



Use of neutrosophy for the analysis of the social reintegration factors of released prisoners in Ecuador

Leny Cecilia Campaña Muñoz¹, Holman Steven Sánchez Ramos², and Johanna Rocio Cabrera Granda³

¹ Professor, Universidad Regional Autónoma de los Andes - Extension Santo Domingo, Ecuador, E-mail: lenycecilia1979@hotmail.com

² Professor, Universidad Regional Autónoma de los Andes - Extension Santo Domingo, Ecuador, E-mail: holmansteev0420@hotmail.com

³ Professor, Universidad Regional Autónoma de los Andes - Extension Santo Domingo, Ecuador, E-mail: johannacabrera71@hotmail.com

Abstract. The research was aimed at determining the relationship between penitentiary policy and the social reintegration of those released from the Santo Domingo de los Tsáchilas penitentiary in Santo Domingo Canton, in 2017, through non-experimental and correlational research. A sample of 20 released persons was considered, and for the collection of information regarding the two variables, a structured survey was applied, as well as interviews with social groups. A recommendation model based on knowledge was used, using neutrosophic sets of unique value, revealing from the results obtained the main organizational and legal factors of Penitentiary Policies and the Social Reinsertion of those released from Santo Domingo de los Tsáchilas in 2017. On the basis of these factors, a recommendation is made to favor the reinsertion of prisoners into society.

Keywords: Social work, reintegration, prisoner, penitentiary system, prison, neutrosophic statistics

1 Introduction

In today's world, the fight against criminality is becoming more and more complex, crime levels are increasing in a worrying way, and citizens are demanding greater security from their leaders. Today, there is no political and governmental agenda that does not include public security among its objectives [1], in order to minimize the effects of crime on societies.

The term reinsertion is mainly used as the action of integrating again into society or community that individual deprived of liberty towards productive activities that the person exercised before the entrance to prison through programs and intervention strategies from inside the prison to facilitate the reinsertion or reincorporation of the persons to their family and society. For this reason, it is stipulated that it is an act of giving the offender the opportunity to adapt again or adapt positively to society.[2]

They warn that the design and planning of activities that contribute to increasing levels of social participation are characterized by formality and verticalism, where participation is organized from bottom to bottom, with their backs to the interests and needs of the group, thus limiting their reflexive and active involvement in the community environment. This entails the risk that people assume a passive role and a lack of social commitment, even in those issues that affect them, thus limiting their protagonism in social development, at least from formal spaces [3].

They analyze psychosocial treatment from an interdisciplinary approach in order to extract and reflexively recover the experiences of the process from the perspective of social work, concluding that overcrowding limits the process of resocialization of the prisoner, the deficiencies of infrastructure and services to carry out prison work, and psychological therapies contribute to the low prognosis of rehabilitation [4].

They assess the extent to which occupational training and work programmes in prisons in Catalonia contribute to the social and labor reinsertion of prisoners and ex-prisoners, stressing that occupational training and workshop work contribute moderately to the reinsertion of prisoners, according to their personal motivation and social resources; however, their most determining role lies in their therapeutic and educational aspects in the prison itself, which helps to maintain order and, indirectly, to the resocialization of prisoners [5].

They describe social reintegration as an international model of crime prevention that is not based on a criminal law that seeks to punish the person himself, but rather seeks to punish the criminal act and reintegrate the person into the society that aggravated his conduct, to do so, it must receive prison treatment under the principles of respect for human rights through work, training for work, education, sport and health [6], because initial education (...) plays a crucial role in the quality of education, as well as the fact that it continues in continuous education and training .[7]

Despite the fact that the social reintegration of inmates is a mandatory subject within the Mexican penitentiary system, the reality of prisons in Mexico presents multiple problems for the achievement of this process. The studies carried out by [8] in the prisons of Topo Chico, Cadereyta and Apodaca show that the majority of male inmates of productive age, after their imprisonment, are not guaranteed either training or sufficient education to ensure a decent working future. Therefore, they suggest organizing education, health, training and paid employment programs, with greater success, since they would serve as the basis for reducing crime.

All the efforts made can be lost due to the lack of orientation that the community has in order to give continuity to the process initiated in reclusion. In Cuba, advanced Pedagogy and Psychology programs are being applied to give differentiated educational treatment to young people based on the special conditions in which they comply with their sanctions. Once they graduate from correctional institutions and rejoin society, in order to act in social reintegration [9], they present a system of activities to be carried out by community agents and factors, based on the incorporation of sport, culture, education and work, among others, corroborating the effectiveness of the same, which allowed for raising the rates of reinsertion of young people and providing community agents with an instrument for action in accordance with the objectives set.

These results are reinforced by [10], who describes the Cuban experience in community social control that can be a reference for other countries engaged in the fight against criminality and the consequent citizen insecurity through the work of popular organizations, a systematic work of education, awareness-raising and sensitization of the population, which is ultimately decisive for this control activity in the socio-community environment, together with the convening power of the Cuban state, as a consequence, in addition, of the confidence that the people have maintained in the revolutionary government.

They describe a co-administrative and participative business model to encourage the economic and social reinsertion with values of the inmates of the penal establishment of Pisci, Peru. The program is based on previous knowledge and values in order to fully develop the capabilities and productivity of the inmates, and involves the entire family so that family values are transformed or strengthened - as appropriate - as part of the process of social, economic and labor reinsertion of the prisoner and promote training, credit and formation of microenterprises, to improve their quality of life and not relapse into delinquency. It concludes that strengthening values such as honesty, responsibility, perseverance, trust and teamwork, among others, empowers productive units, reduces project abandonment and reinforces the social, labor and economic reintegration process of inmates of the Pisci Criminal Establishment [11].

They present good practices of training and labor insertion in the international environment that emphasize the need for personalized attention, with educational accompaniment and work to build a social network of support through social awareness actions that allow second opportunities for ex-prisoners.

The development of criminal trajectories in a territory cannot be tackled only through psychological or educational treatment as usual. Rather, the prevention of infractions requires different levels of intervention, the psychosocial and community approach being fundamental.

The current Constitution of the Republic of Ecuador establishes a social rehabilitation system for the purpose of the comprehensive rehabilitation of persons sentenced to criminal penalties in order to reintegrate them into society, as well as the protection of persons deprived of their liberty and the guarantee of their rights. The system prioritizes the development of the capacities of persons convicted of crimes to exercise their rights and fulfill their responsibilities when they are released.[12]

The Comprehensive Organic Penal Code establishes the National Social Rehabilitation System in Ecuador as a set of principles, norms, policies of institutions, programs and processes that interrelate and interact in a comprehensive manner for criminal execution.

However, for society, the State has not achieved the conquest of this sector, so it is not possible to speak of the rehabilitation of the individual, despite the fact that the constitution indicates that persons deprived of liberty are considered a vulnerable group with priority attention. In practice, there is no real rehabilitation, since many of the persons deprived of their liberty are repeat offenders and even go out with other modalities, such as entering through the sale of drugs and going out to engage in the theft of persons. It is necessary to emphasize that there may be rehabilitation, but if there are no sources of work outside the Centers of Deprivation of Liberty, it would result in that person again committing a crime. "[...] the supreme corrective to natural crime, reincorporation justly in knowledge, respect and preservation in formal terms." [12].

The person deprived of liberty, once he serves his sentence, recovers his liberty, recovers this very basic principle; it could be said that his free will is rehabilitated, freedom makes us possessors of negative and positive decisions, for an ex-prisoner it would be the freedom to decide to infringe the Law again and to submit again to a sanction of personal precautionary measure that restricts his freedom again; or otherwise, the ex-prisoner could take the decision to reinsert himself into society as a rehabilitated and productive individual.

There is a duality in the way the prison sentence is viewed: a) from the perspective of a society that demands greater security and that only in the imposition of sentences deprived of liberty does it satisfy its demands for justice and social peace; b) from the point of view of persons deprived of liberty, who, the longer they are detained, have less chance of returning to society as a member who will not offend again, since mere deprivation of liberty

has not only proved to be ineffective in the fight against the increase in delinquency, but also, according to official figures on recidivism, seems to stimulate it.

Statistics show that prisons have become overcrowded and that Ecuador's current penitentiary system does not comply with the fundamental objectives of the Constitution and does not consider the person deprived of liberty as a vulnerable and priority group.

All of the above leads us to study the process of social reintegration of former inmates of the Santo Domingo de los Tsáchilas Liberty Deprivation Center, Santo Domingo Canton in Ecuador, in order to determine the relationship between penitentiary policy and social reintegration during the year 2017. The study made use of knowledge-based recommendation models, which make suggestions by inferring the user's needs and preferences. The knowledge-based approach is distinguished in the sense that it uses knowledge about how a particular object can meet the user's needs, and therefore has the ability to reason about the relationship between a need and the possible recommendation that will be displayed. In this study, the recommendation model is based on the construction of user profiles as a knowledge structure that supports inference which can be enriched with the use of expressions that use natural language [13]. [14]

This paper proposes a recommendation model based on knowledge using neutrosophic numbers of unique value (SVN) allowing the use of linguistic variables [14] to recommend the factors to be taken into account in the social reinsertion of released prisoners in Ecuador. This process is considered as modeling, taking into account that it is articulated from sequences that are instituted in the representation of an internal character.

2 Materials and Methods

A descriptive study is conducted to analyze and interpret the topic in the case study through the non-experimental cross-sectional design.

Theoretical methods were used through structured survey techniques and interviews through dialogue with different social groups in the Canton of Santo Domingo to identify citizen criteria on the subject of study supported on the basis of what is required by legal regulations.

Documentary review to verify the role of the state, its constitutional and legislative policy in force through social reinsertion.

The sample consisted of 20 released from the Santo Domingo Penitentiary Establishment of the Tsáchilas of the Santo Domingo Canton, who at all times offered their collaboration for its realization.

A recommendation model based on knowledge was developed using neutrosophic numbers of unique value, to recommend the analysis of the main organizational and legal factors of the Penitentiary Policies and the Social Reinsertion of the released penitentiaries in Ecuador. Neutrosophy is a new branch of philosophy which studies the origin, nature and scope of neutrality, as well as its interactions with different ideational spectra, created by Professor Florentin Smarandache[15]. His fundamental theory states that every idea tends to be neutralized, diminished, balanced by ideas as a state of equilibrium.

The term "neutrosophic" was proposed because "neutrosophic" comes etymologically from "neutrosophy", which means knowledge of neutral thought, and this third neutral represents the main distinction, i.e. the unknown indeterminate neutral part (in addition to the "truth" "belonging" and "falsehood" Components of "nonbelonging" that appear in the overall fuzzy logic). Neutrosophic Logic is a generalization of Zadeh's fuzzy logic[16], and especially of Atanassov's [14] intuitive fuzzy logic and other logic.

The workflow of the knowledge-based recommendation model using single-value neutrosophic numbers for the analysis of the social reintegration factors of released prisoners in Ecuador is presented in Figure 1. The model is based on the proposal of for knowledge-based recommendation systems allowing linguistic terms and indetermination to be represented by single-value neutrosophic sets (SVN), [17].

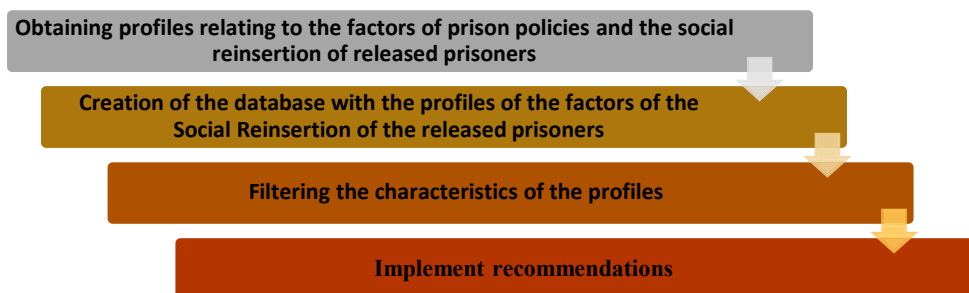


Figure 1: Proposed model. Source: Own elaboration.

The detailed description of each of the components of the model supported by the proposal is presented below:

1. Obtaining profiles relating to the organizational and legal factors of prison policies and the social reintegration of released prisoners.

Each of the organizational and legal factors of the Penitentiary Policies and the Social reinsertion of those released for their social reinsertion are described by a set of characteristics that will conform the profiles for analysis, these characteristics are represented by expression 1.

$$C = \{c_1, \dots, c_l\} \quad (1)$$

To obtain the database with the profiles of the organizational and legal factors of the Penitentiary Policies and the Social Reinsertion of the released prisoners for their social reinsertion are obtained through single valued neutrosophic number (SVN) [28, 29], where it is taken into account that:

Sea $A^* = (A_1^*, A_2^*, \dots, A_n^*)$ is a vector of SVN numbers such that $A_j^* = (a_j^*, b_j^*, c_j^*)$ $j = (1, 2, \dots, n)$ and $B_i = (B_{i1}, B_{i2}, \dots, B_{im})$ ($i = 1, 2, \dots, m$) are m vectors of n SVN numbers such that and $B_{ij} = (a_{ij}, b_{ij}, c_{ij})$ ($i = 1, 2, \dots, m$), ($j = 1, 2, \dots, n$) then the Euclidean distance is defined as. The B_i and A^* result [28]:

$$d_i = \left(\frac{1}{3} \sum_{j=1}^n \left\{ (|a_{ij} - a_j^*|)^2 + (|b_{ij} - b_j^*|)^2 + (|c_{ij} - c_j^*|)^2 \right\} \right)^{\frac{1}{2}} \quad (2)$$

From the obtaining of the Euclidean distance, a similarity measure is defined as referred to in [18].

To the extent that the alternative A_i is closer to the profiles relating to the organizational and legal factors of the Penitentiary Policies and the Social reinsertion of those released for social reinsertion (s_i), the greater the similarity will be, which makes it possible to establish an order between alternatives according to [15]. The profiles relating to the organizational and legal factors of prison policies and the social reintegration of those released can be obtained directly from experts, which is mathematically represented by equation 3.

$$F_{a_j} = \{v_1^j, \dots, v_k^j, \dots, v_l^j\}, j = 1, \dots, n \quad (3)$$

The evaluations of the characteristics of the main organizational and legal factors of the Penitentiary Policies and the Social Reinsertion of the released prisoners for their social reinsertion are expressed using the linguistic scale S , $\in S$ where $S = \{s_1, \dots, s_g\}$ corresponding to the second set of linguistic terms defined to evaluate the characteristics using the numbers SVN. For this purpose, the linguistic terms to be used are defined once the set of conceptions related to the right to life has been described and are represented according to expression 4.

$$A = \{a_1, \dots, a_j, \dots, a_n\} \quad (4)$$

The set of organizational and legal factors of the Penitentiary Policies and the Social Reinsertion of the released prisoners, for their social reinsertion, is kept in a previously created Database.

2. Creation of the database with the profiles of the organizational and legal factors of the Penitentiary Policies and the Social Reinsertion of the released prisoners.

In this phase, the database is created with the profiles of the organizational and legal factors of the Penitentiary Policies and the Social Reinsertion of the released prisoners for their social reinsertion. The factors that correspond to the profiles of released prisoners are shown mathematically through expression 5.

$$P_e = \{P_1^e, \dots, P_q^e, \dots, P_l^e\} \quad (5)$$

These profiles are made up of a set of attributes, which for interpretation are represented through expression 6.

$$C_e = \{c_1^e, \dots, c_k^e, \dots, c_l^e\} \quad (6)$$

Where: $c_k^e \in S$

The profiles corresponding to the organizational and legal factors of prison policies and the social reintegration of those released for social reintegration are obtained through the so-called conversational approach or through examples, which can be adapted as referred to [19].

3. Filtering the characteristics of the profiles

In this phase, the main organizational and legal factors of the Penitentiary Policies and the Social Reinsertion

of the released prisoners for their social reinsertion are filtered in order to find out which are the factors that influence so that the released prisoners can be incorporated into society.

In order to obtain these results, the similarity between the organizational and legal factors of the Penitentiary Policies and the Social Reinsertion of the released prisoners for their social reinsertion is calculated, the profile of each factor, P_e and each characteristic related to the factors that influence social reinsertion registered in the database is obtained through the calculation of the total similarity, using the expression 7.

$$s_i = (1 - d_i)^{\frac{1}{2}} \quad (7)$$

The function S calculates the similarity between the values of the attributes of the profile of the organizational and legal factors of the Penitentiary Policies and the Social reinsertion of the released prisoners for their social reinsertion, a_j [32].

The profile related to the main factors for the social reinsertion of released prisoners is obtained through the so-called conversational approach or through examples that can be adapted according to [15].

4. Implement recommendations

Calculated the similarity between the profiles of the organizational and legal factors of the Penitentiary Policies and the Social Reinsertion of the released prisoners, for their social reinsertion and each factor analyzed in the present study are ordered according to the similarity obtained, it is represented according to the similarity vector that is represented in expression 8.

$$D = (s_1, \dots, s_n) \quad (8)$$

The characteristics to be taken care of will be those that best satisfy the needs of the profile of the organizational and legal factors of the Penitentiary Policies and the Social Reinsertion of the released prisoners, that is to say those that possess greater similarity with the characteristics of the released prisoners that desire to reincorporate to the society.

3 Results

The diagnosis showed that the facilities of the Santo Domingo de los Tsáchilas Prison are not adequate for a therapeutic and psychosocial process; even the staff of psychologists and psychiatrists is not sufficient for the 1601 persons deprived of liberty that exist in this Centre:

1. The limited opportunities for rehabilitation and the lack of efficient administrative policies in detention centers to meet the primary objective of rehabilitation set out in the Constitution.
2. The prisoners are mainly people who have not had access to basic services that the State should provide to the population, they came from broken families, with parental abandonment and instability of family members whose relationships were marked by domestic violence, such as physical and psychological abuse and negligence on the part of parents or caregivers, some have as close models siblings or groups of peers who are using drugs and breaking the law.
3. Temporal and Future Perspective of released prisoners who wish to reincorporate into society, characterized by established goals, resources and actions implemented for their concretion.

The interviews carried out show the influence that the social and economic context exerts on the elaboration of future goals and the degree of feasibility that they have with the released prisoners. In this sense, it should be noted that people in unfavorable educational and socioeconomic conditions tend to show a restricted Future Temporal Perspective, an aspect that can be explained in terms of the lower level of resources available for their maintenance and achievement.

Similarly, information was obtained regarding the work carried out in the families of released prisoners, which is non-existent, since there are no resources or professionals prepared to carry out such work. When inmates are released, the institution has no way of monitoring their reintegration, which leads to a decrease in support networks [11].

Other results obtained from interviews with social groups are that 87% of those interviewed agree that they do not offer a job opportunity to a former prisoner, due to a lack of confidence in these people to take charge of their businesses or even their families. This infers that job opportunities for a former inmate in Cantón Santo Domingo are very low if the state does not take action to reverse the fact.

Similarly, 93% say that the penitentiary system does not fulfill its purpose of rehabilitation as enshrined in the country's Constitution, it would be a center for the deprivation of liberty, these buildings do not comply with the structural logistics for an adequate rehabilitation for the inmate [4].

On the other hand, the Constitution of the Republic of Ecuador, in its art. 2003, on the guidelines of the social rehabilitation system in its fifth paragraph; ratifies social reintegration as one of the fundamental objectives of the system, so on the basis of this it is recommended to promote respect for the rights of persons deprived of liberty, since that is the objective of our Constitution, although the reality is distant from what is enshrined in the Magna Carta that guarantees a series of rights to this priority attention group, what the current legislation has sought is to

leave behind the punitive system, being repealed; Today, the State is trying to create a system for rehabilitation, since etymologically the word rehabilitation comes from the Latin word "habilitar" which means something new, seeking to train people to reintegrate into a social environment [6].

Also on the analysis carried out, it is detected that the Regulation of the National System of Social Rehabilitation in its art. 49 of this code sets forth the treatment that should be given to persons deprived of liberty, therefore this process must be attended to, which must be an orderly process, starting from individualized orientation to each person who enters a deprivation of liberty center, advancing with them towards a therapeutic part where the participation of psychologists and psychiatrists who help them to establish their correct behavior takes on great importance, in order to encourage them to continue a true process of rehabilitation by learning a trade, or a job, or even to educate themselves and obtain a degree that will help them to insert themselves into society in the future.

As described by the ex-prisoners, when they enter the center for crimes, they learn practices of violence as a means of survival and they regroup among themselves to be protected, as a solidarity among the excluded, they are marked by social exclusion, they return to the same conflictive environment, dysfunctional origin, families in conditions of instability and poverty, without access to basic services, stigmatized by society. This leads them to be marked by social exclusion, they return to the same conflictive environment, without access to basic services, stigmatized by society.

The increase in delinquency in Ecuadorian society is considered a result of the few opportunities that the State offers to its citizens, such as: a bad education system, a bad health system, there is no migration control, there are no job opportunities.

There is no monitoring and control of compliance with policies and regulations aimed primarily at rehabilitating the prisoner, for positive insertion into society; this sector has been forgotten; society is unaware of the existence of a rehabilitation policy for prisoners enshrined in the constitution; much less does society know of comprehensive rehabilitation systems for the prisoner, society only considers that prisons have become centers for perfecting offenders, in addition to considering that the existing short rehabilitation system actually causes social resentment and even hatred of justice.

The stigma of prison is an indelible effect on the life of the ex-prisoner, limiting job opportunities; the governments in office must begin to consider the reinsertion of the ex-prisoner as a social problem that afflicts society on a daily basis, and take action measures to prevent further propagation of individuals without rehabilitation who continue to delinquency; citizens must get involved to support the State and the Government in presenting projects aimed at the reintegration of the ex-prisoner.

Linguistic term	SVN Numbers
Extremely good(EG)	(1,0,0)
Very very good (VVG)	(0.9, 0.1, 0.1)
Very good (VG)	(0.8,0,15,0.20)
Good(G)	(0.70,0.25,0.30)
Medium good (MDG)	(0.60,0.35,0.40)
Average(M)	(0.50,0.50,0.50)
Medium Bad (MDB)	(0.40,0.65,0.60)
Bad (B)	(0.30,0.75,0.70)
Very bad (VB)	(0.20,0.85,0.80)
Very very bad (VVB)	(0.10,0.90,0.90)
Extremely bad (EB)	(0,1,1)

Table 1: Linguistic terms used by [28].

The recommendations given the information related to the 3 factors of social reinsertion of the released penitentiaries that predominate in Ecuador are shown in table 2, is obtained as shown in expression 9.

$$P_e = \{MDG, VVG, MDG\} \quad (9)$$

Based on the result obtained, it is recommended to take into account factor 2 related to the characteristics of the inmates in order to achieve their adequate reintegration into society. This is the most important factor in the analysis carried out.

Once the above-mentioned recommendation has been obtained, the similarity between the profiles of the organizational and legal factors of the Penitentiary Policies and the Social Reinsertion of the released prisoners in Ecuador is calculated. The results are shown in table 2.

<i>a1</i>	<i>a2</i>	<i>a3</i>
0.44	0.80	0.52

Table 2: Similarities between the organizational and legal factors of prison policies and the social reintegration of released prisoners
Source: Prepared by the authors.

Based on the results obtained, it is recommended that attention be paid to the profiles that come closest to the organizational and legal factors of penitentiary policies and the social reintegration of those released from prison. A ranking of concepts according to comparison would be $\{a_2, a_3, a_1\}$.

In the case of a recommendation of the profiles related to the organizational and legal factors of penitentiary policies and the social reinsertion of released prisoners, it is recommended for our case study to look at the closest profiles, which would be the recommendations, a_1 , a_3 , corresponding to the rehabilitation opportunities that released prisoners have and the temporal and future perspective that released prisoners have.

The aforementioned results help to highlight the social problem and the most vulnerable part of this problem in society. Social exclusion can be characterized as the situation of certain groups in which public and/or private mechanisms of prevention, assistance or social support do not exist or are not capable of re-establishing the balance.

Conclusions

The Penitentiary Policy, as well as the organizational factors of the penitentiary policy and the Social Reinsertion of those released from the Santo Domingo de los Tsáchilas Penitentiary Establishment of the Santo Domingo Canton, 2017, was analyzed through a recommendation model for the analysis of the social reinsertion factors of the released penitentiaries in Ecuador, the model follows a knowledge-based approach, specifically based on the use of SVN numbers to analyze linguistic terms.

It was found that persons deprived of their liberty, being a group of priority attention recognized in Article 35 of the Constitution in Ecuador, deserve better attention, in all their rights.

An analysis of the various regulations led to the conclusion that persons deprived of their liberty (Ecuadorian or foreign men and women) must have their integrity protected by the State so that their rights are not violated and thus are rehabilitated in a positive manner.

It is clear that the Ecuadorian State is solely responsible for issuing appropriate policies to develop rehabilitation systems that will lead to the prisoner's productive reintegration into society.

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