Because decisions made in this field of knowledge directly impact the lives of thousands of people, in large or small cities around the world. Given the complexity, many public policies lead managers to focus on final results, such as reducing crime rates. However, a police agency is no different than any other organization. They need inputs so that their activities can be developed. Resources are finite and need to be managed efficiently and optimally. This issue has led researchers and managers to research the subject as noted in section 2.1.

In Basilio et al. (2018) the integrated goal system model was discussed from the perspective of the multicriteria methodology. The integrated target system assesses the operational performance of the IPSA, based on three strategic indicators. However, it does not infer how managers equate and apply the resources available to achieve the goals established by the Government, through the Institute of Public Security. The decision maker responsible for an IPSA must be able to equate the logistical and operational variables. The proposed model was emulated with 13 criteria, which include operational variables that are measured and used in the integrated system of goals, plus logistical variables that represent the main inputs available to IPSA managers.

Table VIII records the ranking of the 39 IPSA and Figure 5 illustrates the relationships between police agencies arising from the application of the PROMETHEE II method. In the first moment, we identified the IPSA29 (1st), IPSA30 (2nd), and IPSA26 (3rd) as the first three placed in the ranking. In the last three positions, we have IPSA9 (37º), IPSA14 (38º), and IPSA21 (39º). From this information, we can observe the thermal map illustrated in Figures 6 and 7. Figure 6 represents the geographical distribution of the 39 IPSA in the territory of the State of Rio de Janeiro. Figure 7 shows the state capital and its metropolitan region. When looking at figure 6 immediately, the ranking result reveals that the IPSA that are mostly located in the interior of the State of Rio de Janeiro were categorized as Strongly Efficient or moderately efficient. As was the case with the first three placed. The exception were IPSA28, IPSA33, IPSA34 and IPSA35. When we look at Figure 7, we have an opposite situation, having in the state capital, where most of the population of the state is concentrated, we have the police agencies categorized as highly inefficient and moderately inefficient, as in the case of the last three positions of the ranking. However, we can also observe exceptions such as IPSA02, IPSA19, IPSA23, which correspond to an area of high purchasing power and tourism in the city, which correspond to the neighbourhoods of Copacabana, Botafogo and Leblon. Another exception is IPSA18, which is isolated among other surrounding agencies. In a first analysis, the result of the proposed model presents the government with a systemic view of how IPSA decision makers manage the resources made available in the face of local operational problems. Considering the results presented, we can say that the resources made available to police agencies in the interior of the state are better equalized in comparison to the police units operating in the state capital, as shown in Figure 7. In this sense, the information produced in the proposed model can help the government to better assess the reallocation of available resources. On the other hand, the improvement in public security provides an improvement in the quality of life of the citizen and in the local economic development. Thus, we can infer that the results can also contribute to decision making in other sectors, such as: in tourism, in the economic sector, in the real estate and insurance sector, because in places where police agencies are more efficient, the trend is that criminal rates are also lower compared to 100,000 / inhabitants.

As a contribution to new research, we can indicate the realization of qualitative research with the decision makers of the police agencies to identify the best practices, such as, for example, what the IPSA18 manager did that differentiates it from the bordering IPSA managers. Or what factors contribute to the fact that police units in the interior of the state stand out in relation to those in the capital. Or even, carry out a comparative study between the economic development of the areas where the agencies are more efficient, with the inefficient ones.

In this sense, we believe that the proposed model answers the research problem, and that it presents practical contributions to the scientific community. From the methodological point of view, the ordering of the IPSA by means of a multicriteria method proved to be viable, since, regarding the efficiency theme, the most common to be used is the DEA. As a practical implication, we can assert that the proposed model contributes to decision-making, by the government and by the managers of the police agencies, in relation to the optimization of the resources available to face criminal actions, as well as the reduction of criminal indicators.

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