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## The crime prevention quadrant plan in Chile: a viable system model perspective on police operations

El plan de prevención del delito por cuadrantes en Chile: una perspectiva de modelo sistémico viable para el funcionamiento policial

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**ABSTRACT.** This study employed the Viable System Model (VSM) to visualize the operational dynamics of a Chilean police station implementing the Crime Prevention Quadrant Plan. It also analyzed crime prevention strategies implemented in Latin America. The findings suggest that the synergies derived from the interconnected systems within a Chilean police station contribute to its viability within the ever-evolving police environment. However, the study also discusses certain limitations of VSM in assessing interpersonal interactions within complex organizations. This necessitates further research into more holistic and integrated approaches to address these limitations. The implications of this research for the Carabineros' organizational policies highlight the critical role of human resources and their intangible capabilities in determining the success or failure of strategies such as the Quadrant Plan.

**KEYWORDS:** Carabineros; Chile; crime reduction; police operations; policing; Quadrant Plan; Viable System Model

**RESUMEN.** Este estudio empleó el Modelo de Sistemas Viables (MSV) para visualizar la dinámica operativa de una estación de policía chilena en la implementación del Plan Cuadrante de Prevención del Delito. También analizó las estrategias de prevención del delito implementadas en América Latina. Los hallazgos sugieren que las sinergias derivadas de los sistemas interconectados dentro de una estación de policía chilena contribuyen a su viabilidad dentro del entorno policial en constante evolución. Sin embargo, el estudio también analiza ciertas limitaciones del MSV para evaluar las interacciones interpersonales dentro de organizaciones complejas. Esto requiere más investigación sobre enfoques más holísticos e integrados para abordar estas limitaciones. Las implicaciones de esta investigación para las políticas organizacionales de Carabineros destacan el papel crítico de los recursos humanos y sus capacidades intangibles para determinar el éxito o el fracaso de estrategias como el Plan Cuadrante.

**PALABRAS CLAVE:** Actuación policial; Carabineros; Chile; Modelo de Sistema Viable; operaciones policiales; Plan Cuadrante; reducción de la delincuencia

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## Introduction

The work carried out by Carabineros of Chile highly depends on their interaction with the community (Carabineros, 2010, 2018). Chilean society requires the intervention of the Carabineros to control crime and disorder within their communities. Additionally, people need Carabineros in emergency situations arising unexpectedly, such as fires, earthquakes, traffic accidents, and other socio-political phenomena of similar magnitude. The Carabineros also rely on reports from people to resolve crimes. In recent decades, this symbiotic relationship between police stations and the communities they serve has become increasingly important as both parties recognize the importance of working together to create better living conditions for social development (Carabineros, 2010). In 1996, as a direct consequence of this paradigm of joint work between police and the community, the Crime Prevention Quadrant Plan emerged.

In general terms, implementing this police strategy developed by the Carabineros of Chile represents a change in its traditional structure to a more decentralized one. This modification aimed to be more proactive and focused on problem-solving, where police stations work together with the community they serve (Carabineros, 2010). In official terms, the Crime Prevention Quadrant Plan (Quadrant Plan hereafter) is likely the result of the interaction of three socio-political variables that were part of the Chilean context at the end of the 1990s. Dammert and Bailey (2005) argue that the first factor that prompted the Carabineros to implement this police strategy was the process of democratization experienced in Chile post-Pinochet dictatorship (Bailey & Dammert, 2006).

The second variable was the decentralization of the state administration. This process sought to give public organizations more autonomy in decision-making. The third and most crucial factor was increased crime and insecurity in Chile (Dammert & Bailey, 2005; Tudela, 2002). Based on the latter, the newly democratic government aimed to prioritize public security on the political agenda (Garland, 2000; Blanco & Tudela, 2019). These three variables eventually led Chile's newly democratic government to order the Carabineros to innovate how its police services were delivered to the community. In this context, Carabineros began its innovation-based organizational change by designing its first strategic plan. This plan sought to significantly restructure how the institution had been providing its police services to the community (Carabineros, 2010; 2018; Dammert, 2019; 2020). The Carabineros then developed the Quadrant Plan.

This paper discusses the role that Viable System Modelling plays in understanding police operations in a police unit that implements the Quadrant Plan. Modeling police operations through this theory by Beer (1984) can be understood as a neurophysiological representation of how a police unit operates autonomously. Viable System Modelling helps identify the parts crucial to police operations viability. Similarly, it allows us to identify structural deficiencies and, simultaneously, to know the parts of the organization that are not involved in the systemic viability. In summary, modeling a police station implementing the Quadrant Plan by VSM makes it possible to visualize the synergetic functioning of the parts of

the system in an integrated and balanced way. This ultimately allows for the design of police operations and strategies in a constantly changing environment.

This paper begins with a brief synopsis of the crime prevention strategies implemented in Latin America. The main aspects of the Carabineros of Chile and the Quadrant Plan, along with the evaluations conducted by external entities to the Carabineros of Chile on the effectiveness and efficiency of the Quadrant Plan, are discussed below. Next, some background on the Viable System Model (VSM) is discussed, and the theory originated around its application (Beer, 1984; Harnden, 1989; Espejo, 1990). The Viable Systems Model is well known in systems modeling arenas and has been used successfully in various organizational contexts (Brocklesby, 2012; Kinloch et al., 2009). Next, this paper presents and analyses the recursive structure of Carabineros. This is followed by the identity of a police unit that implements the Quadrant Plan. This paper concludes with a conclusion and discusses policy implications.

## Crime Prevention Strategies in Latin America

Crime and insecurity are serious problems in Latin America. This scenario has led Latin Americans to distrust governments and police (Dammert & Malone, 2006; Chinchilla & Vorndran, 2018). To solve this problem, governments in Latin American countries have taken several measures to improve public safety. These measures have mostly been inspired by policing models implemented in the UK and the US (Müller, 2010). Basilio et al. (2022) point out that in the last 50 years, research on crime prevention has been mainly based on community policing, problem-oriented policing, predictive policing, fear of crime, and social control, among other subjects. In this sense, regional authorities considered community policing a practical approach to reduce crime and insecurity. Furthermore, Latin American governments considered community policing an effective method of restoring public confidence in police (Müller, 2010; Dammert, 2019). For example, Brazilian and Colombian police agencies adopted this approach to change from traditional politic-led policing to a more community policing approach (Londoño & Guerrero, 1999; Dammert & Malone, 2006).

The first official Latin American community policing project occurred in Rio de Janeiro, Brazil, in 1994 (Muniz et al., 1997). Subsequently, similar efforts were implemented in other large Brazilian cities like Sao Paulo. In this city, the military police force implemented a police-community partnership to address crime and insecurity (De Mesquita Neto, 2004). The results of this project revealed specific problems related to resistance, skepticism, and lack of resources. In addition, there are no official performance evaluations associated with the project. In other words, whether its implementation helped reduce crime and insecurity in the Copacabana and Leme sectors of Río de Janeiro is not known.

Soon after, the Inter-American Institute of Human Rights (IHR) sponsored a community policing project called 'Citizen Security in Central America' in Villa Nueva, Guatemala. This project aimed to increase the trust of citizens in the recently created police force after the end of the social conflict with the guerrillas. Evaluations of the project revealed that, overall,

it positively affected the population's sense of security. Crime was no longer among the main concerns of citizens. However, the findings also showed that the quality of the police service had not improved as expected due to the lack of professional training in community policing (IIHR, 2000; Frühling, 2012b; Chinchilla & Vorndran, 2018).

In Colombia, adopting community policing involved several structural changes to transform Colombian police work (Llorente, 2004). However, most police-community initiatives were not as successful as expected due to the significant political pressure to achieve short-term results. This political pressure led the community to protest police violence. The program evaluation indicated no statistically significant decrease in fear of crime in the sector where the community police operated. Similarly, the assessments also did not indicate whether the program reduced crime in the area where it was implemented (Frühling, 2012a).

Another community policing program was carried out in the Dominican Republic. This project was the Safe Neighbourhood Programme. It was implemented in the Capotillo neighborhood in Santo Domingo, the capital city; it focused on two objectives. The first goal was to recover public confidence in the police. The second objective was introducing co-responsibility in creating security (Bobeá, 2012). There is no available evidence on the impact of this community policing program (Frühling, 2011). In 2010, the National Police of Colombia launched the National Quadrant Community Surveillance Plan. Preliminary results indicated that the community believed that community police officers lacked the authority to solve crime problems in the neighborhoods. This scenario generated a negative image of the Colombian Quadrant Plan among citizens (Román & Cárdenas, 2015).

The adoption of community policing by Latin American police agencies has also faced internal difficulties in achieving successful results. These problems relate to the lack of resources (human and logistic) and the fear police managers may experience when shifting from traditional police models to community-oriented ones (Llorente, 2004; Chinchilla, 2004; Frühling, 2012a, b). Additionally, community policing initiatives implemented in Latin America have struggled to gain the support of police officers.

The culture in Latin American police agencies tends to be reluctant and skeptical towards innovations (Frühling, 2012a, b). However, the Quadrant Plan has not gone unnoticed in other parts of Latin America. Other police agencies in the region have subsequently developed their versions of this police strategy (Frühling, 2006; Glebbeek & Koonings, 2016). Examples include the *Plan Nacional de Vigilancia Comunitaria por Cuadrante* introduced by the National Police of Colombia in 2010 (Román & Cárdenas, 2015); the Plan Cuadrante implemented by the National Civil Police of Guatemala in 2008 (Schols, 2011; Josemans, 2011); the *Vecindario Seguro* developed by the National Police of Perú in 2017 (Candia-Haro, 2018); and the *Unidades de Policía Comunitaria* applied by the National Police of Ecuador in 2009 (Pontón, 2009; Pontón & Rivera, 2016).

Implementing police strategies based on the Quadrant Plan in the Latin American police context is not dissimilar to what has happened in Chile. Its implementation has undoubtedly been motivated by the need for Latin American governments and police to reduce crime

and insecurity through the efficient and effective use of the resources they manage. However, Latin American authorities have seemingly overlooked that most of this issue has not yet been solved. In other words, the Latin American governments did not realize the degree of legitimacy most Latin American police agencies held within the socio-political context (Frühling, 2006). In addition to the above, the lack of readiness in Latin American police agencies to adopt the Quadrant Plan model also seems not to have been fully considered (Ungar & Arias, 2012). In this vein, Frühling (2006) summarized this issue, pointing out that the probability of success in the implementation of a police strategy similar to the Quadrant Plan in other Latin American countries depends, in general terms, on four factors: a) the readiness of the police agency, b) the social context in which the strategy is implemented, c) relations with the community, and (d) information analysis systems.

The readiness of the police agency is a paradox of police strategies. In general, law enforcement agencies that require the most policing strategies are the least prepared to implement them. The police-community relationship should also be crucial for Latin American police agencies attempting to implement innovative police strategies. The most nourished area of policing strategies in the region is the efforts to address this issue. However, community policing programs introduced in the region have been very heterogeneous. These projects have ranged from creating informal communication channels between police and citizens to complex programs, such as those carried out by the police in Rio de Janeiro, Brazil (Muniz et al., 1997). This project sought to drastically modify the presence of the security forces in the communities, seeking to replace antagonistic relations with bonds of trust (Muniz et al., 1997). However, the evaluations of these programs revealed that police officers were not trained in community policing. Therefore, the results were not as expected.

Although the inventory of police strategies in Latin America since the late 1990s is extensive, only a tiny proportion of them are supported by information capable of supporting a rigorous assessment of their effects. This is the least obvious but most important obstacle to any policing strategy in the region. Without data and evaluations, police innovations are at the mercy of the prejudices that the deteriorating situation of public order in Latin America invites.

## The Carabineros of Chile

Established in 1927, the Carabineros of Chile is a technically proficient, military-style police force that forms part of Chile's public security framework (Political Constitution of Chile, Art. 101). Their mission is to maintain public order across Chile and perform other duties as assigned by the Constitution and laws (Carabineros, 1990). The Carabineros aspire to be a national and international leader in policing, known for their operational excellence and high-quality service, playing a crucial role in the nation's security decisions (Carabineros, 2018). Their primary focus is preventative policing, necessitating continuous community engagement and a clear understanding of their objectives. In carrying out this sensitive mission, the Carabineros' values are highly valued by society, particularly compared to other Latin American police agencies (Carabineros, 2018; Hathazy, 2013).

The Carabineros' mission encompasses seven key roles related to various aspects of police work: prevention, education, public comfort, national integration, social solidarity, public order, and investigative functions (Carabineros, 1990). These institutional roles align with the broader definition of policing and converge on the preventative role through the implementation of the Quadrant Plan. This plan focuses on crime prevention and includes education, protection, guidance, and community comfort, fostering partnerships with residents (Carabineros, 2010, 2018). Although the Quadrant Plan does not fully address needs in rural and border areas, the Carabineros remain committed to their institutional roles through their extensive nationwide operational deployment.

The Carabineros' doctrine is rooted in a "military body ethos," where their principles are deeply embedded in the service oath (Carabineros, 2010, 2018). This oath represents a profound commitment to God, the Fatherland, and personal integrity, pledging to uphold prudence, righteousness, energy, courage, and respect. Thus, the Carabineros' institutional doctrine is a set of core principles believed, accepted, and practiced by every member, defining their identity as a community-oriented police agency dedicated to protecting and serving the Chilean people (Carabineros, 2010, 2018).

The Carabineros of Chile address, resolve and prevent social conflicts, which naturally invites criticism. Nonetheless, they enjoy high trust and recognition from Chilean society. For instance, between 2005 and 2014, the Carabineros were ranked as the second most reliable institution after radio stations (Paz Ciudadana, 2015). Additionally, from 2008 to 2019, they were regarded as Chile's most trustworthy state institution, surpassing the armed forces, the Catholic Church, ministries, and public service offices (Paz Ciudadana, 2015). Finally, the Global Competitiveness Report 2014-2015 by the World Economic Forum awarded the Carabineros a score of 6.3, placing them third worldwide in police performance, behind only Finland and New Zealand (Dammert, 2019).

## Crime Prevention Quadrant Plan

The objectives of the Quadrant Plan are to reduce crime and insecurity in Chile (Carabineros, 2010, 2018). According to the Carabineros, the Quadrant Plan is a police strategy designed to be implemented in urban sectors where more than 90% of the Chilean population lives. The goals of the Quadrant Plan are to be met through a territorial patrolling system divided into quadrants. This patrolling system (in principle) also aims to improve the Carabineros-community relationship (Carabineros, 2010, 2018). The origins of the Quadrant Plan can be traced back to a series of research studies carried out by the Carabineros in the early 1990s in conjunction with the Catholic University of Chile and the University of Chile (Carabineros, 2010). Based on these studies, Carabineros sought to develop ways to optimize its operational results better. This process gave rise to two fundamental tools that would later form key components of the Quadrant Plan.

The first of these tools was the Equivalent Vigilance Unit (UVE). The UVE is the key measurement unit to determine the supply and demand for police services in Chile. The second tool was the Police Cover Index (PCI), which aimed to objectively calculate the supply of police services required to meet the security demands of the community. These two tools provided the methodological framework for the Quadrant Plan (Carabineros, 2010). The Carabineros methodology developed to support the implementation of the Quadrant Plan argues that police services provided by individual police stations would have a reverse relationship with the crime figures recorded in each police sector. That is, the supply of police services would increase as crime increased.

This methodology seeks to protect the right to security by consistently distributing police resources to meet the security demand per quadrant (Carabineros, 2010, 2018). To illustrate how this methodology works, consider the following example: Two quadrants have the same population and geographical features. However, the crime rates in each quadrant are markedly different - one is much higher than the other, based on 1-year crime figures. On this basis, the Carabineros would allocate excellent police resources to the quadrant with the highest crime rates. For these purposes, the crime rates in each quadrant, which represents one of the factors consisting of the demand for police services, are calculated by measuring the weighted number of crimes (against persons, against property) and their consequences (death and/or injury) that occurred in the police area during a one-year period (Silva, 2000).

The ethos of the Quadrant Plan seeks to bring Carabineros and quadrant residents together as partners effectively identifying with the crime problems that affect them (Oviedo, 2007; Vergara, 2012; Carabineros, 2010, 2018). This type of police strategy is a clear example of what Bayley (1994) and Sherman and Eck (2003) recognize as the strategy most used by the police: More police, less crime. Also, to some extent, the Quadrant Plan has its foundations in theories such as rational choice and routine activities (Clarke & Felson, 2017). Both theories argue that crime is a product of criminal opportunity. With the implementation of the Quadrant Plan, it is hoped that increasing the number of frontline police patrols per quadrant, coupled with a rapid police response, will reduce crime in the sector by arresting more offenders (Carabineros, 2018).

In addition, frontline patrols enforce traffic laws and perform stops and searches to detect and detain people with outstanding warrants (Carabineros, 2010, 2018). These police mechanisms are also expected to function as preventative action aimed at avoiding serious crimes by controlling minor situations such as disorderly conduct, prostitution, alcohol consumption and public drunkenness, traffic infractions, beggars, vagrancy, and peddlers. Therefore, proactive police mechanisms based on the theory of broken windows and zero tolerance (Wilson & Kelling, 2015; Newburn & Jones, 2007) are applied to some extent by police stations that implement the Quadrant Plan.

Consequently, frontline patrols act in a way that makes them available and visible to deal with disorder, prevent crime, and generate a sense of security in the quadrant (Carabineros, 2018). Similarly, the community is expected to be informant of security prob-

lems, providing confidence and supporting the police work carried out by the Carabineros. Thus, implementing the Quadrant Plan seeks to substantially improve citizen confidence and reduce feelings of insecurity in the quadrant.

Police stations that implement the Quadrant Plan must also conduct a planning process for their police operations (Carabineros, 2018). For this purpose, police station commanding officers analyze the available information on police interests to establish priorities for each quadrant that comprises the police station's precinct. Therefore, the operational planning that underpins the Quadrant Plan relies on problem-oriented policing concepts that seek to allocate police resources to deal with crime hotspots (Carabineros, 2018). It follows then that the planning of police operations designed and implemented by police stations seeks to identify crime hotspots to implement tactics that help reduce serious crime while controlling incivilities that, without control, can lead to more complex crimes.

Furthermore, crime analysis activities by police stations seek to generate useful information to arrest prolific offenders who could operate in the quadrants (Santos & Santos, 2015). This police tactic is carried out jointly by frontline police personnel and crime analysts, who maintain a list of people believed to be operating in crime hotspots and have outstanding crime warrants. The purpose of this police tactic is to increase the number of arrests of wanted offenders, thus preventing them from continuing to commit crimes within the quadrants (Carabineros, 2010, 2018).

In sum, the implementation of the Quadrant Plan, to some extent, followed the broad international trend of adopting problem-oriented policing initiatives to reduce crime (see, e.g., Goldstein, 1990; Bayley & Dammert, 2006; Oviedo, 2007; Reisig, 2010). According to Carabineros, the Quadrant Plan is a decentralized police program. In this sense, local police stations become key business units in managing this police strategy. The Quadrant Plan is an attempt to move the Carabineros away from the predominately traditional policing model to one that was more proactive, more preventive, and worked more closely with the local community to resolve crime-related and non-crime-related problems. In doing so, the Carabineros, through the Quadrant Plan, seeks to reduce crime and insecurity and improve public support for the police. The Quadrant Plan represents a major police innovation in Chile. Its implementation has involved a significant change in the philosophy of the Carabineros and its structure, organization, administration, and procedures (Carabineros, 2010).

## Evaluations of the Quadrant Plan

In sum, although there are some areas for improvement, implementing the Quadrant Plan is fully justified. The results observed by the two Ministry of Economy's evaluations in general suggested this. A sustained drop in crime rates has been observed, especially in municipalities benefiting from implementing the Quadrant Plan (Ministry of Economy 2007, 2014). These findings are consistent with those of the research by Novak et al. (2016) and Haberman and Stiver (2018). These studies concluded that police foot patrols in high and low-crime

hotspots help reduce disorder and violent crime. Similarly, Weisburd et al. (2023) argue that patrolling in areas more significant than a hotspot also helps reduce violent crime, albeit to a lesser extent.

Similarly, the levels of credibility in the program's overall performance have led to a sustained increase in the budget allocated to the Carabineros of Chile and, therefore, to the Quadrant Plan. Moreover, the Carabineros has demonstrated sound management regarding the Quadrant Plan's diffusion. The proof of the above is that during the periods under evaluation, this police strategy increased by 50%, going from reaching 47 municipalities to providing services in 150. This is equivalent to 90% of Chile's urban population by 2013. In this regard, the evaluation reports also acknowledged the correct implementation of information systems to strengthen the Quadrant Plan. However, they also recommend incorporating technologies to manage better the costs associated with producing each of the program's components. The Ministry of Economy (2007, 2014) believed it necessary to ensure transparency in the budgetary management of the Carabineros of Chile.

In 2014, the Ministry of Interior's Deputy Crime Prevention Office hired the Paz Ciudadana Foundation (NGO) to evaluate services after awarding the public tender process that the Chilean government arranged for this purpose. The Paz Ciudadana evaluation was longitudinal and conducted between January and December 2014. The sampling consisted of 117 Greater Santiago police stations implementing the Quadrant Plan. The Paz Ciudadana Foundation study (2012) also highlights an aspect already discussed in the evaluations carried out by the Ministry of Economy (2007, 2014), which affects the expected performance of the Quadrant Plan. This aspect is the complex human resource policy of the Carabineros of Chile. According to Paz Ciudadana, this policy generates deficits that are detrimental to the effectiveness of the Quadrant Plan. Research indicates that 49% of police stations that suffered operational capacity shortages between 2006 and 2013 experienced significant increases in demand for police services. Therefore, the high turnover rate of police station personnel hinders the proper implementation of the Quadrant Plan.

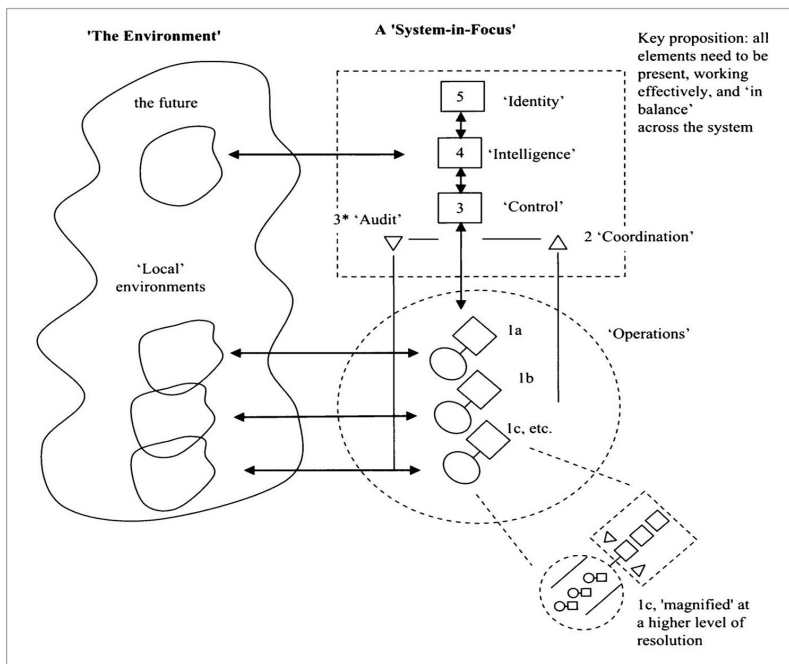
Despite the difficulties noted above, the report links the organizational culture of the Chilean Carabineros with the results obtained by the Quadrant Plan. The Paz Ciudadana report indicates that the management of the evaluated police units at the time of the report is more relevant than the lack of resources suffered by most, if not all, of the Carabineros of Chile's police stations. The culture of the Carabineros is the cornerstone upon which the Carabineros' success in implementing a police strategy such as the Quadrant Plan rests.

## The Viable System Model

The Viable System Model (VSM) is a method for organizational design and diagnosis (Beer, 1984). Initially designed by Stafford Beer, the Viable System Model works for organizations with various values. It has been tested in several types of businesses, public and not-for-profit organizations, and communities in various countries and contexts (Espinosa & Walker, 2013; Espinosa & Duque, 2018; Kinloch et al., 2009; Brocklesby, 2012). Based upon two laws of

cybernetics (feedback and required variety), the model designed by Beer (1984) analyses the organization as a system: as a whole, where all its components are integrated in such a way that they generate both autonomous and synergistic. These symbiotic actions seek to ensure organizational survival in the ever-changing environment (Espejo, 1990; Oliveira & Gascón, 2011; Brockelsby, 2012).

Through the implementation of the VSM, it has been possible to identify the different levels of recursiveness and primary activities in different types of organizations and communities (Espejo, 1990; Espinosa & Walker, 2013; Espinosa & Duque, 2018). For example, the VSM contributed to understanding the complex security systems implemented in British intelligence agencies (Brocklesby, 2012). Similarly, Kinloch et al. (2009) designed a generic framework aimed at supporting the timely detection of criminal activity by integrating geographic information systems (GIS), the Soft Systems Methodology (SSM), and the viable system model (VSM). In addition, Professor Stafford Beer carried out extensive work on applying VSM in Chile. The objective was to design and implement a real-time economic planning system to control the production information of Chile's various industrial and commercial organizations between 1971 and 1973. This work was called the 'CYBERSYN' project (Espejo, 1990). Three main dimensions comprise a viable system: (a) environment, (b) operation, and (c) management, which, in turn, are integrated by five other subsystems: (1) operations; (2) coordination; (3) control; (4) intelligence; and (5) policy (identity and ethos); see Figure 1).



**Figure 1.** *The Viable System Model*

Source: Adapted from Beer (1984).

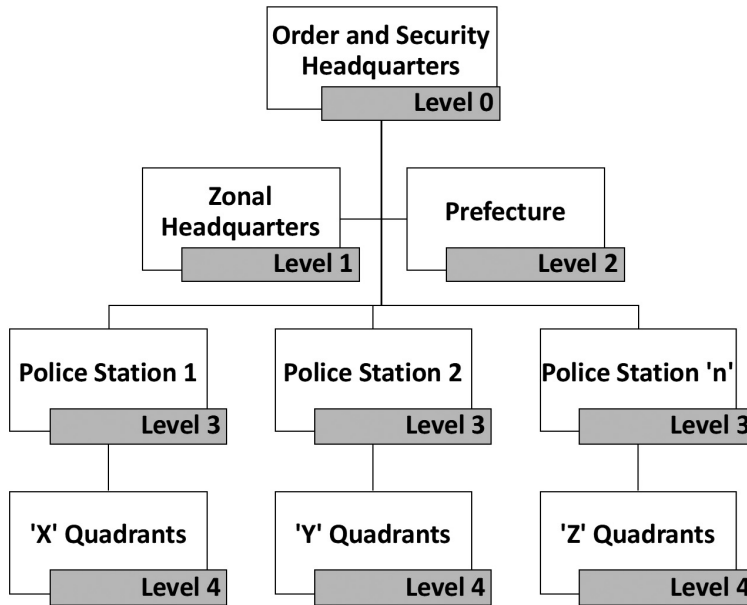
Figure 1 shows the functioning, interaction, and dimensions of the VSM and the other five subsystems that make up it. The circular figure represents system 1 (operations). This system is composed of the basic operational units of the organization, which, due to their functional nomenclature, are in direct relation with the 'environment' surrounding them. System 2 (coordination) synchronizes the work between the operational units, ensuring the normal development of their activities, while the audit and control activities of the system constitute System 3. System 4 (intelligence) is responsible for analyzing the environment surrounding the organization. It is tasked with studying environmental variations and identifying potential threats and opportunities so that the agency can adapt quickly and survive. These changes in the face of uncertainty are regulated by System 5, which oversees controlling the organization's 'internal front,' dictating policies to define, in a certain way, the pace of change in the face of constant variations in the 'external front' (Espinosa & Walker, 2013).

Espejo and Reyes (2011) summarised the interrelationship between the five systems proposed by the VSM, arguing that they operate dynamically while forming two mechanisms that regulate the model's functioning. The first mechanism is what the authors call "adaptation" and comprises systems 3, 4, and 5. This mechanism seeks to make the organization 'effective' in what it does, doing things well today to ensure its existence in the future. The second mechanism Espejo and Reyes (2011) identified as that of cohesion, which comprises Systems 1, 2, and 3 and seeks to make the organization 'efficient' by doing things well without questioning why. The interplay between the two mechanisms would generate synergies that ensure the agency's viability.

## Recursive Structure of the Carabineros of Chile

The VSM postulates that an organization is a recursive system (Beer, 1984; Espejo, 1990; Espejo et al., 1999). This means that each viable (autonomous) system must be composed of or shaped by other viable systems that are also autonomous. Each one of them is busy pursuing its development. As Espinosa and Walker (2017) discussed, structural recursiveness is defined by the policies that those responsible for administrating each of the organizational structure's systems dictate to define the primary tasks to be developed. Regarding the Carabineros, for example, structural recursion can be acknowledged by observing their operational hierarchy.

Each level of operational responsibility represents a viable system. Each level is autonomous in carrying out the primary activities, which, by their location in the structure, they are responsible for carrying out but at the same time focused on fulfilling the mission of the Carabineros of Chile. When understanding a police unit as a viable autonomous system within other autonomous units in which all members can align their purposes with those of the police strategy under study, they will likely feel more committed and, therefore, predisposed to contribute to the achievement of the objectives of the Quadrant Plan (see Figure 2).



**Figure 2.** Recursive Structure of the Carabineros of Chile

Source: Adapted from The Quadrant Plan Handbook (Carabineros of Chile, 2018)

Figure 2 shows the Carabineros of Chile’s recursive structure levels. Level 0 of the structure is composed of the National Headquarters for Order and Security (DIOSCAR)<sup>1</sup>. This strategic division generates the Carabineros of Chile’s operational policies. The DIOSCAR also coordinates with the Ministry of Interior to ensure compliance with the requirements imposed by the Chilean government concerning homeland security. Level 1 corresponds to the Zonal Headquarters. As in the previous system, it manages and controls the operational command of the prefectures and police units that implement the Quadrant Plan. Meanwhile, Level 2 corresponds to a Carabineros prefecture. Level 3 is made up of police stations that are responsible for implementing operational plans to meet the security demand in their areas of police responsibility. In other words, it is the police stations that manage the implementation of the Quadrant Plan. Finally, level 4 consists of the quadrants that make up the precinct of the police station. Each of them is allocated police resources to provide preventive police services according to the security needs detected and evaluated during the transformation process that the police station performs recursively.

In summary, the recursive structure of the Chilean Carabineros allows police stations to absorb the complexity produced by their operations. This complex architecture, in turn, increases the operational complexity of the Carabineros, making the police organization

1 Dirección Nacional de Orden y Seguridad de Carabineros de Chile

more cohesive and enabling it to adapt quickly to the changing environment. The following subsection develops the VSM of a police station that has implemented the Quadrant Plan. This theoretical diagnosis seeks to represent the areas and processes within a complex system, such as a Carabineros police unit that applies this police operations strategy.

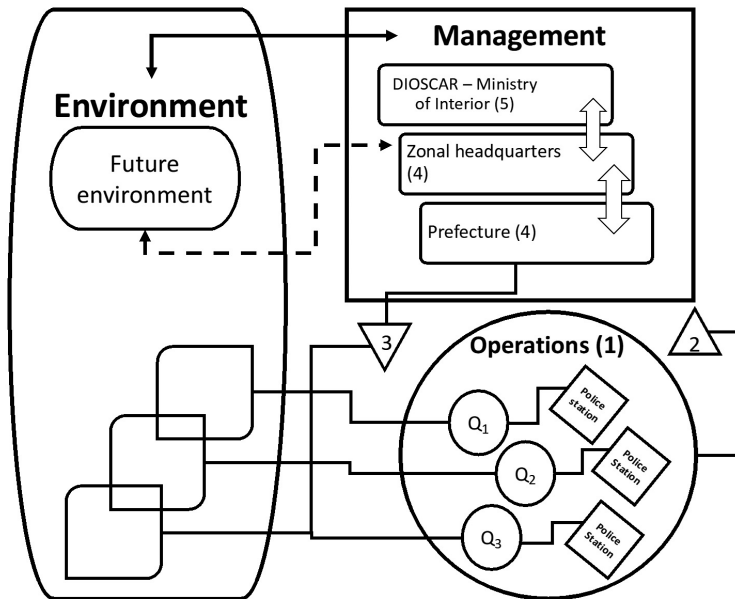
## Viable System Modelling Applied to a Police Station

The VSM of a police station that implements the Quadrant Plan encompasses the three essential elements of such a system – environment, management, and operations (Carabineros, 2018; Beer, 1984). The ‘environment’ is what surrounds the police station. This element is relevant since that is where the inputs it uses in the transformation process come from. Meanwhile, the ‘operation’ encompasses all those operations that the police station ‘system’ carries out with the Quadrant Plan. The latter, in turn, can constitute other viable systems in themselves (recursiveness of the model). Finally, ‘management’ refers to the primary activities that have to do with the administration of the police unit and that aim to make the system work. Unlike operations, the ‘management’ element is not a viable system. This is because it does not possess the capacity to function autonomously. However, it has the capacity to act as both an attenuator of the variety generated by areas of the police station and as an amplifier of its own variety so that decisions have the desired effect on the entire police unit. The same is true for the operations that the police station performs.

The unprocessed information (data) is what Beer’s (1984) design of the VSM considers to be the ‘variety’ driving the system’s performance. Considering the amount of information the police station receives; it is possible to obtain a measure of how complex it is to control its operation. The only two ways to control the operation of a complex system, Beer (1984) argues, is to amplify the variety of the regulated system or, conversely, diminish its variety. As such, a police unit responsible for the Quadrant Plan cannot pretend to be able to design a strategy for each case. Therefore, the police station manages demand by reducing the variety of its strategies and focusing on the actions of its police resources (Carabineros, 2010). However, the police station also has the particularity of amplifying its ‘variety’ through the fulfillment of parallel strategies developed to meet, for example, the demand arising from an unplanned event (i.e., emergencies due to natural phenomena, massive sports events, political elections, and like, Carabineros, 2010).

As noted above, the police station is unlikely to generate enough variety to satisfy the variety in its environment; it needs to implement some variety reducers and amplifiers (see Figure 3).

Figure 3 illustrates the elements of a VSM for a police station implementing the Quadrant Plan. The environment is the community inhabiting a police station’s area of responsibility (Sommerville, 2009). In this case, it is assumed that different security needs arise within the community and are addressed by the operational services provided by the police unit in question. System (1) is made up of the police stations in charge of carrying out the pri-



**Figure 3.** Viable System Model of a police station implementing the Quadrant Plan  
Source: Adapted from Beer (1984)

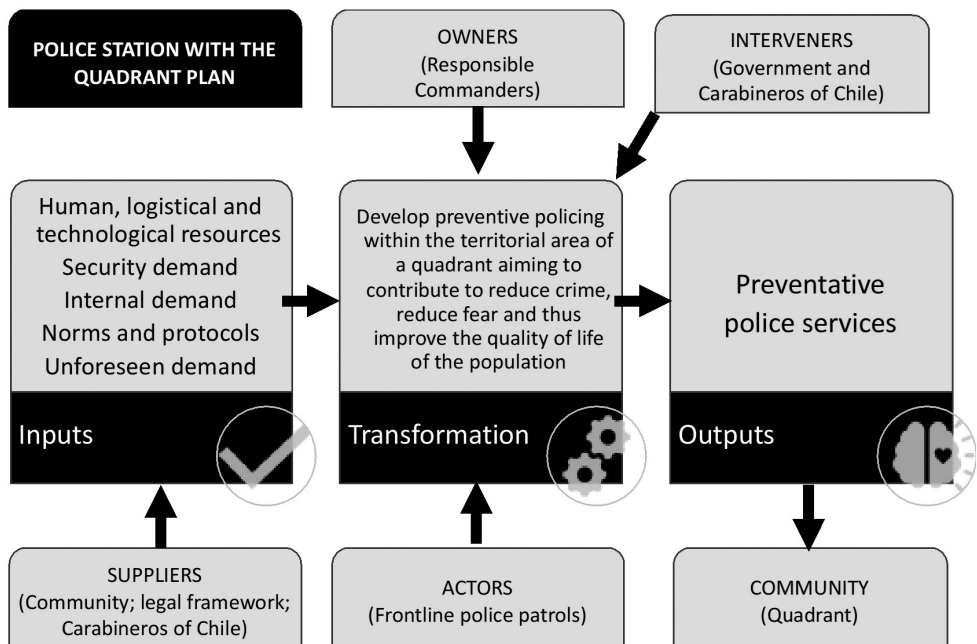
mary and coordination functions (System 2) aimed at satisfying community demand through the implementation of the four primary components or functions of the Quadrant Plan: a) targeted police services, b) calls for service, c) law enforcement actions, and d) court order compliance.

The intelligence (System 4), control, audit, and evaluation (System 3) tasks of the Quadrant Plan are carried out by both the police stations and the prefecture on which they depend. However, for reasons of recurrence, the Carabineros Zonal Headquarters also carries out the intelligence work, under which both police forces are operationally dependent. Meanwhile, the task of regulating the internal stability of the system, considering the ever-changing criminal environment, and dictating policies and norms is carried out by DIOSCAR (Order and Security Headquarters) in coordination with the Ministry of the Interior of Chile (System 5). System 5 provides the closure of the entire system. It defines and develops the vision and values of the system through policy. System 5 creates identity, ethics, and the foundation rules in which everyone operates. It aligns all the organization's tasks (Espinosa & Walker, 2013; Espinosa & Duque, 2018).

### The identity of a police station that implements the Quadrant Plan

The functioning of a police station that implements the Quadrant Plan is contingent on its goal and purpose (Carabineros, 2010). According to Carabineros, the Quadrant Plan is

as a zone-based policing strategy in which preventative police operations are carried out to meet the demand for security. Therefore, the Quadrant Plan was implemented to reduce crime and insecurity among residents of the area where it operates. The definition of the Quadrant Plan by the Carabineros represents what Espejo et al. (1999) called ‘the areas in which people in the organization accept the challenge of viability’ (p. 664). Espejo et al. (1999) also acknowledge that a declaration like the Carabineros makes about its strategy helps facilitate an understanding of the police organization beyond simply what it ‘is’ (i.e., as a police agency) and, further, to what it ‘does’ (Espejo et al., 1999). In other words, the definition of the objectives of the Quadrant Plan helps identify what they do as a police agency charged with enforcing the law in Chile. Additionally, who carries out this mission, why do they do it, on whose behalf do they do it, and what and who else is involved in fulfilling the mission? In short, the identity of the Quadrant Plan police station system is made known (see Figure 4).



**Figure 4.** The Quadrant Plan identity applies the TASCOI method.

Source: Adapted from the Quadrant Plan Handbook (Carabineros of Chile, 2010).

Figure 4 illustrates the primary functions of the police station system implementing the Quadrant Plan. Applying the TASCOI mnemonic, the system’s inputs are mainly the security demands detected in the police unit’s environment. This demand is then grouped into four components. There are also internal demands, demands for human and logistic

resources, and legal and administrative regulations governing the operation of a police station. Meanwhile, the transformation process represents the functioning of the system. In other words, what does the police unit do, how, where, by whom, and for what purpose? The answers to these questions are the results generated by the process itself. These results are represented in the preventative police services the station deploys to benefit the area of responsibility. In this context, the police station commanding officers and other recursive commanders are the 'owners,' or those responsible for implementing the Quadrant Plan. Therefore, they are obligated to command and manage the operations carried out by the 'actors' (frontline patrols) who implement the strategy within the quadrant. This transformation process is only possible with the intervention of those who provide input to the system, which, in this case, are the beneficiary community, the Carabineros of Chile, and the legal framework that regulates the police in Chile.

## Discussion

This paper has made practical use of the Viable System Model (Beer, 1984) to clearly visualize how a police station that implements the Quadrant Plan works. Having understood the functioning of a police station, it is possible to suggest that the synergies derived from their interactions ensure its viability in the ever-changing police environment. These findings align with what Espejo and Gill (1997) assert regarding the viability of a system, which is determined by its ability to develop harmonic behaviors in subsystems. The police station's viability, therefore, is related to system competitiveness and co-creation capabilities. These findings also reinforce what Beer (1984) postulates: that viable or autonomous systems, in this case, a police station, have an essential optimal organization.

A police station implementing the Quadrant Plan has a specific structure with five specialized functions that ensure its survival through the homeostasis regulatory process. In this sense, the VSM showed that the identity of a police station has a direct impact on its performance. This is important because the identity of systems can change, and adapting to the ever-changing environment is easier (Espejo, 1990; Espejo et al., 1999; Espinoza & Duque, 2018). In other words, the VSM allows the police station that implements the Quadrant Plan to promptly estimate the need to apply a variety of reducers and amplifiers. The institution's ability to estimate the potential demand for police services functions as an instrument able to regulate the variety of demand for police services, which, in some way, has allowed the Quadrant Plan to develop correctly, making it a viable system that is sustainable over time – it has developed, learned, and adapted and has managed to survive (Ministry of Economy, 2007; 2012). In this line, future research should focus on studying the features of identity that affect police stations as complex systems and in what form. This would permit a more effective design of identity features to ensure system functionality. Advances in this field will have a direct impact on police management.

However, the VSM fails to identify the possible inconsistencies related to human relationships within a complex system. Soto (2019) points out that the missing link in the VSM is the intangible asset of all organizations, i.e., the human factor. In other words, a key limitation of the VSM is that it does not allow an understanding of the relationships between the intangible assets (human capabilities) of the police station and the system and subsystems of the VSM. In this respect, Espinoza and Walker (2013, 2017) point out that Beer (1984) does not include the linguistic aspects of communication and information processes in depth. Hence, the model lacks conceptual depth concerning humans and their learning, development, and interaction forms. In fact, this shortcoming gave the model a weakness in its practical application during its implementation in Chile between 1971 and 1973 under the name of CYBERSYN (Espejo, 1990). However, the value of the VSM lies in the fact that it provides police managers with the opportunity to improve internal communication channels and ensure that officers contribute to the best of their ability to achieve the objectives of the Quadrant Plan.

The weakness of VSN, described above, can be remedied by conducting further studies to assess the human factor's influence within viable organizations. In this case, more studies are needed to investigate what organizational and individual-level variables can better explain or predict the performance of police stations that implement the Quadrant Plan in Chile. The implication of this research for the Carabineros' organizational policies is that it could clarify that human resources and their intangible capabilities mark the success or failure of a strategy such as the Quadrant Plan.

## Conclusions

A key contribution of this study is the use of both the Viable System Modelling (VSM) method by Beer (1984) and the TASCOTI method by Espejo et al. (1999) to analyze the implementation of the Quadrant Plan in Chile. As a result of this innovative methodological approach, it was possible to determine clearly how a Chilean police station that implements this police operations strategy works. The relevance of these findings relies on the fact that modeling police operations through VSM and TASCOTI made it possible to see them as a neurophysiological representation of a police station's autonomous functioning. Therefore, VSM aids in identifying the essential components for the viability of police operations. Additionally, it enables managers to pinpoint structural deficiencies and recognize parts of the organization that do not contribute to systemic viability. Moreover, future researchers can use this method to analyze the viability of police agencies as a system: as a whole, where all its components are integrated in such a way that they generate both autonomous and synergistic.

Latin American law enforcement agencies are addressing many problems associated with crime. Their current police policies dealing with the scourge of crime and its consequences fall far short of what is needed for public order to remain a viable common good over time. Integrating research, data analysis, simulations, cultural change in policy, and

community engagement could make a difference. When these variables align with an ethos of sustainability and social responsibility, police organizations can become more resilient and capable of developing sustainable viability. Police managers can use the Viable System Model to design such organizations. To achieve this objective, Latin American police managers must critically reflect on each of the systems and subsystems that make up their police agencies. This challenge will answer the question of how to improve police efficiency and effectiveness. Thus, ensuring the long-term viability of the police organization they command.

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