

# Prediction Model for Probability of Terrorist Activities in the Western World

*Dr. David Gaft*

*The State of Israel*  
[davidgaft@gmail.com](mailto:davidgaft@gmail.com)

## Abstract

This article investigates global terrorism in general, with emphasis on Israel, suggesting suicide bombing attacks create a significant ripple effect considering the fact that although the actual number of attacks is relatively small, the number of people killed or wounded may account for as much as 50% of all casualties from terrorist activities.

One reason for this is the willingness of terrorists to commit suicide attacks and become “martyrs” rather than disappoint and betray their operators. Hence, the ability to deter activists is not a viable option. Prevention of terrorist attacks by suicide bomber cells may take place in a number of situations or events. In this work, we shall focus on the interception of suicide bomber terrorist cells attacks in three different phases: the early preparation phase, after one attack, and after several attacks.

Most administrative detentions are carried out during the early preparation phase, without use of force or risk of injury to friendly forces, such that many casualties are spared. In cases where the cell is not uncovered after the first attack, the chances of apprehending its members is greatly reduced and it is most likely the cell will not be caught until after it has carried out several attacks.

**Keywords:** terror, terrorist organisation, terrorists, Intifada, Hamas, punitive measures.

## Introduction

Ever since its establishment, the State of Israel has been engaged in an ongoing struggle against terrorism [9]. As part of this uncompromising struggle, Israeli governments have been involved in countless military operations, intelligence activities and legal proceedings against various terrorists and terrorist organizations. However, the struggle against terrorism by a democratic country is very different from that of the individual [4].

In the second half of the 70s, and especially after the Iranian revolution, the involvement of Islamic movements in the Middle East conflict increased, an increase that is clearly visible in the West Bank, Gaza, and among Israeli Arabs. Palestinians saw the establishment of a radical religious movement that gave rise to militant groups that rejected all forms of political agreement.

Today there are several known methods for combatting suicide attacks:

1. Intelligence – effective intelligence allows forces to attack activists or their operators, who are regarded as a type of ticking bomb, and by doing so it is possible to thwart the attack [11].

2. Offensive operations – extensive operations against terrorist infrastructures are necessary for maintaining a continuous comprehensive initiative in order to preserve the achievements of such operations.

3. Punitive measures – although it is not possible to punish the bomber himself, the very knowledge that their family will be punished as a result of their actions serves as possible deterrence. Punishment is directed towards the suicide bomber's immediate family and is primarily executed when the bomber's family shows support for his attack.

Punishment is typically applied in one of two forms:

1) demolition of homes – Israel has carried out this punishment several times.

Demolition is considered an especially effective means of discouragement and has proven itself effective in reducing the number of suicide bombing attacks;

2) deportation of the attacker's family members from the region.

4. Public relations – it is possible to encourage delegitimisation of suicide bombings by applying massive international pressure against the phenomenon, including recruitment of moderate voices from within the Arab and Muslim world who would speak out against the phenomenon and participate in establishment of a global consensus against suicide bombings.

Preparation of suicide bombers for Attack – by contrast to popular belief, suicide bombings are not sporadic acts of individuals who suddenly decide to act at their own initiative, but rather carefully planned operations that are driven by larger mechanisms that prepare the bomber for action. They are well-timed military operations in which the bomber himself is the final link in a long chain of command. Psychological and physical training of suicide bombers may extend for a long time. "Suicide bombers are no more than the tip of the iceberg of larger organisations" (Michigan War).

Since the end of 2001, when the number of Palestinian casualties in the second intifada greatly increased and living conditions in the Western Bank deteriorated, the pool of potential terrorist bombers dramatically increased and it was possible to send them out on missions following significantly shorter preparation period, with no more than minor psychological preparation. Even the psychological profile of suicide bombers is no longer as clear cut as it was prior to this time, with even married people, parents, and women carrying out attacks. [8]

**Aim.** This paper focuses on the following stages: prevention of the activity of the terrorist group under preparation, interruption of its activity after the first attack, destruction after a terrorist campaign. The articles addresses the data about small terrorist cells and the incentives of their attacks. The theoretical model of a network of small terrorist groups and the nature of their activity have been analysed.

**Material.** The data about the terrorism in Israel formed the basis of the analysis.

**Methods.** Traditional, historical, sociological, anthropological, comparative analysis.

“Hybrid” terrorist organisations – that is, terrorist groups with semi-state, geographical, political, civil and institutional presence – pose special difficulties and challenges to those acting against them [5].

The several periods that were characterised by many terrorist attacks and political events that had direct impact on the region can be considered in the Table 1.

*Table 1.* Terrorist attacks and political events that had direct impact on the region

No.	Period	Political Processes	Terrorist Attacks
1.	1993–1997	Establishment of the Palestinian Authority. The “Oslo A” agreements. The “Oslo B” agreements. Decrease in number of administrative detainees	Multiple attacks by terrorist squads and suicide bombers. High casualties
2.	2000–2008	Failure of government policy. Policy of restraint. The failure of Camp David Accords. Unilateral withdrawal of the IDF from Lebanon. Successful start in the war against. Successful prevention of attacks. From 2002 – over 4000 administrative detainees	Wave of suicide bombing attacks with large number of casualties. Decrease in number of attacks only after destruction of terrorist cells in 2005
3.	2013–2015	No negotiations. Complete neutralisation. Operation “Protective Edge” (Mivtza Tzuk Eitan). Increased use of social networks	Terrorist attacks by individual operatives (stabblings, running over people, drive-by shootings)

As seen in the table, there is one common denominator between the first and second periods: execution of attacks by terrorist cells and suicide bombers. By contrast, the third period is more characterised by **individual operatives** who were influenced by incitement on social networks [10].

The goal of suicide bombings, much like that of any other terrorist attack, is to achieve certain political objectives by violent means.

Terrorist networks (Figure 1) are structured in a dispersed “clandestine cell” structure, with no definite military hierarchy [1], and often without any direct contact between the separate cells. Such a structure is very difficult for security forces to discover or prevent from carrying out their attack.

The arrows in the figure represent relationships between the different terrorist cells and their external environment: communication between cells, recruitment of new members, purchasing and manufacturing of weapons, movements in the field, and so forth.

Terrorist organisations design their networks such that there is integration of information between the different cells.

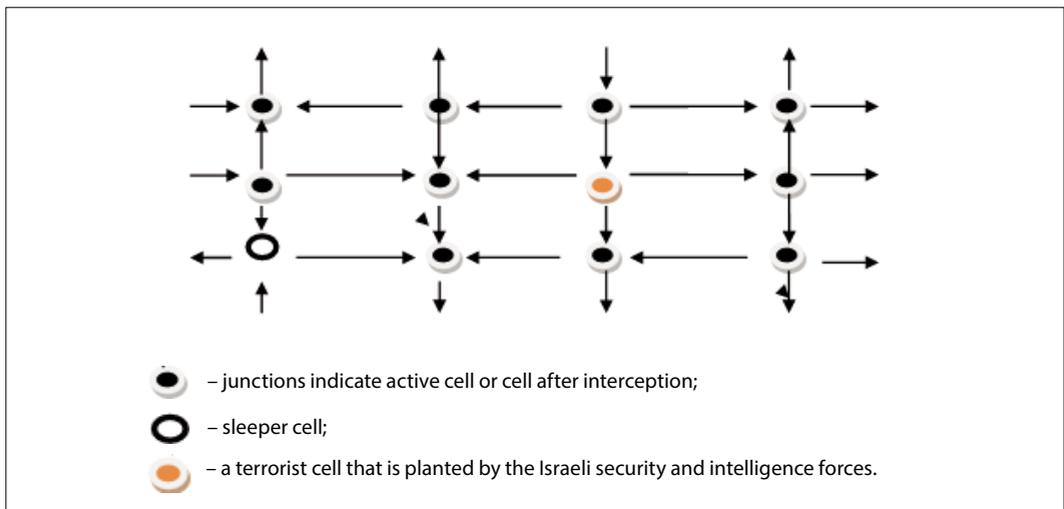


Figure 1. Illustration of a terrorist cell network

The intention is to ensure each cell is able to obtain the resources and information its members require in order to:

- 1) survive, and
- 2) initiate action or respond.

The structure of terrorist cells suggests an extreme ability to survive in an independent manner and sophistication of the integration processes (different types of communication) necessary for maintaining such independence. Terrorist cells establish an integration process as part of their existence and under their full responsibility (fast and dynamic changes in smaller organisations).

Consider a situation where one of the cells is exposed (the junction in the figure) or an intelligence cell is successfully “planted”. Because of the links existing between the cells, other cells, which maintained contact with the exposed cell, are now “burnt”.

For purposes of illustration only, in the terrorist network diagram we obtain the following:

$$G_1 = n \times T,$$

where:

$G_1$  – the number of terrorist cells that may be exposed as a result of exposing a neighbouring cell (See the Network diagram above);

$n$  – the number of arrows pointing out of exposed cells towards other network cells;

$T$  – exposed cell/s (junctions).

In the terrorist network diagram (for illustration purposes only):

$$G_1 = 4$$

$$T = 1$$

$n = 4$  (the number of arrows pointing out from the single junction)

We shall now calculate the potential impact of one cell being discovered or exposed on other cells that do not maintain direct contact or activities with that cell. We shall examine the phenomenon by which the exposed cell disengages itself from the other network cells that are furthest away from it.

This phenomenon is expressed using the fading coefficient  $\lambda_i$ :

$$\lambda = 1, \frac{3}{4}, \frac{1}{2}, \frac{1}{4}, \dots,$$

where:

$i$  – indicates increasing “distance” from the exposed cell ( $i = 1, 2, 3, 4, \dots$ ).

We shall now calculate the total number of cells that could “burn” following exposure of a single cell:

$$G = \lambda_1 n_1 T + \lambda_2 (n_2 - 1) T + \lambda_3 (n_3 - 1) T + \lambda_4 (n_4 - 1) T \dots,$$

or the following equation is obtained:

$$G = \lambda_i n_i T + \sum_2^i \lambda (n - 1)$$

In the theoretical model, we investigated the effect of one cell being discovered on other cells within the network.

The network drawing and equations for calculation of impact on the entire terrorist network allows us to analyse relevant data for uncovering of terrorist cells [7].

In this study, we created a model of a terrorist network as an additional layer of an interactive map, with visual information that connects between themselves and geographic location (Figure 2). The geographical mapping system will function as a unified operational platform.

In this research we shall study the behavioural model of terrorist cells (in the drawing, the network is a junction).

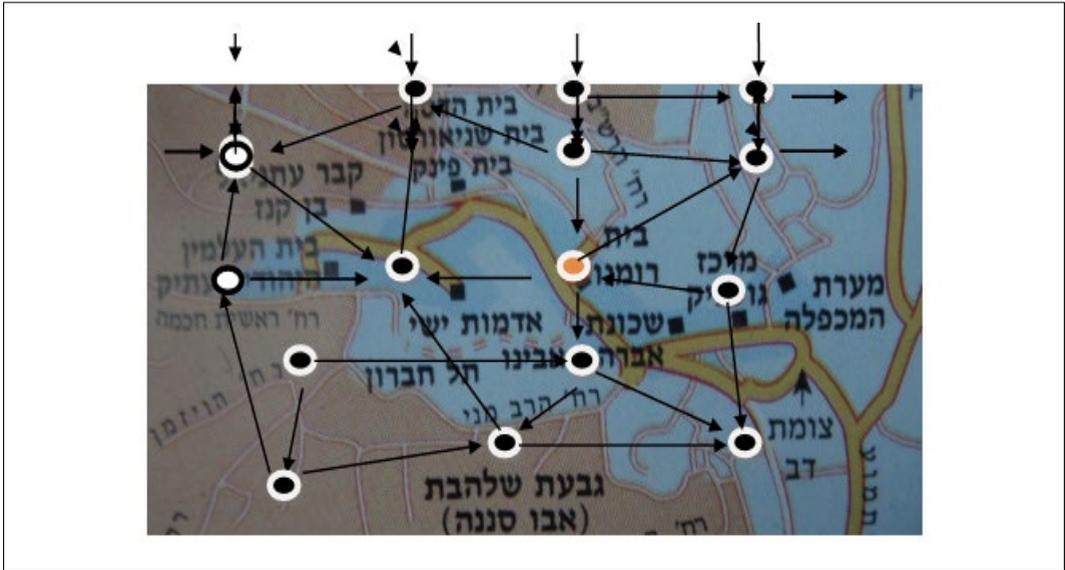


Figure 2. Illustration of a terrorist network platform on a map

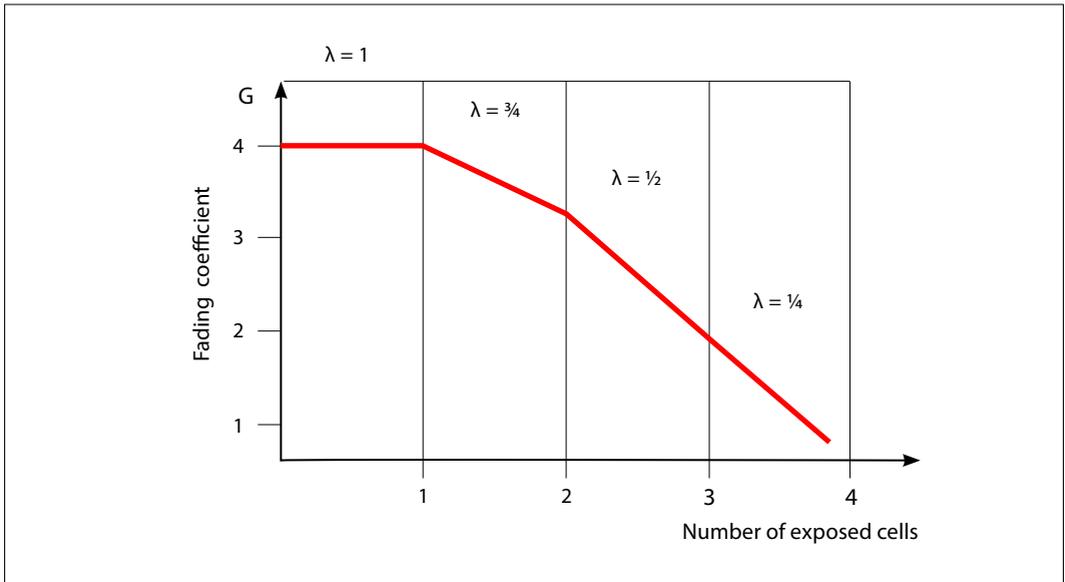


Figure 3. The decreasing probability for detection of terrorist cells

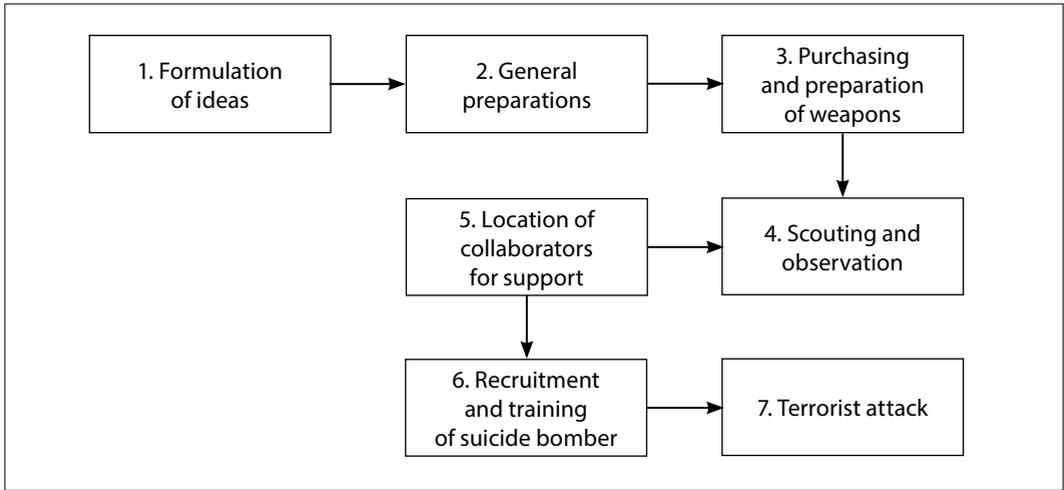


Figure 4. The activity of terrorist cells during establishment (including attack)

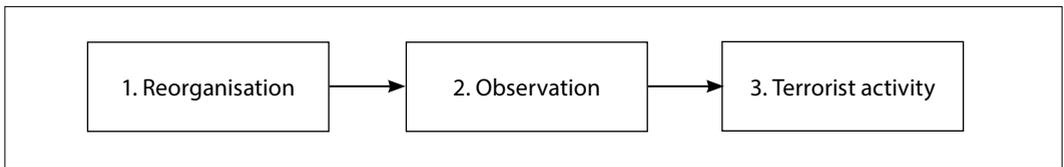


Figure 5. The stages in execution of a terrorist attack by a cell that was not discovered and remains operational

Total number of events:

$$N = S + P,$$

where:

N – total number of events;

S – number of interceptions during the measured period (several months, 1 year, several years);

P – total number of attacks during the period.

$$P = 1x + 2x + 3x + 4x + 5x + 6x + 7x$$

where:

P – a single terrorist attack including stages of exposure;

ix – stages of exposure.

Each stage represents a terrorist attack – potential for attack.

$$P = \sum_1^7 x$$

$$P = \sum p$$

**Statistical effectiveness coefficient (F)** for prevention of attacks – the Exposure Coefficient may be calculated using the following formula:

$$F = S / N$$

$$F = S / \sum \sum_1^7 x + S$$

$F_m$  – statistical effectiveness – average rate of uncovering cells over 6-year period based on data presented in Figures 5 and 6.

$$F_m = 0.73$$

According to the graph, the result suggest the following coefficients:

Example 1: Year 2005       $F = 0.85$

Example 2: Year 2005       $F = 0.875$

Example 3: Year 2005       $F = 0.98$

The closer the number is to “1”, the greater the effectiveness of security forces and their ability to destroy terrorist cells. Had the security forces failed to uncover cells or prevent attacks, the coefficient would have been close to “0”. In this case the effectiveness statistical model is [3]:

$$0 \leq F \leq 1$$

**Examples for probability of exposure – prevention** (data taken from Figures 1 and 2):

$p_2$  – statistical value representing a cell that is not yet exposed, as per Figure 2.

$$10x + 9x + 8x = 2p$$

Probability of exposing a single terrorist attack according to Figure 1:

$$Y = \sum_1^7 x / \sum_1^7 x + \sum_8^{10} x = 0.7$$

Probability of exposing a single terrorist attack according to Figure 2:

$$Y_2 = \sum_8^{10} x / \sum_1^7 x + \sum_8^{10} x = 0.3$$

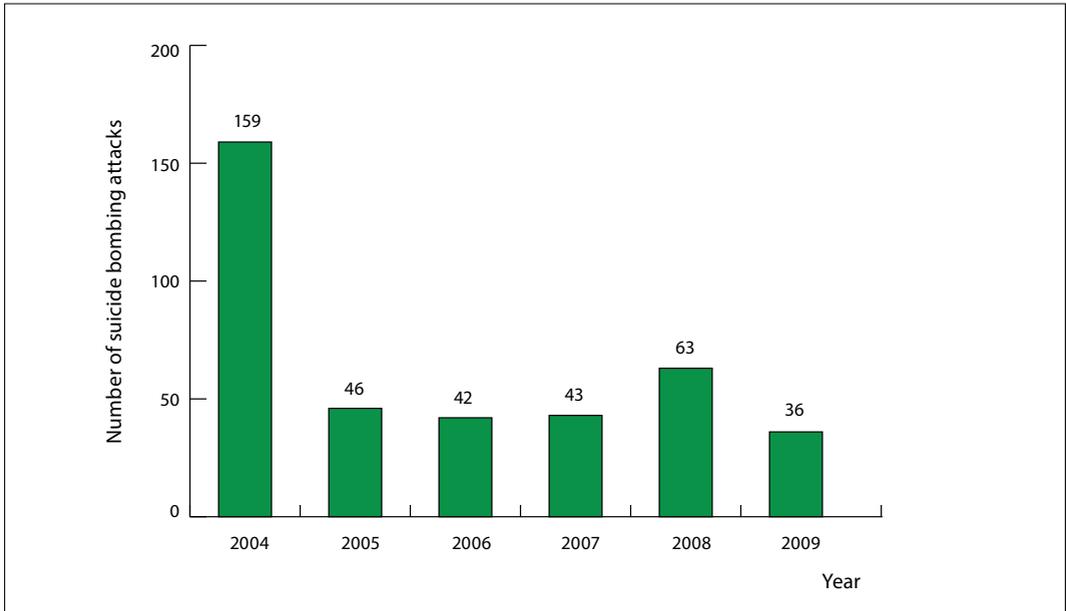


Figure 6. Number of suicide bombing attacks since the beginning of the conflict (sorted by years)

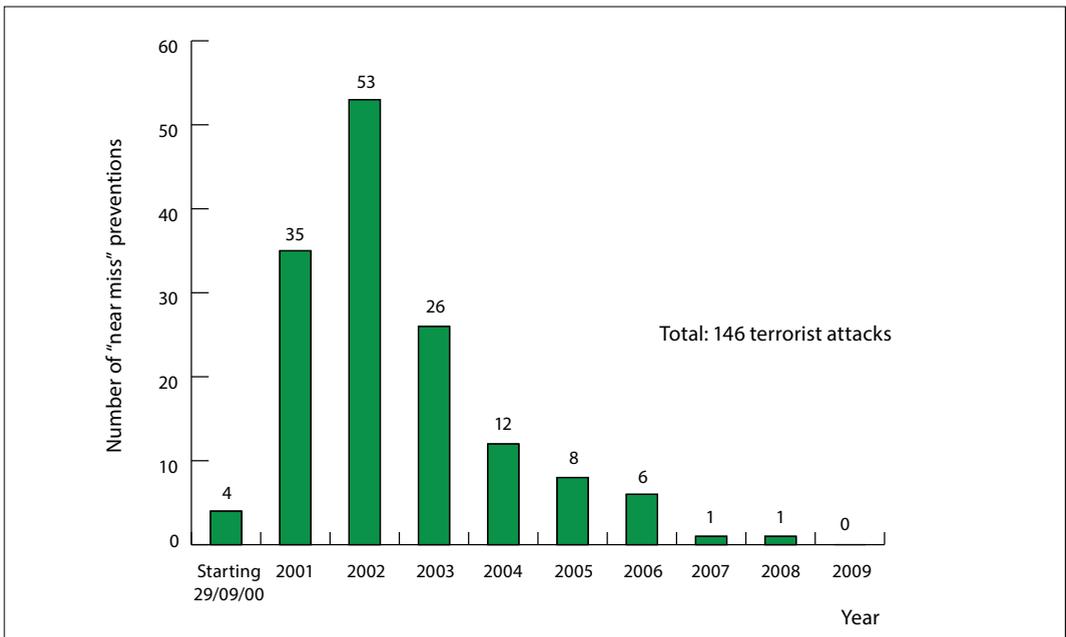


Figure 7. Distribution of "near miss" preventions during the years 2000–2009

## Administrative Detainees

Administrative detentions and court detentions serve as effective means of deterrence (Avinoam Sharon) and are considered a “non-violent” means of prevention which is in most cases possible prior to Stages 3, 6, 7 (Figure 2) [10]. In recent years various cells have been “leaving their mark” on the social networks, a development that both facilitates ISA operations but also poses a new challenge for intelligence forces. The contribution of administrative arrests may also be assessed by the number of Israelis killed in suicide bombings (according to ISA reports) which despite the fact that they account for no more than 0.6% of the total number of terrorist attacks carried out since the beginning of the struggle, the number of fatal casualties from such attacks accounts for almost 50% of all fatal casualties from terrorist activity. From this we can deduce that each time a suicide bombing plot is foiled by administrative detention, the lives of hundreds of people are saved. [6]

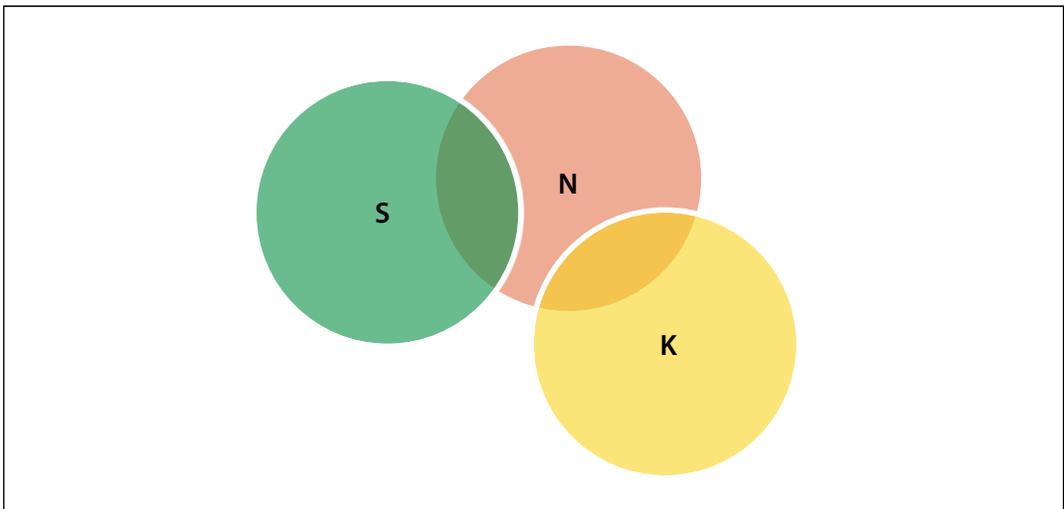


Figure 8. Statistical Venn diagram

In the diagram, the number of administrative detainees [11] is marked as “K”.

The shared areas of P, N and K represent the effectiveness of interceptions –  $F_s$  is the final number. It is not possible to make a quantitative calculation of administrative detainees. Our estimate is that during course of “Period 2” in the table, there were 24 000 attacks while the number of detainees stood at 4000. Accordingly, the ratios between the two figures:

$$K \leq 0.15$$

K – an estimate of the contribution of arrests to the prevention of attacks.

## Conclusions

To summarise, this article focuses on four topics:

- 1) coping with suicide bombings;
- 2) examination of terrorist networks and development of a theoretical model that allows discovery of terrorist cells;
- 3) analysis of the behaviour of terrorist cells and methods for early interception;
- 4) the impact of administrative detention.

Terrorist networks must be analysed as geographic information systems that may be analysed using graphical map. The cells that during preparation are exposed more times than older cells. The discovery of terrorist cells and exposure of their plans during the early preparation stage is vital.

Accordingly, more efforts must be invested in intelligence, including monitoring of social network forums and chats. Interception of such cells is very difficult due to the distributed structure under which the networks operate, without any military hierarchy. If a cell is not intercepted during early stages of preparation, later interception becomes much more difficult and is typically successful only after the cell has executed several attacks.

Administrative detentions play an important role in saving of civilian lives and contribute to the successful interception of attacks. Court Detentions are a punitive measure designed to deter individuals, not to intercept attacks in territories controlled by the Palestinian Authority. This provides networks with a relative advantage in organisation and execution of attacks, when the number of attacks is not affected by any negotiations or agreements (Oslo 1993). [2]

Successful combating, including vital support of intelligence units, has proven themselves successful in coping with suicide bombings (during 2002–2005 period). It was also shown that reduction in direct contact with Palestinians results in lower number of terrorist attacks (construction of the Fence in 2005).

## ļespējamo teroristisko darbību prognozējamais modelis Rietumvalstīs

### Kopsavilkums

Pasaules terors kopumā un it īpaši terorisms Izraēlā liecina par to, ka pašnāvnieku terorakti ar spridzināmo ierīču palīdzību izraisa ļoti lielu rezonansi un ir ļoti efektīvi no teroristu mērķu redzes viedokļa. Neraugoties uz samērā nelielo teroristu pašnāvnieku absolūto daudzumu, bojāgājušo un ievainoto skaits tamlīdzīgos teroraktos var sasniegt līdz 50% no visu teroraktu upuru skaita.

Šajā rakstā uzmanība ir koncentrēta uz šādiem jautājumiem: terorisma darbības novēršana sagatavošanas stadijā, darbības pārtraukšana pēc pirmā uzbrukuma, likvidēšana pēc teroraktu sērijas. Rakstā pievērsta uzmanību nelielām teroristu šūniņām un motīviem, kas tās pamudina uzbrukumiem. Izanalizēts sīko terorisma posmu tīkla terorisma modelis un to darbības raksturs.

Galvenie iemesli, kas pamudina teroristus izdarīt pašnāvības – tā ir vēlēšanās kļūt par “mocekli” (“šahīdu”), nenodot un nepievilt to cerības, kuri viņus nosūtījuši. Tāpēc praktiski nav iespējams lauzt viņu pārliecību. Dažās situācijās ir iespējama nelielu teroristu saišu uzbrukuma novēršana vai pārtraukšana.

Teroristu tīkli jāanalizē kā ģeogrāfiskās informācijas sistēmas, ko var izpētīt, izmantojot ģeogrāfijas karti. Vitāli svarīgi ir atklāt teroristu šūniņas un preventīvi novērst viņu plānu īstenošanu sagatavošanās agrīnā stadijā. Vairums organizatoru arestu un teroristu šūniņu tiesāšana arī notiek teroraktu sagatavošanas etapā, bez vardarbīgas sagūstīšanas, kuru pavada militāras sadursmes ar drošības spēkiem, un tas palīdz izvairīties no liela upuru skaita. Gadījumā, kad saite nav atklāta pēc pirmā terorakta realizācijas, iespējas to atklāt vēlāk samazinās, un iespējams, ka teroristi tiks pieķerti tikai pēc uzbrukumu sērijas.

Tāpēc vislielākās pūles jāiegulda tieši izlūkošanā, pievēršot uzmanību sociālo tīklu un sarunu kontrolei. Tādas informācijas pārtveršana ir ļoti grūta teroristu tīkla sadalītās struktūras dēļ, turklāt tīkli darbojas bez jebkādas militārās hierarhijas. Liela nozīme civilpersonu dzīvību saglabāšanā un sekmīgai plānojamo uzbrukumu novēršanā ir aizdomās turamo administratīvā aizturēšana.

**Atslēgvārdi:** terors, teroristiskās organizācijas, teroristu tīkls, intifāda (sacelšanās), HAMAS, pretizlūkošanas dienests.

## References

1. Alvesson, M. Knowledge work: ambiguity, image and identity. *Human Relations*, 2001. 54 (7): 863–864.
2. Dooley, K. Organizational complexity. In M. Warner (ed.) *International Encyclopedia of Business and Management*. London: Thompson Learning, 2002. – Pp. 5013–5022.
3. Kaplan E. H., Kress M. Operational effectiveness of suicide-bomber-detector schemes: A best-case analysis. *PNAS*, 2005. 102 (29): 10399–10404.
4. Kaspit, Ben. The Jerusalem Intifada: Quiet, but alive and kicking. <http://www.usnews.com/news/articles/2014/10/24/jerusalems-silent-intifada> (sk. 04.04.2016.).
5. Litvak, Meir. The Palestine Islamic Jihad: Background Information. The Jaffe Center for Strategic Studies & The Moshe Dayan Center for Middle Eastern and Tel Aviv University African Studies, February 2003.
6. Maniv, Omri. The police presents: This is how we act against Jerusalem's Quiet Intifada. <http://net.nana10.co.il/Article/?ArticleID=1087654> (sk. 04.04.2016.).

7. Matthew J. Morgan. *The Impact of 9/11 on Politics and War: The Day that Changed Everything?* Palgrave Macmillan, 2009. – P. 222.
8. Mozes-Sadeh, T. Means Employed during the Recruitment and Training Process of Suicide Bombers. University of Haifa.
9. Sela, Avraham (ed). Arab-Israeli conflict. *The Continuum Political Encyclopedia of the Middle East*. New York: Continuum, 2002. – Pp. 58–121.
10. Sela, Avraham (Ed.) Arab-Israeli Conflict. *The Continuum Political Encyclopedia of the Middle East*. New York: Continuum, 2002. – Pp. 863–864.
11. Tabansky, Lior. *The Fight against Terrorism in the Age of Information*. Tel Aviv University: Harold Hartog School of Government and Policy, 2009.
12. The Quiet Jerusalem Intifada: 600 people killed, 130 wounded policemen – in 2 months. [http://www.mako.co.il/news-channel2/young-edition-q4\\_2014/Article-b11b607aa659941004.htm](http://www.mako.co.il/news-channel2/young-edition-q4_2014/Article-b11b607aa659941004.htm) (sk. 04.04.2016.).