Analysis of International Terrorist Organization Based on Social Network

Xueyue Liu\textsuperscript{1,a}, Qiwu Wu\textsuperscript{1,b,*} Jiaqi Liu\textsuperscript{1,c} and Lingzhi Jiang\textsuperscript{1,d}

\textsuperscript{1} Engineering University of PAP, Xi’an, 710086, China
\textsuperscript{a}492202659@qq.com, \textsuperscript{b}wuqiwu700@163.com, \textsuperscript{c}ljqstawk@163.com, \textsuperscript{d}ustb520@163.com

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Abstract. In recent years, international terrorism transformate rapidly and improve constantly, the relationship between international terrorist organizations intertwined jumbled. This article based on Social Network Analysis, we build an international terrorist organization - organization association relationship matrix and international terrorist organization - regional distribution relationship matrix, using network analysis software UCINET to generate relevant network model diagram, then the network characteristics are calculated and analyzed by numerical social network, it can reveals the social status and influence of the size of each terrorist organization in the network. The measured values can be applied to the formulation of China's anti-terrorism strategy.

Introduction

Social network analysis is a study of the interaction between social actors, based on a point to represent the social actors, with the connection between the point and the point to represent some kind of social relationships among actors, thus quantify these social relationships a method for analyzing the [1-3]. Based on the most current anti-terrorism launched from within the social networks of terrorist organizations and personnel event of its manufacture, or be analyzed according to certain specific cases, but in recent years the relationship between terrorist organizations intertwined jumbled, exist under the assignment, interactive support, cooperation conspiracy, declared their loyalty, etc. [4-6]. Based on Social Network Theory and Analysis of different terrorist organizations relationship matrix, using the NetDraw visualization capabilities UCINET software plotted terrorist association network model, the characteristics of the network of numerical analysis, researchers found that characteristics and trends of terrorist networks, in order to Antiterrorism and provide more valuable information.

Construction of International Terrorist Networks

Data Sorting

This article based on the list as of the latest UN sanctions in July 2016 of 72 terrorist organizations of the United Nations official website, reference Wikipedia English website announced as of the terrorist organization in 2016 the European Union and Russia, the United Kingdom, Australia, Canada and some other countries recognized the situation, also refer to the list of foreign terrorist organizations as of July 2016 the US State Department identified [7,8], a summary of the world's 124 major terrorist organization. For ease of presentation and analysis of social networks, we first of 124 of the world's leading terrorist organizations aggregate uniform numbers shown in Figure 1.
| Code | Terrorist organizations  | Code | Terrorist organizations  | Code | Terrorist organizations  |
|------|-------------------------|------|-------------------------|------|-------------------------|
| X1   | Abdullah Aziz Brigade   | X45  | East Turkistan Liberation Organization | X55  | Jihad in West Africa Unity Movement |
| X2   | Abu Sayyaf               | X44  | East Turkistan Information Center | X56  | Jihad youth movement |
| X3   | ASC                     | X45  | World Uyghur Youth Congress   | X57  | Libby Aday Nalu       |
| X4   | Al-Haramain Foundation (Indonesia) | X46  | Lashkar                    | X58  | Caliph soldiers      |
| X5   | Al-Haramain Foundation (Pakistan) | X47  | Annu Shirikyo               | X59  | Emma Geddes          |
| X6   | Al-Haramain branch in Afghanistan | X48  | SIRA, Saha in Organization | X60  | Tripoli Islamic militant group |
| X7   | Al-Haramain branch in Bangladesh | X49  | The Islamic Jihad Movement in Bangladesh | X61  | Baqia Islamic militant group |
| X8   | Levantine peoples Al-Nusra Front | X50  | Jemash Islamiyah            | X62  | Fezzan armed Islamist groups |
| X9   | Iraq’s “base” organization | X51  | Jerusalem supporters organizations | X63  | Al-Haramain and Al-Aqsa Charity Foundation |
| X10  | Arabian Peninsula “base” organization | X52  | Bangsamoro Islamic Freedom Fighters | X64  | Al-Haramain Islamic Foundation |
| X11  | Ansar al-Islam           | X53  | Armed groups Khorasan Province | X65  | Al-Haramain branch in Afghanistan |
| X12  | Ansar alliance           | X54  | Democratic Alliance Army    | X66  | Netherlands branch of Al-Haramain Foundation |
| X13  | Haidani network          | X55  | “Blood signer to” combat team | X67  | Lashkar Jis Gewei Organization |
| X14  | HAKAKAT SHAM AL-Islam    | X56  | More Salomon Camp           | X68  | Kazakhstan soil Islamic Party |
| X15  | Mujahideen Movement      | X57  | More than through organization | X69  | ETA                   |
| X16  | The Islamic Jihad Movement | X58  | Al-Haramain Foundation (Union of the Comoros) | X100 | Red Brigades            |
| X17  | Islamic Army of Adjenn   | X59  | Al-Haramain Foundation (Somalia) | X101 | Irish Republican Army |
| X18  | Islamic Movement of Uzbekistan | X60  | Al-Haramain branch in Ethiopia | X102 | Irish National Liberation Army |
| X19  | Muhammad army            | X61  | Al-Haramain Foundation (Kenya) | X103 | Persistent IRA |
| X20  | Association of Islamic Cooperation | X62  | Al-Haramain Foundation (Tanzania) | X104 | Maria dos Salakhtin Recomnaseign and Sabotage Battalion of Chechen Martyrs |
| X21  | Jemash Islamiyah,        | X63  | Islamic Solidarity Organization | X105 | Chechen Juan National Assembly |
| X22  | Allah unified group      | X64  | Somali Youth Party          | X106 | Supreme Military Caspian Mujahideen Consultative Council Joint Forces |
| X23  | Korea Tangan Trading Company | X65  | Benghazi Ansar Organization of Islamic law | X107 | Shining Path |
| X24  | KUT state-run textile company | X66  | Darnah organization Ansar Sharia Law | X108 | Rodriguez Patriotic Front |
| X25  | MUJAHID-DEN Indonesian TIMUR | X67  | Tunisia supported the Organization of Islamic law | X109 | Leftist revolutionary movement |
| X26  | Rajah Sulaiman Movement  | X68  | The Islamic Defender        | X110 | Lautaro Youth Movement |
| X27  | Revitalization of Islamic Heritage Society | X69  | Ansar Lu                    | X111 | FARC                  |
| X28  | Pakistan Taliqan movement | X70  | Armed Islamic Group         | X112 | Colombia ELN          |
| X29  | Migrants and supporters of the military | X71  | Salafist missionary organization | X113 | Three K party |
| X30  | Hamas                   | X72  | Egyptian Islamic Jihad      | X114 | Chechen rebels         |
| X31  | Hezbollah               | X73  | FDLR                       | X115 | “Base” organization    |
| X32  | Turkish Hezbollah       | X74  | Beko Haram                  | X116 | East Turkistan Islamic |

Fig. 1 International terrorist organizations number assignment table
Construction of Relationship Matrix

We will 124 terrorist organization by \(X_1, X_2, \ldots, X_{124}\) represents, depending on whether there is interaction between any two or assignment is a terrorist organization, established binary 124 * 124 symmetric matrix shown in Table 1, with \(Y_1, Y_2, Y_2, Y_4\) representing Asia, Africa, Europe and the Americas, depending on the active area of terrorist organizations, even a terrorist organization active in multiple continents, global terrorist organization - distribution area binary matrix as shown in table 2.

| \(X_1\) | \(X_2\) | \(X_3\) | \(X_4\) | \(X_5\) | \(X_6\) | \(X_7\) | \(X_8\) | \(X_9\) | \(X_{10}\) | \(X_{120}\) | \(X_{121}\) | \(X_{122}\) | \(X_{123}\) | \(X_{124}\) |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1     | 0     | 0     | 0     | 0     | 0     | 0     | 1     | 0     | 0     | ...   | 0     | 0     | 0     | 0     |
| 0     | 1     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | ...   | 0     | 0     | 0     | 0     |
| 0     | 0     | 1     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | ...   | 0     | 0     | 0     | 0     |
| 0     | 0     | 0     | 1     | 0     | 0     | 0     | 0     | 0     | 0     | ...   | 1     | 0     | 0     | 0     |
| 0     | 0     | 0     | 0     | 1     | 0     | 0     | 0     | 0     | 0     | ...   | 1     | 0     | 0     | 0     |
| 0     | 0     | 0     | 0     | 0     | 1     | 1     | 0     | 1     | 0     | ...   | 0     | 0     | 0     | 0     |
| 0     | 0     | 0     | 0     | 0     | 0     | 1     | 1     | 0     | 0     | ...   | 0     | 0     | 0     | 0     |
| 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | ...   | 1     | 0     | 0     | 0     |
| ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   |
| \(X_{120}\) | 0     | 0     | 0     | 1     | 1     | 1     | 0     | 0     | 0     | ...   | 1     | 0     | 0     | 0     |
| \(X_{121}\) | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | ...   | 0     | 1     | 0     | 0     |
| \(X_{122}\) | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | ...   | 0     | 1     | 0     | 0     |
| \(X_{123}\) | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | ...   | 0     | 0     | 0     | 1     |
| \(X_{124}\) | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | ...   | 0     | 0     | 0     | 0     |

Table 1. Terrorist organization - organizational relationships binary matrix

| \(Y_1\) | \(Y_2\) | \(Y_3\) | \(Y_4\) |
|-------|-------|-------|-------|
| \(X_1\) | 1     | 0     | 0     |
| \(X_2\) | 1     | 0     | 0     |
| \(X_3\) | 1     | 0     | 0     |
| \(X_4\) | 1     | 0     | 0     |
| \(X_5\) | 1     | 0     | 0     |
| \(X_6\) | 1     | 0     | 0     |
| \(X_7\) | 1     | 0     | 0     |
| \(X_{123}\) | 1     | 0     | 1     |
| \(X_{124}\) | 1     | 0     | 0     |

Table 2 Terrorist organization - distribution area binary matrix

Analysis of International Terrorist Networks

Based on the above data, the use of terrorist organizations drawn NetDraw - organizational relationship network model and terrorist organizations - regional distribution network model, shown in Figures 2 and 3:
As can be seen from Figure 2, except that X20, X54, X100, X113, X123, 13 is an isolated point, the additional 111 constitutes a terrorist organization network 3, respectively, X101, X108, X115 center of each network, which the scale of respectively 4,6,101. Network size is obvious, X101 and X108 as the center is small, its members have the same distribution area, and a huge network size to X115 "base" organization-centric, members are distributed around the world, in the center of this network was second only to "base" organization of the Islamic State is X33, which is the rapid rise in recent years of a terrorist organization. We can see from Figure 3, Y1 living in the network core, that center of Asia's largest, followed by a minimum of central Africa, the Americas. This shows that most of the activities of terrorist organizations distributed in Asia and Africa. Figure in Asia
with three other continents can be connected to each other through part of a terrorist organization, indicating that some of the activities of terrorist organizations in other continents are also active in Asia, global.

Ucinet using international terrorist organizations - various tissues of the central network model calculation, calculation results shown in Figure 4.

### Normalized Centrality Measures

| Degree | Closeness | Betweenness | Eigenvector |
|--------|-----------|-------------|-------------|
| 1 X1   | 3.275     | 3.941       | 1.014       |
| 2 X2   | 3.272     | 3.941       | 1.014       |
| 3 X3   | 1.626     | 3.771       | 0.130       |
| 4 X4   | 0.513     | 3.750       | 0.000       |
| 5 X5   | 0.252     | 3.750       | 0.000       |
| 6 X6   | 0.252     | 3.750       | 0.000       |
| 7 X7   | 0.813     | 3.710       | 0.000       |
| 8 X8   | 1.488     | 3.917       | 0.215       |
| 9 X9   | 4.878     | 3.932       | 2.434       |
| 10 X10 | 4.878     | 3.932       | 2.434       |
| 11 X11 | 0.913     | 3.912       | 0.000       |
| 12 X12 | 3.252     | 3.050       | 1.164       |
| 13 X13 | 4.878     | 3.944       | 3.771       |
| 14 X14 | 0.813     | 3.797       | 0.000       |
| 15 X15 | 3.252     | 3.937       | 0.418       |
| 16 X16 | 1.429     | 3.791       | 0.204       |
| 17 X17 | 1.626     | 3.920       | 0.000       |
| 18 X18 | 4.065     | 3.974       | 1.614       |
| 19 X19 | 3.252     | 3.832       | 0.371       |
| 20 X20 | 0.000     | 0.000       | 0.000       |
| 21 X21 | 4.878     | 3.946       | 6.374       |
| 22 X22 | 1.626     | 3.941       | 0.000       |
| 23 X23 | 0.000     | 0.000       | 0.000       |
| 24 X24 | 0.000     | 0.000       | 0.000       |
| 25 X25 | 4.399     | 3.985       | 0.668       |
| 26 X26 | 3.502     | 3.937       | 0.000       |
| 27 X27 | 2.459     | 3.955       | 0.153       |
| 28 X28 | 1.626     | 3.957       | 0.000       |
| 29 X29 | 0.813     | 3.744       | 0.000       |
| 30 X30 | 0.153     | 3.744       | 0.000       |
| 31 X31 | 0.153     | 3.744       | 0.000       |
| 32 X32 | 0.373     | 3.945       | 0.000       |
| 33 X33 | 0.000     | 0.000       | 0.000       |
| 34 X34 | 3.272     | 3.971       | 1.009       |
| 35 X35 | 0.153     | 3.744       | 0.000       |
| 36 X36 | 0.153     | 3.744       | 0.000       |
| 37 X37 | 1.626     | 3.997       | 0.000       |
| 38 X38 | 0.813     | 3.914       | 0.000       |
| 39 X39 | 0.153     | 3.744       | 0.000       |
| 40 X40 | 0.153     | 3.744       | 0.000       |
| 41 X41 | 0.153     | 3.744       | 0.000       |
| 42 X42 | 4.878     | 3.918       | 1.542       |
| 43 X43 | 5.691     | 3.936       | 1.956       |
| 44 X44 | 3.252     | 3.815       | 0.000       |
| 45 X45 | 3.252     | 3.815       | 0.000       |
| 46 X46 | 3.252     | 3.815       | 0.000       |
| 47 X47 | 0.373     | 3.945       | 0.000       |
| 48 X48 | 0.373     | 3.945       | 0.000       |
| 49 X49 | 0.373     | 3.945       | 0.000       |
| 50 X50 | 0.373     | 3.945       | 0.000       |
| 51 X51 | 0.373     | 3.945       | 0.000       |
| 52 X52 | 0.373     | 3.945       | 0.000       |
| 53 X53 | 4.065     | 3.873       | 1.523       |
| 54 X54 | 3.252     | 3.815       | 0.000       |
| 55 X55 | 0.373     | 3.945       | 0.000       |
| 56 X56 | 1.626     | 3.955       | 0.153       |
| 57 X57 | 0.813     | 3.740       | 0.000       |
| 58 X58 | 0.813     | 3.740       | 0.000       |
| 59 X59 | 1.626     | 3.955       | 0.153       |
| 60 X60 | 0.813     | 3.740       | 0.000       |
| 61 X61 | 0.813     | 3.740       | 0.000       |
| 62 X62 | 0.813     | 3.740       | 0.000       |

Fig. 4 Various centrality values of terrorist organizations

Using 2-Mode Centrality international terrorist organizations - Distribution Center Region matrix calculation various degrees, and the results are shown in Figures 5 and 6.
According to Figure 4, the international terrorist organization degree centrality: \( X_{115} > X_{33} > X_{120} > X_{81} \), close to the center of: \( X_{115} > X_{33} > X_{81} > X_{21} \), middle centrality: \( X_{115} > X_{81} > X_{120} > X_{33} \). Visible "base" organization of all three kinds center of the X115 network at a maximum, no doubt living in network-centric, global terrorism is still the primary target audience; now the rapid rise of the Islamic State, is expanding its sphere of influence; X21 Jemaah Islamiyah and X81 Al-Qaida in the Islamic Maghreb, respectively, as a branch of al-Qaeda in Asia and Africa, but also have a greater influence, X120 Al-Haramain Islamic Foundation main activities in some Islamic countries, set up in the world many chapters, providing funds for terrorist organizations, material and technical support, it is also the key objectives in the fight against terrorism needs.

From Figure 5, the highest degree centrality is organized X115, X118, X119, X120, X122, X123 six organizations, all of the center thereof was 0.75 degrees. By comparing the closeness centrality, we find X115 "base" organization, X118 Islamic International Brigade, X119 The Islamic Army in particular and X120 Al-Haramain Islamic Foundation are 0.940, higher than the other two organizations, they are simultaneously active in Asia, Africa and Europe, they are the core of this network organization. Islamic International Brigade and Islamic Army in particular has become the core of this network of organizations, shows once again that the current rampant spread of extremist religious terrorism. Again observed the middle of the center, X122 highest Muslim Brotherhood, and it's close to the center of the second highest value, it can be inferred that it is the key organization in this network of interconnected terrorist organization, the Muslim Brotherhood actually very wide range of activities, its activities in the Middle East, North Africa, the United States and the world Muslim community, which has links with many terrorist organizations, and to fund the "base" organization network, material and technical support. It can be clearly seen from Figure 6 that the degree centrality, closeness centrality and betweenness centrality in Asia are living in the first, and there is a big gap with three other continents, indicating that the area is under the entire core network, and Africa, second only to Asia.
Summary

Based on social network analysis, can reveal the position and influence in international terrorist organizations and terrorist networks distribution network in the region, terrorist organizations can be drawn with the current need to focus on combating the analysis and research to combat the characteristics of networks effective countermeasures violent and terrorist activities.

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