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## Tweeting propaganda, radicalization and recruitment: Islamic state supporters multi-sided Twitter networks

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## **Tweeting propaganda, radicalization and recruitment: Islamic state supporters multi-sided Twitter networks**

### **Abstract**

Islamic State (IS) terrorist networks in Syria and Iraq pose threats to national security. IS' exploitation of social media and digital strategy plays a key role in its global dissemination of propaganda, radicalization, and recruitment. However, systematic research on Islamic terrorist communication via social media is limited. Our research investigates the question: How do IS members/supporters use Twitter for terrorism communication: propaganda, radicalization, and recruitment? Theoretically, we drew on microeconomic network theories to develop a theoretical framework for multi-sided Twitter networks in the global Islamic terrorist communication environment. Empirically, we collected 3,039 tweets posted by @shamiwitness who was identified in prior research as "an information disseminator" for the IS cause. Methodologically, we performed social network analysis, trend and content analyses of the tweet data. We find strong evidence for Shamiwitness-intermediated multi-sided Twitter networks of international mass media, regional Arabic mass media, IS fighters, and IS sympathizers, supporting the framework's utility.

### **Disciplines**

Engineering | Science and Technology Studies

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# Tweeting Propaganda, Radicalization and Recruitment: Islamic State Supporters Multi-Sided Twitter Networks

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## ABSTRACT

Islamic State (IS) terrorist networks in Syria and Iraq pose threats to national security. IS' exploitation of social media and digital strategy plays a key role in its global dissemination of propaganda, radicalization, and recruitment. However, systematic research on Islamic terrorist communication via social media is limited. Our research investigates the question: *How do IS members/supporters use Twitter for terrorism communication: propaganda, radicalization, and recruitment?* Theoretically, we drew on microeconomic network theories to develop a theoretical framework for multi-sided Twitter networks in the global Islamic terrorist communication environment. Empirically, we collected 3,039 tweets posted by @shamiwitness who was identified in prior research as "an information disseminator" for the IS cause. Methodologically, we performed social network analysis, trend and content analyses of the tweet data. We find strong evidence for Shamiwitness-intermediated multi-sided Twitter networks of international mass media, regional Arabic mass media, IS fighters, and IS sympathizers, supporting the framework's utility.

## Categories and Subject Descriptors

J.4. [Computer Applications]: Social and Behavioral Sciences – Communication. J.1 [Computer Applications]: Administrative Data Processing – government. H.4 [Information Systems]: Information Systems. H.1.1 [Systems and Information]: Value of information

## General Terms

Strategy, Communication, Performance.

## Keywords

Twitter, terrorism communication, propaganda, radicalization, recruitment, Islamic extremism, Islamic State, @shamiwitness, social network analysis, global social networks, multi-sided networks.

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## 1. INTRODUCTION

President Barack Obama earlier referred to Islamic State (IS) – Islamic terrorist networks of predominantly Sunni Muslim extremists, foreign fighters, and sympathizers – as a "Junior Varsity" version of Al Qaeda" [25, p. 1]. Since then the rapid rise and resilience of the IS militants in Syria and Iraq against the US-led coalition of 60-plus nations, however, seems to pose a serious threat. Furthermore, IS seems to deploy social media platforms effectively and strategically for terrorism communication; namely propaganda, radicalization, and recruitment. In this research, we hold that a much greater threat may be posed by the IS multi-ethnic military force powered by IS strategic use of multi-sided Twitter networks in "the new digital age" [54, p.4].

There are two reasons for our concerns. First, both al-Qaeda and IS hold the political goal of establishing a new Islamic state (or "caliphate") where Sharia law is the highest authority and jihad is sanctioned. Importantly, while Osama bin Laden, leader of al-Qaeda, failed to achieve this political goal during his lifetime, Abu Bakr al-Baghdadi, leader of IS, in Mosul, Iraq on July 4, 2014, proclaimed himself as "Caliph Ibrahim". Al-Baghdadi proclaims that he has the absolute power under Allah over the "Islamic State" and all Muslims on earth, inciting them to obey him in waging global jihad against all Allah's enemies [2]. This is an open call for extreme political violence as the duty of all faithful Muslims, not only against infidels (those who are unfaithful to Islam), but also against Shia Muslims and moderate Sunni Muslims. Immediately, Sunni-ruled Jordan declared IS as a "direct and immediate threat to our national security" [5, p. 1]. Similarly, Sunni-ruled Saudi Arabia expressed a view that Abu Bakr al-Baghdadi's efforts to create a multi-ethnic military force under the banner of his Islamic fundamentalism ideology and polity as a serious threat to national security [4]. These threat perceptions of the regional powers echo those of the Western nations, having resulted in 60-plus members of the anti-Islamic State coalition in September, 2014 to fight against the IS military force in Syria and Iraq [45].

Second, while al-Qaeda also exploited mass media and the Internet for terrorism propaganda [12, 13], IS exploits the explosive speed and increasing reach of global social media platforms in luring hearts and minds of younger generations of the Muslims and the Westerners alike to fight with its IS multi-ethnic force in Syria and Iraq to extend the political power and dominance of the "Islamic State" worldwide. A 2014 United Nations Security Council report shows that 15,000 foreign fighters from more than 80 countries are fighting with the IS in Syria and Iraq [3]. The Central Intelligence Agency (CIA), however, gives higher estimates of 20,000 – 31,500 fighters in Syria and Iraq [1]. These statistics seem to indicate that IS can recruit continuous flows of new fighters to wage war against the

US-led coalition with 60-plus nations as well as against Kurdish fighters and Iraqi military force, although the Pentagon claims that US-led air strikes killed several hundred IS fighters in and around the Syrian town of Kobane in October, 2014 [41].

Despite the potential greater threat posed by the IS' overarching political goal of the worldwide Islamic State, military capability, and exploitation of Twitter networks in terrorism communication, however, there is a clear paucity of scientific research – both theoretical and empirical research – on social media use by IS. Therefore, we address a central research question in this research: *How do IS members/supporters use Twitter for terrorism communication: propaganda, radicalization, and recruitment?* In answering this research question we strategically selected the Twitter account of @shamiwitness. Prior research [16, 33] has identified “Shami Witness” as someone who had been closely linked to the IS terror networks. On December 13, 2014, Mehdi Masroor Biswas behind this popular and prolific @shamiwitness was arrested by Indian police for spreading the views of Islamic State [9, 60]. We collected a sample of 3,039 tweets posted by @shamiwitness during the period of October 6 to October 27, 2014. We then performed a social network analysis of this tweet dataset to examine the emergent structure of connectedness and communication content of the Twitter networks formed by @shamiwitness and his followers.

Since terrorism is multi-faced, there exist different definitions in the literature. However, in this research we adapt the 2012 US Department of Defense (DOD) definition of terrorism as the use of unlawful violence or threat of unlawful violence to implant and spread fear so as to coerce or politically influence governments and/or citizens in the pursuit of goals which are political, religious, and/or ideological [64]. In other words, we distinguish terrorism from terrorizing (e.g., terrorizing the public through random violence by an individual or a group with mental health problems).

The structure of this paper is organized as follows: the next section presents our research background on the Islamic State and @shamiwitness. Drawing on a review of the relevant literatures, in the third section, we discuss a theoretical framework for examining two emergent social media-enabled structural mechanisms that amplify terrorism communication in the context of radical Islamic terrorist networks. In the fourth section, we describe our research methods. In the fifth section, we present key research findings. In the sixth section, we discuss the socio-political and socio-technical implications of our key findings that may improve the government practice in countering social media-enabled terrorism communication towards safeguarding the national security and contributing to the political order of the Middle East. Finally, the seventh section presents our conclusions, including the research limitations of this paper and the future research directions for social media-enabled terrorism communication in e-government research field.

## 2. BACKGROUND

### 2.1 Islamic State

Islamic State (IS), also known as the Islamic State of Iraq and Syria (IS) or the Islamic State of Iraq and the Levant (ISIL), has its origin in al Qaeda in Iraq (AQI) which engaged in the Iraqi insurgency against the 2003 US-led invasion to oust Saddam

Hussein during the Iraq War [35]. The US lists IS as a predominantly Sunni terrorist and jihadist group.

Abu Bakr al-Baghdadi, whose real name is Ibrahim Awwad Ibrahim Ali al-Badri, hailed from Samarra, in the Sunni Triangle north of Baghdad, which was heavily affected by US bombing after the 2003 invasion of Iraq to oust Saddam Hussein, AQI, and the insurgency [24].

As stated in our Introduction section, al-Baghdadi claims that a caliphate – a single, transnational “Islamic State” based on sharia has been established. Despite the US-led coalition airstrikes against the IS positions, IS controls a large part of Iraq including Mosul, the second largest city in Iraq. The area (in solid orange color) in Figure 1 shows a sizable part of Iraq and Syrian border under the control of IS and IS support (as of January, 2015) [8]. The confirmed airstrikes by US-led coalition in Syria and Iraq since June, 2014 are shown by dark blue bubble, where the size shows the number of strikes. On the map below, the 4th largest bubble (40 strikes) at the bottom right corner indicates the number of airstrikes in and around Baghdad, while the largest bubble (600 strikes) at the top left corner indicates that in and around Kobane. A total of 880 in Iraq and a total of 665 strikes in Syria were conducted by US-led coalition, including the regional Sunni-ruled nations [8].

■ IS control   
 ▨ IS support   
 ■ Kurdistan Government Administered

Confirmed airstrikes as of January 2015

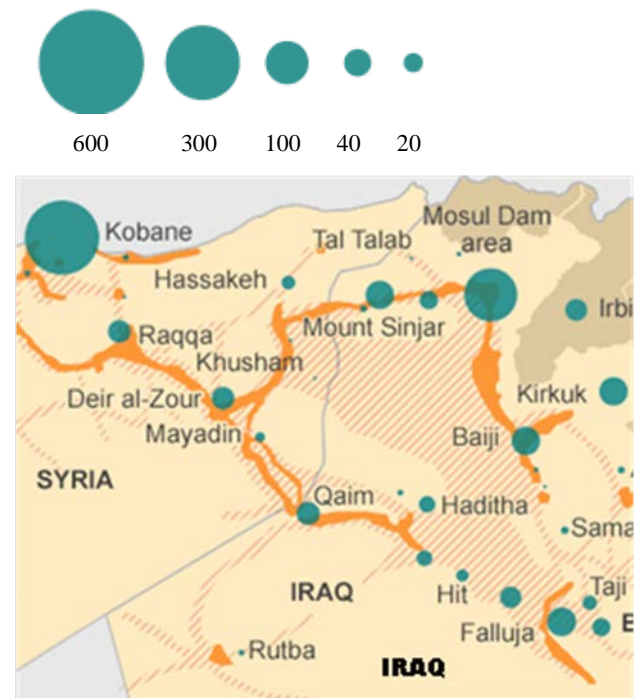


Figure 1. IS control of Syria and Iraq [8]

IS has been reported as “the world’s richest terrorist group” and “controls more firepower and territory than any jihadist organization in history” [55, p. 8]. IS has seized control of bank assets in Mosul, took control of Syria’s largest oil field, and generates the illegal revenue of up to \$3 million crude oil sales per day [36]. However, a new and emergent threat of Islamic State is the dynamic capability of IS, through strategic use of Twitter

networks in the new digital age, to connect globally with younger generations of Muslim and Western would-be terrorist fighters and sympathizers and to lure them to support its IS multi-ethnic military force through terrorism communication: political propaganda, radicalization, and recruitment.

Despite the 1,545 confirmed airstrikes against the IS positions as of January, 2015 [8], a 2014 United Nations Security Council report shows that 15,000 foreign fighters from more than 80 countries are fighting with the IS in Syria and Iraq [3]. The Central Intelligence Agency (CIA), however, gives higher estimates 20,000 – 31,500 fighters in Syria and Iraq [1].

## 2.2 ShamiwitNESS

In their research on Syrian foreign fighter networks, Carter et al. [16] examined 2,405 Twitter users whom foreign fighters on Twitter followed, during the observation period of nearly 12 months, ending February, 2014. This generated a social-media network of 2,405 nodes. Of this network, 1,778 (or 74%) of Twitter users were followed by only one foreign fighter, whereas a minority of 46 (or 1.9%) attracted 10 or more followers. Of the 46, 32 Twitter users were more closely examined. Unsurprisingly, the study failed to find any official Twitter account that had been registered by any known terrorist group. Importantly, however, the study found that @shamiwitNESS had the great number of followers, and hence Carter et al. [16] considered ShamiwitNESS as the most popular and influential Twitter user to the foreign fighters in Syria.

Carter et al. [16, p. 15] identified ShamiwitNESS as one of “the new information disseminators” who “were not foreign fighters nor do they have any official links to jihadist organizations. Instead, they broadly support the Islamist project in Syria, and in that respect, provide both moral and political support to the cause by establishing themselves as reliable sources of information.” However, they did not provide any information content generated by @shamiwitNESS. Therefore, it is unclear about a detailed communication strategy or mechanism through which @shamiwitNESS provides both moral and political support to the IS cause.

Of the most popular and influential Twitter users listed in their report, all but the @shamiwitNESS account has been shut down by Twitter prior to our observation period beginning October 6, 2014. Finally, Twitter closed the @shamiwitNESS account upon his arrest on December 13, 2014 but took the unprecedented action to reinstate the account for archival access. In his Twitter profile, @shamiwitNESS attempts to underscore his independence from Islamic State terrorist networks: “RTs ≠ endorsements.” At this point, although it remains unclear whether or not he is a card-carrying member of IS terrorist networks, his arrest indicates that his Twitter networks were viewed by Indian Police as having produced value to IS terrorist networks.

## 3. THEORETICAL FRAMEWORK

Figure 2 below shows our theoretical framework for examining multi-sided Twitter networks in the global Islamic terrorist communication environment that can amplify terrorism communication effectiveness. We submit that the structural mechanisms reshape the core communication operations of Islamic terrorist networks; namely terror propaganda, radicalization of Islamic religion, and recruitment of new jihadists and fighters to accomplish terrorism goals. In this research we centrally focus on global multi-sided Twitter networks in terrorism communication, without direct reference to the

accomplishment of the terrorist goals. In this section we explain each construct identified in this theoretical framework.

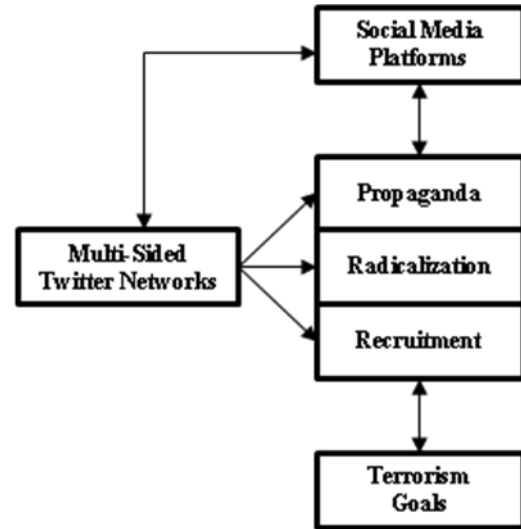


Figure 2. Framework for multi-sided Twitter networks in the global Islamic terrorist communication environment

### 3.1 Social Media Use by Terrorist Networks

Historically, terrorist networks have used various media, and recently, the Internet, as propaganda and recruitment instruments for terrorist activities [12, 13, 18, 30, 43, 66]. The Internet websites, the globalization of communications via emails, smart phones and tablets, among other ICT tools, and the digitization of media, however, have radically reshaped the structure and capability of terrorism communication. Importantly, using the Internet, terrorist networks have overcome the limitations of traditional mass media publishing; they have gained greater control over a quick, inexpensive, and anonymous means of terrorism communication, through which their political, religious, or ideological messages can reach new audiences around the world [18].

Using social media platforms, especially Twitter and Facebook, with 284 million and 1.35 billion monthly active users worldwide (in the 3rd quarter 2014), respectively [57, 58], the terrorism communication landscape can be radically reshaped by the speed, reach, affordance, and ease of uploading voice, text and imagery data via mobile devices for immediate visualization effects. It has been reported that terrorist networks [59] and lone wolf terrorists [17] alike have seized an unprecedented opportunity to engage wider audiences with their extremist ideologies and terrorism actions. The Syrian Civil War against the Shia-dominated Bashar al-Assad government has been powered by social media use by foreign fighters: “Already, considered the most socially mediated conflict in history.” [16, p. 7].

### 3.2 Multi-Sided Twitter Networks

Social-media networks are computer-mediated virtual communities formed by users/account holders of a social media platform, such as Twitter, to share information, common interests, needs, or purposes. For example, a social-media network of @shamiwitNESS is formed by his posting a tweet when it is replied or re-tweeted by another Twitter account holder. On the voluntary basis, some of these network members produce user-generated information content, including text, voice and imagery data, for the use and the re-use by other network members. In this regard,

social-media networks behave much like other network goods, such as mobile-phone networks, digital-TV networks, eBay, Skype, and DropBox.

Network goods are normally subject to network effects [31]. Positive network effects are present when a user's benefit from a product/service depends not only on product/service characteristics but also on the network [size] of other users who also adopt or use the same product/service [19]. Prior research distinguishes intrinsic benefits that arise from product/service characteristics from extrinsic benefits that derive from actions of others [11, 53].

Entrepreneurs of technology platforms and network goods who play an intermediary role and create value primarily by enabling interactions and information exchanges between two (or more) distinct types of affiliated consumers are referred to as two-sided networks (or multi-sided platforms) in microeconomic literature [19, 22]. These *information intermediaries* normally have several levers of control influencing managing product/service design and the intensity of network effects [11].

Prior research on network goods would suggest that one strategy network platform owners, such as Twitter, and/or individual network operators, such as @shamiwitness, can pursue to increase users' benefits is (1) by controlling network operations to increase intrinsic benefits through enhanced information quality, reputation, and other value-added services to attract new account holders (network size) and (2) by increasing extrinsic benefits. In order to increase the extrinsic benefits, @shamiwitness, for example, can entice his social-media network users to actively engage by issuing their own tweets, replying to his tweets or retweeting his tweets to their own "followers" (who are not members of the @shamiwitness network but belong to separate social-media networks). Therefore, for a network good whose product/service quality is shaped by the actions of other users (the network effect) [11], the value of the @shamiwitness Twitter account seems to be a function of content and information quality he himself produces and of those his social-media network users co-produce. In other words, the value creation process is dynamic and interactive in nature, and we submit that the value seems to be co-produced by the entire social-media network that is ever dynamically changing. In other words, social media platforms are necessary but not sufficient to create such value; social network operators' strategy and users' actions matter.

Network effects can operate in a one-sided network of users, such as, Skype, where network users have only a user role in the network) or in cross-sided (two-sided or multi-sided) networks. In the case of two-sided networks [20, 27], there are two distinct populations of users who form networks, and a user's benefits in one network are dynamically influenced by the size of the cross network. For example, digital-TV networks represent two-sided network goods [47], where a network of digital-TV network users may be deeply interested in the size and actions of the cross network of developers. Moreover, a one-sided network good can evolve into a two-sided network. For example, YouTube, a single-sided network good of users differentiates two roles each of which forms a different network of content viewers or content providers. The value of the network of YouTube viewers is created not by other viewers but by the cross network of content providers. Similarly, LinkedIn evolved from a one-sided network of professionals to a two-sided network of professionals and corporations.

In this new and complex eco-systems of two-sided and multi-sided networks [22, 47], new roles of information intermediaries have emerged to aggregate benefits of different network users [11, 34]. While prior research [16, p. 14] has described the role played by @shamiwitness as one of "the new information disseminators" who "were not foreign fighters nor do they have any official links to jihadist organizations".

### 3.3 Terrorist Propaganda

Propaganda is a major output of many terrorist networks and a long-standing priority for Al Qaeda [56]. Propaganda is defined as "information, especially of a biased or misleading nature, used to promote a political cause or point of view" [44]. Terrorist networks use campaigns of terrorist violence as "the propaganda of the deed" [14, p. 364] or the propaganda by the ([violent] deed) to achieve operational-level tactics at global and local levels. On the one hand, terrorist networks use the propaganda by the [violent] deed targeted against society at the global level:

- To spread fear [63]
- To intimidate Western public opinion [48, 61]
- To support the moral legitimacy of terrorism violence [52]
- To engage wider audiences with terrorism ideologies and actions and to shift their perspectives [59] - for example, by reframing suicide attacks as martyrdom operations [15]

On the other hand, they use terrorist propaganda targeted largely towards the Islamic populations (1.5 billion worldwide) at the local level:

- To generate support within the Muslim communities [61] and a target population [14]
- To establish an emotional connection with the targeted audience [51]
- To provide collective identity that motivates terrorism violence [48] and to cultivate an identity as fighters of the jihad [62]
- To promote common knowledge of terrorism ideologies and violence in the decentralized, loosely networked structure of today's global jihadist organizations [28]

As the list above indicates, we can identify at least two categories of the target of the propaganda by the deed: external (the first four) vis-à-vis internal (the last four) networks of people, from a perspective of a terrorist network. The literature also underscores the central role of the media in supporting the propaganda by the [violent] deed, since terrorism is essentially a political communication. In fact, in the digital age, the increasing symbiotic relationship between the media and terrorists has been examined [21, 48] and the effective use of media-jihad by al-Qaeda [63].

In the new digital age, the impact of the propaganda by the deed could be greatly amplified through the social media platforms such as YouTube and Facebook that support easy uploads of user-generated content such as extremely violent videos and photographs. Furthermore, Twitter has been used to drive terrorism communications over other social media platforms among the jihadists in Syria and Iraq [33].

While the literature on social media use in terrorism is still new, the question of who controls access and content of social-media networks on Twitter is mixed. As discussed earlier in our Background section, Carter et al. (2014) [16] view @shamiwitness as playing a role of information disseminator for Islamic State terrorist networks. In a study of Twitter use by 59 Western fighters in Syria from January through March 2014,

social network analysis indicates *the controlling role* played by feeder accounts belonging to terrorist organizations in the insurgency zone, and by Europe-based organizational accounts [33].

### 3.4 Radicalization

Radicalization refers to increasing extremity of beliefs, feelings, and behaviors in support of political violence in a context of strong group identification and response to perceived threat to the in-group [39]. Based on this definition, we can argue that extremism Islamic propaganda can radicalize, for example, the target young Islamic males by strengthening the in-group identification (e.g., radical Sunni Muslims) and hatred against other groups, and by magnifying the external threats from other groups (e.g., political and moral decay of the US and oppressive Shia-ruled Syria's Assada administration). Terrorist networks also attempt to radicalize the population by attacking a government and provoking a counterterrorism response [14]. IS in particular through its online recruitment magazine, *Dabiq*, to have glorified a self-claimed preacher, Man Haron Monis as "as one of the jihadists ("mujahidin") of the Islamic State" [42]. A lone wolf, Monis, demanded a black flag of IS and killed two of his hostages during his Sydney siege [23]. Shaykh Abu Muhammad al-Adnani, the official spokesman for the Islamic State (IS) incites random "lone wolf" jihad attacks against citizens of US-led coalition nations: "If you can kill a disbelieving American or European - especially the spiteful and filthy French - or an Australian, or a Canadian, or any other disbeliever from the disbelievers waging war, including the citizens of the countries that entered into a coalition against the Islamic State, then rely upon Allah, and kill him in any manner or way however it may be. Do not ask for anyone's advice and do not seek anyone's verdict." [42, p. 1].

Despite the limited empirical studies on individual processes of Islamic radicalization, extant case studies and newspaper articles seem to indicate two plausible pathways to radicalization: (1) political influence of extremist Islamic preachers or spiritual leaders [10, 38, 40], terrorist training, and combat experience in a physical environment [29, 40] and (2) "virtual terrorist radicalization" via YouTube [6] characterized by violent propaganda in a virtual community of hatred and violence through the Internet [12, 48, 50] and Twitter [33]. Psoiu (2013) argues for the importance of intentional and developmental factors, including the emergence of new trans-cultural identities and generational change [37, 46] and social experiences and discursive interactions [65], rather than the traditional focus on socioeconomic and structural factors such as economic and political grievance, to more comprehensively understand violent Islamic radicalization. Given only 20% of the radicalized terrorists were influenced by extremist Islamic preachers or spiritual leaders, the potential threat from the online radicalization process through social media in the new digital age needs to be better understood for effective public policy approaches.

### 3.5 Terrorist Recruitment

Islamic terrorist recruitment refers to enticing young, similarly situated people to engage in terrorizing and fighting the Islamic jihad war [32]. Despite his family background (Jewish father and Catholic mother), Adam Yahiyeh Gadahn, a 25-year-old American, converted to Islam at the age of 17 and adopted increasingly radical political views through the close associations with radical Islamic spiritual leaders [40]. Gadahn was recruited by al-Qaeda and later became active on YouTube as a leading voice of As-

Sahab, al-Qaeda's media arm, with violent threats against Americans on streets [40].

While hard-core members such as Gadahn are rarely recruited via social media, the explosive growth of Internet penetration rate, social media penetration rate, and estimated 1.5 billion Muslim population worldwide, together with the on-going political conflicts in Afghanistan, Syria, and African nations, terrorist networks exploit social media platforms such as Twitter, YouTube, MySpace and Facebook and new youth cultures to recruit new members and new jihad war fighters [40]. However, there is a lack of academic research on online terrorist recruitment using social media platforms in the literature.

In contrast, there are numerous mass media reports on sophisticated use of social media by IS fighters in Syria and Iraq to recruit new fighters and promote terrorist messages of violence via Twitter, YouTube and Facebook [49]. This may be explained by the ABC report on the presence of a media arm of IS with a sophisticated digital strategy for increased visibility, global dissemination of propaganda, magnified image of power and threat, and enhanced attractiveness of IS for recruitment [49].

As Adam Yahiyeh Gadahn played the propaganda role of a modern-day Tokyo Rose for al-Qaeda's media arm on YouTube [40], many of the estimated 3,000 Western IS fighters with their own Facebook and Twitter accounts are reported to be playing a similar role in influencing and shifting political views in their countries of origin [49].

With the advent of social media platforms, especially YouTube and Facebook, which support easy uploads of user-generated content such as videos and photographs, the visualization of terrorism violence, which is characteristically sensational, can provide terrorist networks with a powerful tool for legitimacy and efficacy in radicalization and recruitment, as the internet has done [7].

## 4. RESEARCH METHODOLOGY

This paper examines the question of how Islamic terrorism communication; namely propaganda, radicalization and recruitment to terrorist networks, is supported by Twitter networks in the hands of self-organizing IS sympathizers and IS fighters. We examine this question both theoretically and empirically in a specific and emergent research context of the rising power of Islamic State in Syria and Iraq. Research on social media use by IS terror networks is new but social media network effect in supporting the IS propaganda, radicalization and recruitment of new fighters to Syria and Iraq and "lone wolf" terrorists to city streets needs our urgent research attention. Hence, our central research question is: *How do IS members/supporters use Twitter for terrorism communication: propaganda, radicalization, and recruitment?* To answer our research question, we first reviewed relevant literatures to develop our theoretical framework. We used these following keywords "propaganda AND (terrorism or terrorist)", "radicalization AND Islam", "radicalization AND 'Islamic extremism'" and "terrorist recruitment" in three comprehensive data bases: Scopus, Web of Science and Science Direct. After having removed the redundancy, we found 225 articles relevant to this study. After careful selection, we analyzed an initial set of 56 articles for the development of our theoretical framework.

We examined the structure of online social media networks that have dynamically emerged in the aftermath of US-led coalition

airstrikes in October, 2014 as our case study. It is extremely difficult to identify the IS's official social media accounts since social media platforms such as Twitter and Facebook have policies to suspend the accounts associated with terrorist organizations. In this research, therefore, we strategically selected to observe the Twitter account of @shamiwitness. Prior research [16, 33] has identified "Shamiwitness" as someone who had been closely linked to IS terror networks. However, it remains unclear whether Shamiwitness is a hard-core member of the IS terror networks or a net-savvy sympathizer of IS terror networks. In one of his tweets, Shamiwitness has flatly denied his IS membership. His Twitter account was suspended on December 13, 2014 and his identity and police arrest were widely reported by international mass media. Surprisingly, Twitter took the unprecedented step of reinstating his Twitter account for archival access.

Empirically, we analyzed a total of 3,039 tweets posted by @shamiwitness during the period from October 6 to October 27, 2014. We conducted trend analysis, social network analysis, and content analysis of these 3,039 tweets. For trend analysis of @shamiwitness' tweets, we observed the meta-data found in the tweets including timestamp of tweets and hashtag that embedded in the tweets.

Through social network analysis, we found 877 unique Twitter users directly mentioned either through tweets, retweets or replies in the 3,039 tweets. A retweet (RT) refers to an action of forwarding other user's tweet of interest or of importance, while a reply refers to an action of answering an inquiry tweet. Both RT and reply tweets usually contain the corresponding Twitter user name starting with @. By identifying @shamiwitness' followership, in other words, those who follow him, we can identify the structure of @shamiwitness social-media network for further analysis.

In the content analysis, we classify the tweet contents into four categories: propaganda, radicalization, terrorist recruitment and others. *Propaganda is defined as information, especially of a biased or misleading nature, used to promote a political cause or point of view. Radicalization is defined as increasing extremity of beliefs, feelings, and behaviors in support of intergroup conflict and violence.* Very often radicalization occurs in a context of group identification and response to perceived threat to the in-group. [39]. *Terrorist recruitment is defined as enticing other, similarly situated young men, to join them in terrorizing and fighting the jihad war* [32]. For tweets that do not satisfy any of these three categories are classified as "others".

At this exploratory stage of content analysis, we employed two Arabic speaking PhD students from Iraq and one English speaking academic as our raters. They all carefully reviewed all of the tweets @shamiwitness himself posted but excluded all the retweets (RTs). In the content analysis, we classify the tweet contents into four categories: propaganda, radicalization, terrorist recruitment and others.

## 5. RESULTS

### 5.1 Trend Analysis of @shamiwitness Tweets

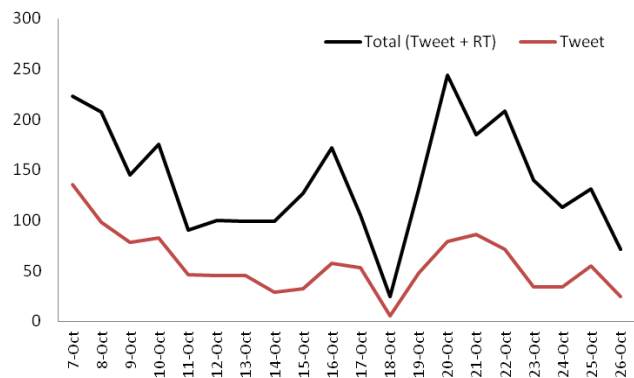
Our analysis finds that 60% of the tweets in the @shamiwitness Twitter account represents RTs of tweets posted by other Twitter users, including some Arabic tweets. The remaining 40% are his own tweets posted entirely in English, except some Arabic #hashtags embedded in his English tweets.



**Figure 3. Trend analysis: @shamiwitness' daily posting habit**

Figure 3 shows trend analysis of @shamiwitness' daily Twitter posting habit. In Figure 3, the red line and green line indicate the timestamp of the first and last tweet, respectively. Hence, the area between the two lines indicates his (potential) daily work hours. On average, his daily work hours can be long, stretching out to 16 hours and 9 minutes per day. As shown in Figure 3, there is not much variation in his daily tweeting habit (or routine operation) from day to day. This suggests Shamiwitness' fanatic/diligent dedication to operating his @shamiwitness network services like a business proposition. It certainly does not look like a hobby for him given the level of time and effort put into his Twitter account.

Figure 4 shows another trend analysis of daily tweets (red line) and daily total tweet and retweet (black line) posted by @shamiwitness. On average, @shamiwitness posted 57 his own tweets and 138 combined tweets and retweets per day, but on October 18, 2014 he posted only 24 tweets. Upon being asked by other users, he replied in one of his tweets that he had taken an administrative leave. Again Figure 4 indicates Shamiwitness' high level of commitment to operating his Twitter network services.



**Figure 4. Number of daily tweets by @shamiwitness**

### 5.2 Multi-Sided Social-Media Networks

Of the 3,039 tweets we analyzed, there are 877 unique Twitter users mentioned by @shamiwitness. Shamiwitness and those 877 Twitter users formed dynamic social networks through tweet exchanges. Figure 5 shows a social network diagram with nodes (Twitter users) and links (weak/strong social ties represented by tweet exchanges). Figure 5 is the visualization of the tweet exchange relationships formed within the @shamiwitness Twitter networks. It is a useful research tool to examine the structure of his Twitter networks. Figure 5 clearly indicates four distinct populations (or networks) of Twitter users: (1) international media, (2) regional Arabic media, (3) IS sympathizers, and (4) IS



fighters. Of the four distinct networks, the network of international media is the largest in size, which is measured by the number of nodes. Within this network of international media, three largest nodes are shown with a red circle whose size is computed by the number of followers to that node. In general, the larger is the size of a node, the greater is social influence (a megaphone effect) of its tweeting or retweeting to its followers within a given network. First, the largest network of international media shows all well-known media: cnnbrk (CNN Breaking News), nytimes (York Times), bbcworld (BBC World), washingtonpost (Washington Post) and foreignpolicy (Foreign Policy), among others. This network also includes journalists, such as jenanmoussa, brown\_moses (citizen journalist), policy analysts, such as charles\_lister and hxhassan, and other international entities, which are not directly related to IS. Second, a much smaller network of regional media is also detected which is characterized by their tweets posted in Arabic. This network includes cnnarabic (CNN Arabic), aa\_arabic (Anadolu Agency, a press agency in Turkey), skynewsarabia\_b (Sky News Arabia), and ajalive (Al Jazeera). Foreign journalists in posting Arabic tweets, such as mousaalomar (Moussa al-Omar) and kasimf (Faisal al-Qassem), are also found in this network of regional media.

Third, the second largest network of IS sympathizers (or interest groups), behind the network of international media, consists of Twitter users who have a special interest in IS. The top of the list is of course shamiwitness but the network also includes his close

associates with whom he often exchanges short coded tweets, such as maliwitness, turkwitness, saudiwitness, yemenwitness. The network of IS sympathizers also include well-known radical Muslim preachers, anjemchoudary and ahmadmusajibril. @ahmadmusajibril was specifically mentioned in prior research as having close ties with IS terrorist networks [16, 33].

Finally, the apparently smallest network of IS fighters includes Twitter users such as win\_or\_die2, al\_zarkawya\_7 and alhezbr\_23. Two of the Twitter usernames show an underscore “\_” followed by version number such as 7 and 23. Many of these Twitter accounts have been suspended by Twitter under its policy against tweets in support of terrorism or violence. In consequence, they open new Twitter accounts by resurrecting their old usernames but adding a version number so that their followers and friends can recognize their new accounts. This general practice among IS fighters whose Twitter accounts were suspended by Twitter has been found in many of their tweets to @shamiwitness in this research.

In summary, the social network analysis of the tweet data obtained through @shamiwitness has identified strong evidence of multi-sided Twitter networks – four distinct networks of different populations which used the network service @shamiwitness has provided for a fairly long period of time.

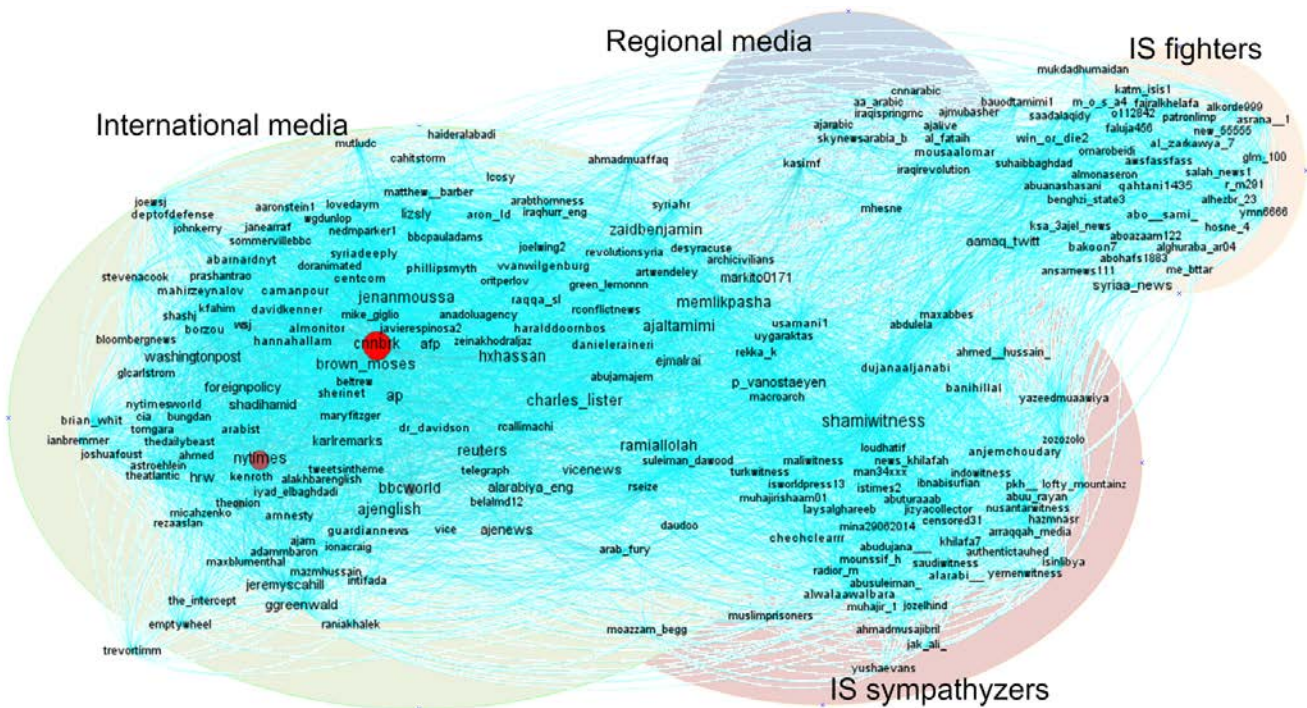


Figure 5. Multi-sided Twitter networks of users mentioned in @shamiwitness tweets

### 5.3 Sample @shamiwitness Tweets

The examples in Table 1 aim to show Shamiwitness’ propaganda, recruitment, and radicalization tweets. As previously discussed, propaganda is information, especially of a biased or misleading nature, used to promote a particular political cause or point of view. For propaganda, this is largely

intended to magnify the power of IS, with his tweets mock the US military miscalculation and inaptitude. Examples shown in Table 1 have Shamiwitness saying that the US is killing children, massacring civilians, destroying homes, and is too fearful to fighting in the streets. His propaganda tweets also smear and mitigate media and people’ positive perceptions

PKK as brave and loyal to the Kurdistan region of Iraq. We selected these earlier dates of our tweet observation period because of the intensifying battles around and in Kobane – the center of the US-led coalition airstrikes.

As discussed, radicalization refers to increasing extremity of beliefs, feelings, and behaviors in support of intergroup conflict and violence. The Shamiwitness tweets in Table 1 show these extreme beliefs. The examples shown ask followers for a call to arms, being a warrior, and destruction of people and property. All of these tweets display extreme views that support extreme political violence.

Finally, as discussed, terrorist recruitment refers to enticing others, similarly situated young men, to join them in terrorizing and fighting the jihad war. Understandably, Shami witness has been well-aware of security risk by being too explicit in online terrorist recruitment. However, we show three examples of recruitment from the sample of Shamiwitness tweets. These examples show him asking Muslim Kurds in Turkey to join the cause, asking another follower to make a “moral” decision, and talking about jihad. All of the tweets show the element of enticing young men to join Islamic terrorism.

**Table 1. @shamiwitness tweet examples: Propaganda, Radicalization, and Recruitment**

Timestamp	@shamiwitness Tweet
	<b>Propaganda</b>
6/10/2014 10:38	Coalition planes massacred these children in airstrikes on #Hit #Anbar <a href="http://t.co/yCsEgkwDY6#Iraq">http://t.co/yCsEgkwDY6#Iraq</a>
6/10/2014 17:48	these PKK fellas are exceptional liars.after the city was almost fully abandoned by civilians, they now claim 55 thousand civilians there.
7/10/2014 16:08	This is so awesome. US airstrikes also by mistake hit a Shia militia convoy near Tuz <a href="http://t.co/zUwWcEzBzk">http://t.co/zUwWcEzBzk</a> 2nd one after the Jabour strikes
8/10/2014 14:30	Ask the Americans how they liked fighting JTJ/AQI/MS/ISI in street wars in Ramadi,Fallujah etc. (3)
10/10/2014 4:13	Amazing thing about Kobane:not a single genuine claim of massacres of civilians. Not one.Meanwhile, Assad keeps killing kids in Aleppo
	<b>Radicalization</b>
6/10/2014 14:45	@Himalaya888 you do realize IS wants to destroy every single nation-state,Arab or Kurd or communist doesnt matter, that they come across?
7/10/2014 18:59	Real warriors, I mean those who are not fags, dont need air support.
8/10/2014 12:18	#IS blows up police station in downtown Kobane where YPG were holed up. #Syria
12/10/2014 11:18	Notice this recent uptick of IS activity in Qara Tepe? multiple VBIEDs [ <i>vehicle-borne improvised explosive device</i> ] hitting PUK ,Pesh,Asayesh ?Guess where else that happened

	earlier?
	<b>Recruitment</b>
7/10/2014 18:21	This is the time for Muslim Kurds in Turkey to show whether they can ever counter PKK.
7/10/2014 20:05	@EbuRuana so if it is not right to make dua [ <i>the Islamic act of calling out to Allah</i> ] for a kafir [a disbeliever, someone who rejects <a href="#">Allah</a> and who does not believe in <a href="#">Muhammad</a> as the final messenger of Allah], what is the right thing to do ?
11/10/2014 16:29	@banihillal blend in like you are the most anti-jihadist guy one can think of. @isinlibya @ummussamah11
12/10/2014 20:14	@DaniyalYasin93 The question is to you:can you,as a Muslim,counter-argue any of the points made in that segment quoted from Dabiq magazine [the IS’ propaganda magazine]?

**Notes:** [*italics*] shows our inserted information to help contextualize his tweet message. Otherwise we did not edit his tweets.

**Note:** A Kafir “is a *disbeliever*, someone who rejects [Allah](#) and who does not believe in [Muhammad](#) as the final messenger of Allah” (<http://wikiislam.net/wiki/Kafir>)

## 6. DISCUSSION

Results of our social network analysis of Twitter demonstrate two important findings. First, social network analysis of Twitter users can be a powerful research tool to discover underlying structure and trends in tweet data, which may not be unearthed by analyzing traditional media outlets and reports. With Twitter an individual with an account is able to spend countless hours, as we have seen with @shamiwitness, trying to influence opinions of international and regional Arabic mass media, to share some common knowledge and newest strategic information with IS fighters, and to radicalize and recruit younger generations of Muslims and Westerns alike, hence greatly promoting the IS cause: the Islamic State as a new global political order. Social media can be very empowering for individuals with political cause, who may not able to influence traditional media outlets. Twitter can be used strategically, as we have shown, to orchestrate multi-sided international networks of supporters and followers with the explosive speed and reach.

Second, we showed evidence of using Twitter for propaganda, radicalization, and recruitment. Although @shamiwitness tweets were carefully posted due to the constant threat of his account being shut down, we did provide evidence of using an IS member/supporter-mediated Twitter multi-sided networks for each of these three activities. This finding shows the extent to which a deep understanding of such a multi-sided Twitter network structure and competent and strategic operators who can exploit such an emergent complex network structure and dynamic capability can provide government with a new and credible power on the fight against global terrorism. It follows that governments need to be more aware that multi-sided social-media networks can be exploited by global terrorist networks for these purposes, and must counter with their own counter-terrorism digital policy and proactive online campaigns. The results show the importance of social media for empowering

individuals, but it also shows the dark side of social media to wage wars and conflict, which would pose a serious threat to national security and policy order.

## 7. CONCLUSIONS

In light of the very limited literature on social media use by Islamic terrorism networks in supporting terrorism communication, we have examined the sophisticated use of Twitter social media platform by Islamic State terrorist networks in this paper. By drawing on microeconomic network theories, we have developed a theoretical framework for examining multi-sided Twitter networks in the global Islamic terrorism communication environment. Our social network analysis of the tweet data generated by @shamiwitness and his Twitter followers finds strong evidence of the presence of multi-sided Twitter networks which consist of four distinct Twitter user populations: international mass media, regional Arabic mass media, IS fighters, and IS sympathizers. In these multi-sided Twitter networks, Shamiwitness seems to intermediate different interests and information needs of these four distinct networks. By diligently doing so, he can aggregate values created by each network either to his own benefits (e.g., enhanced self importance or recognition) or to promoting the global Islamic terrorist goals of IS.

Our research has both theoretical and methodological implications for terrorism communication research in our e-government field. Our research also has policy implications, calling urgent attention to the potential power of multi-sided Twitter networks in more effectively and more efficiently promoting the radical Islamic propaganda, radicalization, and recruitment messages to the global audiences.

However, our research has inherent limitations by focusing on @shamiwitness and his Twitter networks. Terrorist networks tend to change over time because of changes in operational processes such as recruitment and training as well as changes in counter-terrorism policies [26]. Future research can apply our theoretical framework to further investigate the exploitation of Twitter networks by other terrorist networks or the exploitation of other social media networks such as YouTube and Facebook by Islamic State terrorist networks examining how strategic interactions between information reporters and users can affect terrorism communication outcomes.

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