



# Opening Closed Regimes

What Was the Role of Social Media During the Arab Spring?

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## Summary

Social media played a central role in shaping political debates in the Arab Spring. A spike in online revolutionary conversations often preceded major events on the ground. Social media helped spread democratic ideas across international borders.

### Main Findings

No one could have predicted that Mohammed Bouazizi would play a role in unleashing a wave of protest for democracy in the Arab world. Yet, after the young vegetable merchant stepped in front of a municipal building in Tunisia and set himself on fire in protest of the government on December 17, 2010, democratic fervor spread across North Africa and the Middle East. Governments in Tunisia and Egypt soon fell, civil war broke out in Libya, and protestors took to the streets in Algeria, Morocco, Syria, Yemen and elsewhere.

The Arab Spring had many causes. One of these sources was social media and its power to put a human face on political oppression. Bouazizi's self immolation was one of several stories told and retold on Facebook, Twitter, and YouTube in ways that inspired dissidents to organize protests, criticize their governments, and spread ideas about democracy. Until now, most of what we have known about the role of social media in the Arab Spring has been anecdotal.

Focused mainly on Tunisia and Egypt, this research included creating a unique database of information collected from Facebook, Twitter, and YouTube. The research also included creating maps of important Egyptian political Websites,

examining political conversations in the Tunisian blogosphere, analyzing more than 3 million Tweets based on keywords used, and tracking which countries thousands of individuals Tweeted from during the revolutions. The result is that for the first time we have evidence confirming social media's critical role in the Arab Spring.

Our research has produced three key findings:

***First, social media played a central role in shaping political debates in the Arab Spring.***

Our evidence shows that social media was used heavily to conduct political conversations by a key demographic group in the revolution – young, urban, relatively well educated individuals, many of whom were women. Both before and during the revolutions, these individuals used Facebook, Twitter, and YouTube to put pressure on their governments. In some cases, they used new technologies in creative ways such as in Tunisia where democracy advocates embarrassed President Zine El Abidine Ben Ali by streaming video of his wife using a government jet to make expensive shopping trips to Europe.

Bloggers also used the Internet to publish information critical of the governments in Egypt and Tunisia. And



our evidence suggests that political organizations and individuals used Western news sites – such as the BBC and CNN – to spread credible information to their supporters through the revolutionary period. The result was that, by using digital technologies, democracy advocates created a freedom meme that took on a life of its own and spread ideas about liberty and revolution to a surprisingly large number of people. Interestingly, not a single Egyptian political Website we mapped linked to regional news sources such as Al Jazeera and Al Arabiya before the revolution.

***Second, a spike in online revolutionary conversations often preceded major events on the ground.***

Determining whether online conversations were driving street protests or whether the presence of a large volume of people in the streets was feeding an ongoing online conversation can be difficult. However, our evidence suggests that online conversations played an integral part in the revolutions that toppled governments in Egypt and Tunisia. We find that conversations about liberty, democracy, and revolution on blogs and on Twitter often immediately preceded mass protests. In Tunisia, for example, 20 percent of blogs were evaluating Ben Ali's leadership on the day he resigned from office (January 14), up from just 5 percent the month before. Subsequently, the primary topic for Tunisian blogs was "revolution" until a public rally of at least 100,000 people took place and eventually forced the old regime's remaining leaders to relinquish power.

Governments themselves also recognized the power of opposition movements equipped with social media. In Tunisia, officials attempted to block Facebook and other social media sites and arrested bloggers and others who used social media to spread critical news about the government. What they found is that democracy advocates were tech-savvy and had the help of hackers and talented computer programmers who were able to shutter government services online and provide protestors with workarounds to censors. Likewise, Egypt attempted to choke off access to social media and found that the protestors in Cairo's Tahrir Square were nonetheless able to stay connected. The Muslim Brotherhood relied on bloggers whose servers were located in London and therefore couldn't be taken offline.

***Third, social media helped spread democratic ideas across international borders.***

Our evidence suggests that democracy advocates in Egypt and Tunisia used social media to connect with others outside their countries. In many cases, these connections helped inform Western news stories about events on the ground, which in turn spread news about ongoing events throughout the region. In many other cases, we find that democracy advocates in Egypt and Tunisia picked up followers in other countries, where similar democratic protests would later erupt. Ultimately, social media brought a cascade of messages about freedom and democracy across North Africa and the Middle East, and helped raise



expectations for success of political uprising.

Twitter offers us the clearest evidence of where individuals engaging in democratic conversations were located during the revolutions. We find that there were over 2,200 tweets from Algeria, Bahrain, Egypt, Morocco, and Yemen about Ben Ali's resignation on the day he stepped aside. Over the course of a week before Mubarak's resignation, the total rate of tweets from Egypt—and around the world—about

political change in that country ballooned from 2,300 a day to 230,000 a day. Interestingly, the relative contribution of people not living in the region diminished significantly over this period. On the day Mubarak left office, February 11, there were more than 225,000 Tweets outside the country that spread the news of his departure. In the two weeks after Mubarak's resignation, there were an average of 3,400 tweets a day about the political crisis in Egypt by people living in neighboring countries.

## Opening Closed Regimes

### What Was the Role of Social Media During the Arab Spring?

#### **Main Report**

Over the past century, the world has witnessed waves of democratization sweep into sometimes surprising places. The last such great wave toppled the Berlin Wall and brought democracy to formerly communist countries in Eastern Europe and other parts of the globe. By 2010, even though some countries had slipped back toward dictatorship, approximately three fifths of the world's countries were governed by some form of democracy.<sup>1</sup> And in 2011, a new wave was sweeping into a region that had remained notably devoid of democracy: North Africa and the Middle East.

Between January and April 2011 public demand for political reform cascaded from Tunis to Cairo, Sana'a, Amman and Manama. This inspired people in Casablanca, Damascus, Tripoli and dozens of smaller cities to take to the streets to demand change. By May, the political casualties were significant: Tunisia's Zine El Abidine Ben Ali and Egypt's Hosni Mubarak, two of the region's most recalcitrant dictators, were gone; Libya was locked in a civil war; and several constitutional monarchs had sacked their cabinets and committed themselves to constitutional reforms. Other governments sought to quell unrest by promising vast expenditures on infrastructure projects, unemployment benefits, food subsidies, and salary

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<sup>1</sup> Freedom House, Freedom in the World, 2010 Edition.

increases for civil servants and military personnel.

Morocco and Saudi Arabia appeared to fend off serious domestic uprisings, but the outcomes for regimes in Bahrain, Jordan, Syria, and Yemen remain far from certain. Democratization movements had existed long before technologies such as mobile phones and the Internet came to these countries. But technologies have helped people interested in democracy build extensive networks, create social capital, and organize political action. Technology may not have created the desire for political freedom, but it is a tool democracy advocates have used to their advantage.

#### **Egypt and Tunisia's Tech-Savvy Democrats**

One reason why technology has been an effective tool for democracy advocates in Tunisia and Egypt is that both countries have relatively young, tech-savvy populations. In Tunisia, where the median age is 30 years old, approximately 23 percent of the 10 million people who live there are under the age of 14. In Egypt, where the median age is 24, 33 percent of the country's 83 million inhabitants is under 14. Cell phone use is widespread in both countries, with 93 mobile phone subscribers for every 100 people in Tunisia and 67 mobile phones for every 100 people in Egypt. What's more, in both countries the government has censured the media, giving individuals a



strong incentive to turn to the Internet for credible sources of information. Internet use in both countries is also significant. About 25 percent of the population in Tunisia and 10 percent of the population in Egypt has used the Internet at least once, with much of the use concentrated among young people. Some 66 percent of the Internet-savvy population in Tunisia, and 70 percent in Egypt, is under the age of 34. All of this might explain why many of the people who took to the streets earlier this year were young, technologically inclined individuals who blogged, Tweeted, or posted to Facebook news events as they unfolded.<sup>2</sup>

In addition to enabling young people to organize, technology has facilitated the growing participation of women in political conversations. Forty-one percent of Tunisia's Facebook population is female and 36 percent of Egypt's Facebook population is female. Women also participate actively in political conversations over Twitter, and were notably present in street gatherings in both Tunisia and Egypt. Indeed, through social media, women like Esraa Abdel Fattah of the Egyptian Democratic Academy became vocal opponents, and Leil-Zahra Mortada, documented women's involvement in the revolution with a popular Facebook album.

Our unique dataset of Twitter conversations in Tunisia and Egypt reveals that women were quite active during the uprisings. By distinguishing

between people Tweeting in-country from those using the same hashtags (key words) but Tweeting outside the country, we were able to determine that 30 percent of the people actively contributing to Twitter conversations inside of Tunisia were women. Women made up 33 percent of the people actively Tweeting inside Egypt during the revolution.

## Voices of Freedom and Dissent Online

Even before the revolutions, Tunisia and Egypt had active blogospheres. Often the most critical coverage of government abuse was done not by newspaper reporters, but by average citizens using their access to the Internet in creative ways. Most famous in Tunisia was the graphically simple video of the president's plane arriving and leaving Europe's elite shopping destinations with his wife as the only passenger. Since the online publication of that video in August 2007, the regime had variously cracked down on YouTube, Facebook, and other online applications.

In Egypt, democracy advocates benefited from the fact that Cairo is not only a cultural hub, it is also a media center with a reasonably robust information infrastructure. This has enabled the city's politically disaffected, but still active, youth and others to build a vibrant public sphere online. Over the past several years, political parties and social movements have become particularly adept at using social media to their advantage. The Muslim Brotherhood, for example, used the Internet to share information, organize

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*In addition to enabling young people to organize, technology has facilitated the growing participation of women in political conversation.*

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<sup>2</sup> Demographic data from the CIA World Factbook and World Bank's World Development Indicators database. Technology use data from the International Telecommunications Union.



supporters, and conduct other activities that helped it challenge secular authorities.

In response, the governments in Tunisia and Egypt arrested bloggers, tracked online conversations, and shuttered Websites and Internet access. For example, in 2005 Egyptian blogger Abdolkarim Nabil Seliman was arrested and imprisoned for four years after criticizing President Hosni Mubarak and the state's religious institutions. In 2007, a number of bloggers were arrested for organizing and covering social protests when the Egyptian parliament approved controversial constitutional amendments. Many activist Egyptian bloggers, some affiliated with groups such as Kefaya and the April 6 Movement, were arrested and faced physical abuse.

Egyptian bloggers proved particularly resilient in continuing to publish critical information online. But in both Tunisia and Egypt a cottage industry of bloggers and activists used the Internet to evade government censorship by creating alternative newscasts and building spaces online where individuals could publish information critical of the government without attaching their names to it. Online activists and bloggers, digital news organizations, and political party Websites form a virtual ecology of civil society groups that debate contentious issues. In many cases, the boundaries between these organizations are blurred for important reasons. For example, banned political parties, such as Egypt's Muslim Brotherhood, have relied on bloggers who maintain servers located outside of the country and thereby

couldn't be taken offline by the government.

Egypt has a number of active political parties, many of which maintain Websites and online newsletters to communicate with their supporters and constituents, but also with each other. Almost all major parties publish online newspapers, such as the New Wafd Party's *Al Wafd Daily*, the National Progressive Unionist Party's *Al-Ahali* newspaper, the Arab Democratic Nasserist Party's *Al-Arabi* weekly, and the Tomorrow Party's *Al Ghad* weekly. In addition to the discussion spaces fostered by newspapers, party-publications like these allow for active opportunities for cross-party, political negotiation. The Muslim Brotherhood had been banned by the government, but nonetheless used Arabic and English language publications to maintain an equal, if not more prominent, presence in online Egyptian politics than many legally sanctioned parties.

Before the Arab Spring, Twitter had a loyal following of users in Tunisia and Egypt, living mostly in the largest cities. While records of Twitter conversations in both countries prior to the revolutions are not available, in most parts of the world we know that Twitter is used by networks of family and friends to trade jokes and talk about everyday life. Facebook became a political tool because people found it useful for amassing content and building links to like-minded individuals. The Tunisian government was more active than the Egyptian regime when it came to restricting social media. In 2007, for example, it blocked YouTube and



DailyMotion for an extended period and in 2008 it blocked Facebook for a month. In both cases, observers suspected that the regime was reacting to fears that social media were strengthening the bonds of communication between citizens in ways not easily monitored and managed by the state.

Western news media were quick to label the political uprisings as “Twitter” and “Facebook” revolutions. To prepare this report, we sought the latest data on trends in technology use to help shed light on the actual role of the Internet and social media in Tunisia and Egypt.

## **Tunisia – From Oppression to Resistance to Spark for the Region**

On December 17, 2010, Mohamed Bouazizi set himself on fire. This young street vendor had tried in vain to fight an inspector’s small fine, appealing first to the police, then to municipal authorities, and then to the region’s governor. At each appeal he had been physically beaten by security officials. Bruised, humiliated and frustrated by an unresponsive bureaucracy and a thuggish security apparatus, Bouazizi set himself alight in front of a local government office. By the time he died in a hospital on January 4, protests had spread to cities throughout the country. It is not enough to say that news of Bouazizi’s tragedy travelled quickly, because the state-run media did not cover the tragedy or the simmering anger over political oppression in the city of Sidi Bouzid, where Bouazizi self immolated. Networks of family and friends, feeling sympathy for the dying

man’s plight, came to realize that they shared common grievances. The recognition came as people watched and uploaded YouTube videos about the abusive state, read foreign news coverage of political corruption online, and shared jokes about their aging dictators over social media sites. In the end, social media helped people develop strategies to overthrow their president, Zine El Abidine Ben Ali.

Ben Ali’s critics dominated virtual spaces, but after Bouazizi’s death, they took to occupying public spaces. Shamseddine Abidi, a 29-year old interior designer, posted regular videos and updates to Facebook. Al Jazeera used the content to carry news of events to the world. Images of Bouazizi, hospitalized with burns, passed along networks of family and friends. An aggressive Internet campaign called on fellow citizens and unions to set up committees to support the uprising in Sidi Bouzid. Lawyers and student unions were among the first to take to the streets in an organized way.

The government tried to ban Facebook, Twitter and video sites such as DailyMotion and YouTube. But within a few days, social media networks were the organizing tool of choice. Less than 20 percent of the overall population actively used social-media Websites, but almost everyone had access to a mobile phone. Outside the country, the hacker communities of Anonymous and Telecomix helped cripple government operations with their “Operation Tunisia” denial-of-service attacks, and by building software activists used to get around state firewalls.





The government responded with a counter-insurgency strategy against its tech-savvy opponents that included jailing a group of bloggers in early January. For the most part, however, the political uprising was leaderless so there was no long-standing revolutionary figurehead, traditional opposition leader, or charismatic speechmaker who could be arrested.

But there were prominent nodes in the digital networks, people whose contributions held sway and mobilized turnout. Slim Amamou, a member of the copyright focused “Pirate Party,” blogged the revolution (and later took a post in the national unity government). Sami ben Gharbia, a Tunisian exile, monitored online censorship attempts and advertised workarounds. “El Général,” a middle-class Tunisian rapper, streamed digital “soundtracks for the revolution.”

By early January, protestors’ appeals for help and clumsily recorded mobile phone videos were streaming across North Africa and protests in Algeria and other countries started to crop up. By the time Ben Ali fled Tunisia on January 14, active campaigns for civil disobedience against authoritarian rule were growing in Jordan, Oman, and Yemen. In other countries, such as Lebanon, Mauritania, Saudi Arabia and the Sudan, minor protests erupted on a range of issues and triggered quick concessions or had little impact. But even in these countries opposition leaders appeared to draw inspiration from what they were tracking in Tunisia. Moreover, opposition leaders across the region were learning the digital tricks for how to catch ruling elites off guard.

Soon events in Tunisia would help inspire the largest protests in Cairo in 30 years.

Social media brought a cascade of messages about freedom and democracy across North Africa and the Middle East and helped raise public expectations for the success of political uprising. Two kinds of evidence reveal much about this cascade: the rhythm of Tweets about political change and the topical evolution of blog posts.

The rhythm of Tweets is significant because it gives us a window into conversations taking place over the broad digital spectrum. The vast majority of conversations likely involved using cell phones to send text and other type of messages, but there isn’t a good database for studying that information. There is, however, a robust set of data for conversations that take place over Twitter, so in a sense Twitter can serve as a proxy for understanding the types of conversation that happened on other forms of digital communication.

And what we can see on Twitter is that a large volume of people—both inside each country as well as across the globe—were following events as they unfolded. Twitter seems to have been a key tool in the region for raising expectations of success and coordinating strategy. Twitter also seems to have been the key media for spreading immediate news about big political changes from country to country in the region. As a group, Twitter users are probably more educated and wealthy than the average person, and more likely to be found in major cities. They are also,



consequently, opinion leaders for whom Twitter served as an important means of carrying on an extended conversation about the prospects for liberty and the logistics of social action.

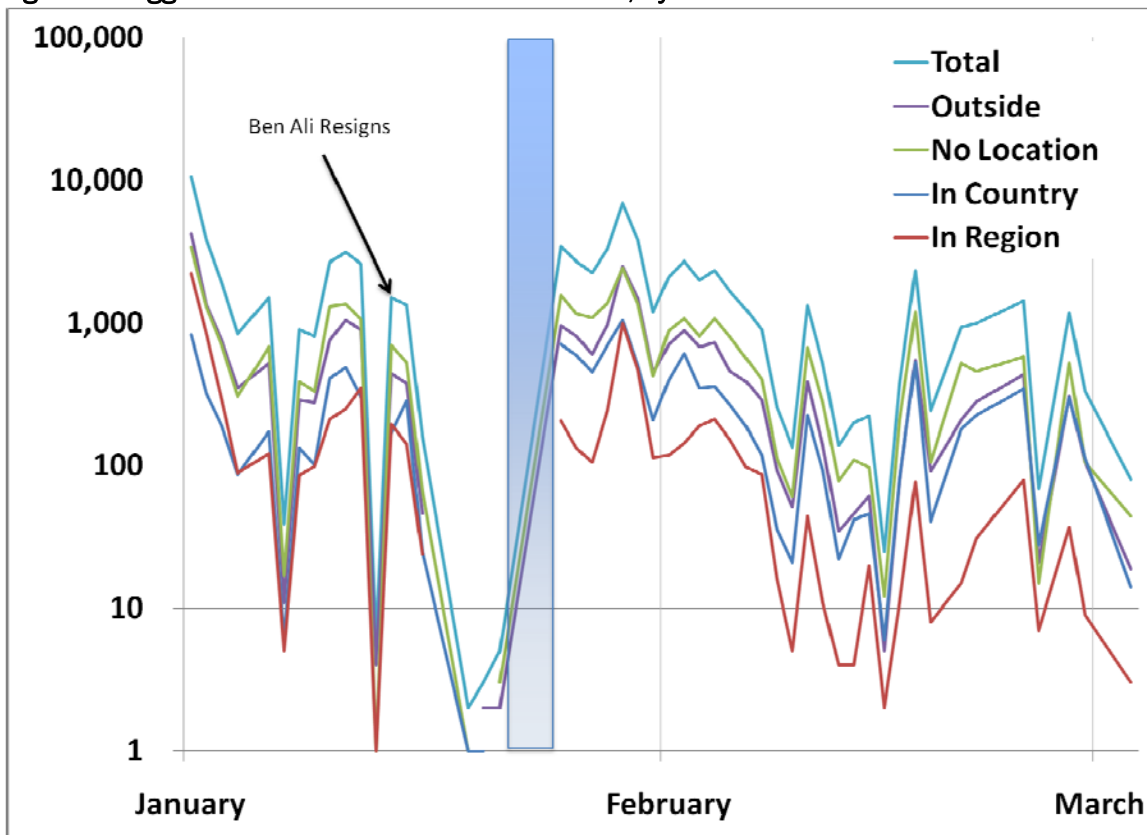
In total, there were 13,262 Tweets using the hashtag most prominently associated with Tunisia's political uprising—#sidibouid. On average, throughout the study period of January 14 to March 16, 18 percent of the Tweets about the Tunisian uprising came from inside Tunisia, 8 percent from neighboring countries, and 32 percent from outside the region. The remainder offered no location information. The day Ben Ali resigned, 2,200 tweets from Algeria, Bahrain, Egypt, Morocco, and Yemen concerned the uprising in Tunisia. Many Tweets involved personal stories of suffering at the hands of a tough and incompetent regime. Some involved links to critical documentaries on YouTube, or made reference to Facebook groups and news

stories that did not paint the regime in a flattering light.

Beginning with the earliest available records of Twitter feeds in Tunisia, it is possible to graph waves of political consciousness with key events and protestor turnout. Figure 1 identifies the number of active Twitter users contributing to one of the most important hashtags of the time, #sidibouid. The number of users appears on a logarithmic scale, day-by-day. A blue bar indicates the dates on which journalists began reporting that attendance at street protests had reached into the thousands. In Tunisia, the number of contributions increased steadily between late January and late February. The number of people with no location information also declined, suggesting that as time passed Tunisians grew more willing to note publicly that they were Tweeting from inside Tunisia during the heady days of political change.



Figure 1: Logged Number of Tweets on #sidibouزيد, by Location

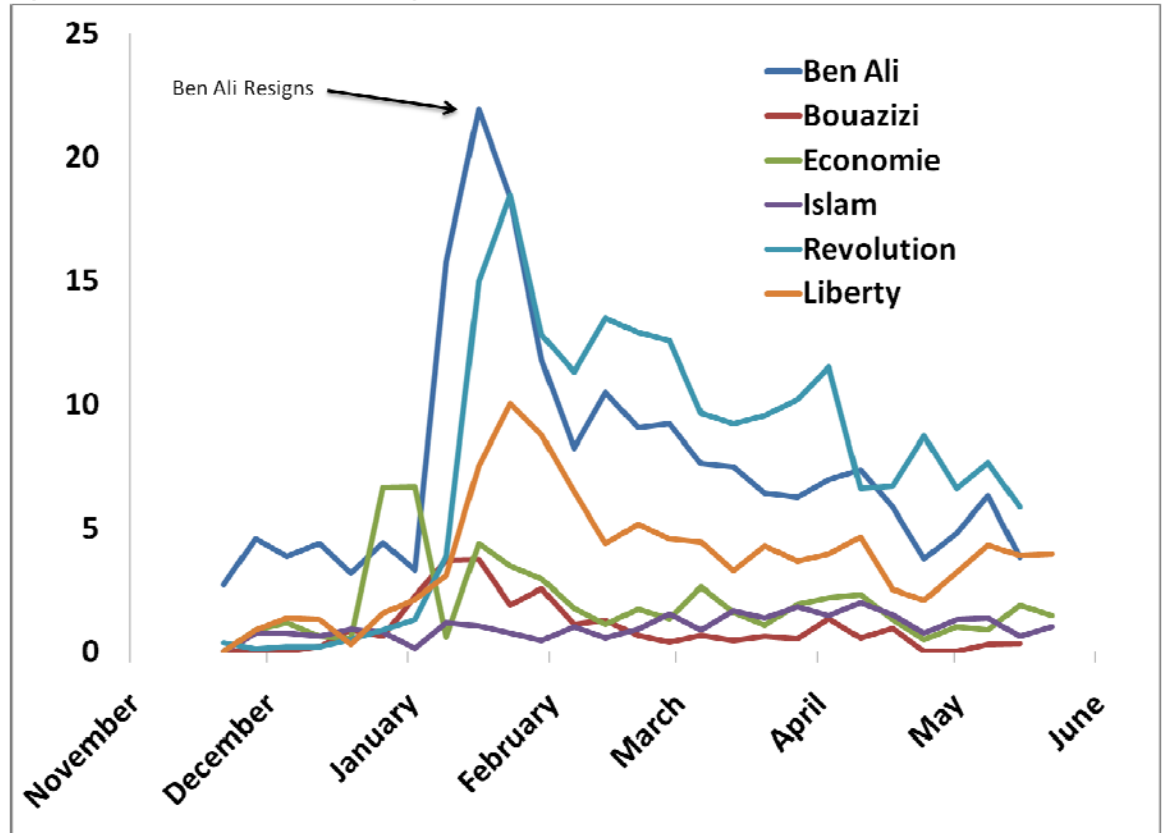


Notes: “Outside Country” refers to Twitter profiles that had locations outside both the country and the region, and “No location” refers to profiles that either had no location data or had have been deleted or suspended since archiving began. The blue bar indicates the period in which journalists began reporting that protests had reached the level of “thousands” of participants.

Figure 1 tracks the rhythm of Tweets on the topic of political change. It also reveals the moments when the service was either overloaded or mobile networks were under attack (or both). Before Ben Ali resigned, more than a thousand people in Tunisia and around the world were Tweeting each day about political change in that country. Immediately after his resignation, Twitter service declined precipitously, with activists in the country reporting

that security forces were interfering with communication networks. When the service returned to normal, Twitter traffic peaked again, with a thousand Tweets a day in Tunisia and street protests drawing tens of thousands of people. Tweets and protests lasted for several weeks, until the last vestiges of the ruling elite were removed from power.

Figure 2: Percent of Tunisian Blogs With Posts on Politics, By Keyword



Note: Figure represents the percent of all blog posts containing at least one of six keywords. Based on data captured through eCairn beginning November 20, 2010.

Figure 2 tracks six of the most important keywords in the Tunisian blogosphere. Just as Twitter traffic peaked with street protest, the topics discussed in the Tunisian blogosphere closely tracked with public interest in political freedom. Analysis of the structure of content and links in the Tunisian blogosphere between November 2010 and May 2011 indicates direct parallels between online political conversations and offline events. Particularly after December 17, 2010, when Bouazizi set himself on fire, the Tunisian blogosphere experienced a spike in the frequency of online

conversations about liberty, revolution, and President Ben Ali's leadership. In this way, the volume of digital conversations peaks with the size of street demonstrations, and the content of these conversations directly reflects public sentiments.

Tunisian bloggers had, for several years, been among the most critical opponents of Ben Ali's regime. By scanning the structure of content and links of the Tunisian blogosphere, we can chart the progress of the idea of political reform. Many Tunisian bloggers wrote in French and Arabic. Moreover, distinct

keywords and themes regarding economic grievances and democratization arose preceding the popular uprising.

Among Tunisia's *digerati*, economic woes and Ben Ali's leadership are key topics from November to December. But with Bouazizi's death in early January came a spike in conversation about his plight, and shortly thereafter a growth in the number of conversations about freedom and revolution. Islam, as a political theme, tracks on only a few blogs and the interest in economic issues diminishes over time relative to themes of freedom and revolution.

Talk about revolution continued even after Ben Ali fled the country, because his replacement, Mohamed Ghannouchi, was viewed by many as part of the old regime. Consequently, the percent of blog posts with the keywords "revolution" and "liberty" peaked after Ben Ali had already left office. By the third week of January, 18 percent of all Tunisian blog posts talked about revolution; 10 percent discussed liberty. That week marked the climax of protester turnout with estimates ranging from 40,000 to 100,000 people in the streets.

The primary topic of political conversation in Tunisian blogs then became "revolution" until a public rally of at least 100,000 people on February 27, after which Ghannouchi was forced to resign. In Tunisia, the blogosphere anticipated what happened on the ground by days. Demand online for liberty eventually manifested itself in the streets.

The relative prominence of conversations about freedom among Tunisia's wired middle class is consistent with anecdotal evidence of public sentiment during the first few days of the uprising. Journalists and country experts consistently expressed surprise that traditional political ideologies and political parties were absent from the protests. Major opposition parties and political leaders did not feature as prominently as Bouazizi, and were not particularly associated with conversations about liberty or the prospects of revolution. And conversations about liberty and freedom were more important than conversations about Islam.

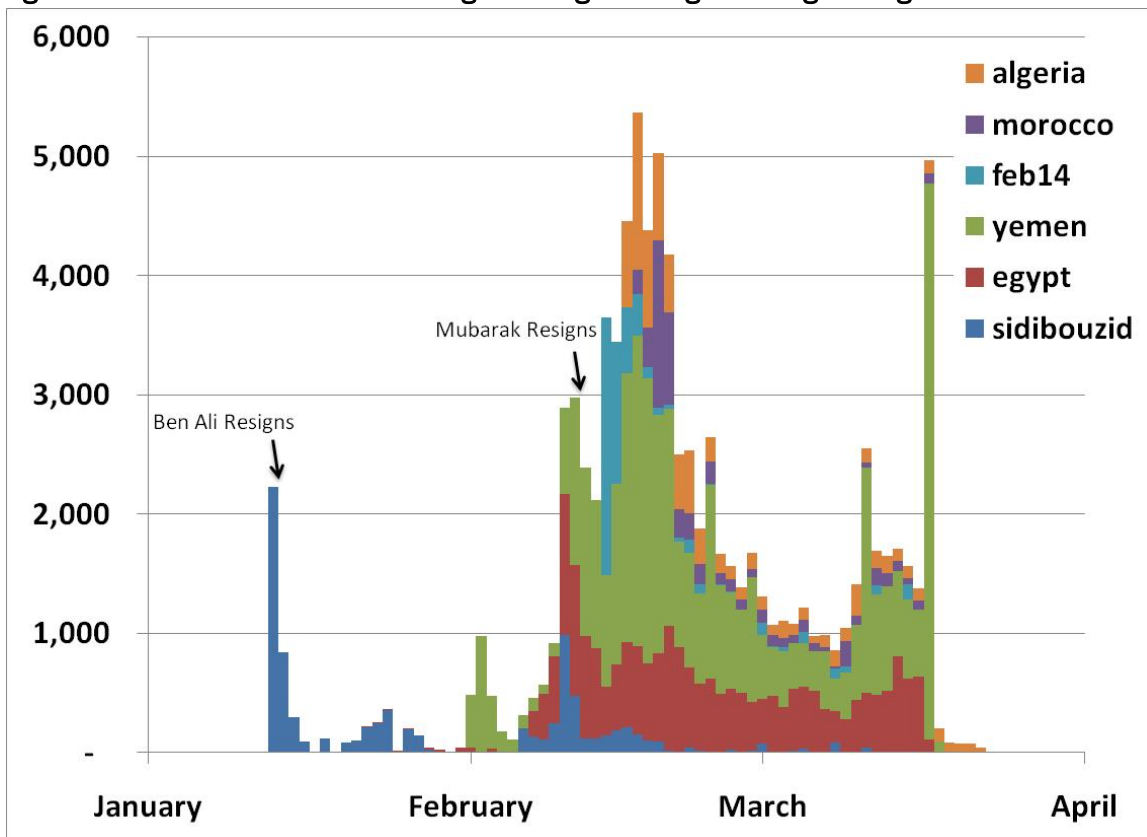
## **Viral Democratic Values**

Around the region, people increasingly Tweeted about events that were occurring in their neighborhood. Stories of success and difficulty spread widely and created a kind of "freedom meme." The same meme traveled across the region through Facebook and YouTube, as inspiring images were captured by mobile phone and transmitted.

Here we study Tweets, rather than simply Twitter users, because they represent a sense of conversation and active dialogue about freedom that transcended national boundaries. For example, after Egyptians heard that Ben Ali fled Tunisia on January 14, Twitter user and journalist Gigi Ibrahim declared that "the Tunisian revolution is being twitterized ... history is being written by the people #sidibouزيد #Tunisia." Blogger Tarek Shalaby echoed with, "we will follow it!" On January 25, journalist Hossam el-Hamalawy noted that "tens of



Figure 3: Number of Tweets in the Region Using Hashtags for Neighboring Countries



Notes: These are the hashtags that most prominently came to be associated with political uprisings in Algeria, Egypt, Bahrain, Tunisia, Morocco and Yemen. The hashtags analyzed, in order, were “#algeria”, “#egypt”, “#feb14”, “#morocco”, “#sidibouزيد” and “#yemen.”

thousands r protesting [with] the same chants as the Tunisians.” In the aftermath of an unexpectedly large turnout in Egypt that day, Mahmoud Salem—the blogger and activist also known as “Sandmonkey”—urged his Twitter followers to “please remember, it took a month of protests 4 Tunis revolution 2 succeed. Persistence is everything.”

Figure 3 demonstrates the rising wave of Tweets about events in other countries and the prospects of making democratic gains. To produce this

graphic, we first selected all the Tweets we could confirm using our geolocation efforts as originating in Algeria, Bahrian, Egypt, Morocco, Tunisia or Yemen. Then we isolated the Tweets using hashtags for countries and freedom movements other than the one they were in. In other words, this figure specifically displays the rate at which people in each country caught and transmitted the meme of political freedom from other countries. In the two weeks after Mubarak’s resignation, there were an average of 3,400 tweets a day about the political crisis in Egypt



by people living in neighboring countries.

This figure reveals that at the peak of events in Tunisia, there were 2,200 tweets outside Tunisia but in the region about Ben Ali's resignation. In the subsequent months, the hashtags associated with conversations about political change in particular countries were often used by people in neighboring countries. In other words, people in countries throughout the region were drawn into an extended conversation about social uprising. As street protests arose in Tunisia and Egypt, then Yemen and Bahrain, and eventually Algeria and Morocco, people across the region tweeted in real time about big events. This is significant because it reveals how the success of demands for political change in Tunisia and Egypt led individuals in other countries to pick up the conversation and talk about how it was relevant to their own lives. In other words, it helped cascade conversation about freedom across the region.

## **Egypt – The Freedom Meme Spreads Through Social Networks**

News of Ben Ali's departure spread rapidly in Egypt, where almost everyone has access to a mobile phone and the Internet-using population is the largest in the region outside of Iran. State-run media in Egypt, which had been slow to report protests in the region and in Cairo, reluctantly covered Ben Ali's exit.

Like Tunisia, Egypt has long had a large and active online public sphere. It is here that illegal political parties, radical

fundamentalists, investigative journalists and disaffected citizens interacted. When the Muslim Brotherhood's online news services were banned in Egypt, the organization moved its server infrastructure to London and kept up a flow of political spin. But it was not the established parties and unions that converted anti-Mubarak vitriol into civil disobedience. It was the campaign to memorialize a murdered blogger.

Wael Ghonim, a regional executive at Google, opened the Facebook group "We are All Khaled Said" to memorialize a young blogger whom police had beaten to death for exposing their corruption. Just as digital images of Mohamed Bouazizi in the hospital passed over networks of family and friends in Tunisia, in Egypt an image of Khaled's bruised face taken as his body lay in a city morgue passed from one mobile phone to thousands. "We are All Khaled Said" became a portal for collective commiseration. But more than being a digital memorial – Egyptian police have long tormented bloggers – this Web page became a logistical tool, at least temporarily, to help organize democracy advocates. Ghonim also fast became the country's most prominent Tweeter, linking a massive Egyptian social network writing in Arabic to networks of interested English-speaking observers abroad.

The first occupants of Cairo's Tahrir Square shared many of the hopes and aspirations of their counterparts in Tunis. They were a community of like-minded individuals, underemployed, educated, eager for change but not committed to religious fervor or a



specific political ideology. They found solidarity through social media, and then used their mobile phones to call their social networks into the street. In a surprise to both government analysts and outsiders, a large network of relatively liberal, middle class, peaceful citizens quickly mobilize against Mubarak. The traditional Islamists, opposition parties, and union organizations were in the square too, but liberal and civil society voices dominated the digital conversation about events. News and speeches from Mubarak, President Barack Obama, and regional leaders were streamed live to mobile phones and laptops in the square.

Mubarak tried to disconnect his citizens from the global information infrastructure in the last week of January. It was a desperate move and it failed. A small group of tech-savvy students and civil society leaders stayed connected by organizing satellite phones and dialup connections to Israel and Europe. There is also evidence to suggest that some of the people Mubarak relied on to shut down telecommunications systems deliberately acted slowly to choke off Internet access. The first large Internet service provider was asked to shut down on Friday, January 28, but engineers didn't act until Saturday. Other providers responded quickly but returned to normal service on Monday. The amount of bandwidth going into Egypt did drop for four days, but it was not the information blackout Mubarak had ordered.

What's more, taking down pieces of the nation's information infrastructure

crippled government agencies. The people most affected were middle-class Egyptians, who were cut off from Internet service at home. Some people apparently stayed there, isolated and uncertain about the status of their friends and family. But in the absence of information about the crisis, others took to the streets. Mubarak's move to shut off the protestors may have bolstered their ranks as people filled the streets to find out what was happening.

A few days later, the Egyptian security services began using Facebook and Twitter as a source of information for a counter-insurgency strategy. They used social media alerts to anticipate the movements of individual activists. They arrested Ghonim once his Facebook group topped 300,000 people. But by then, the revolution was well underway.

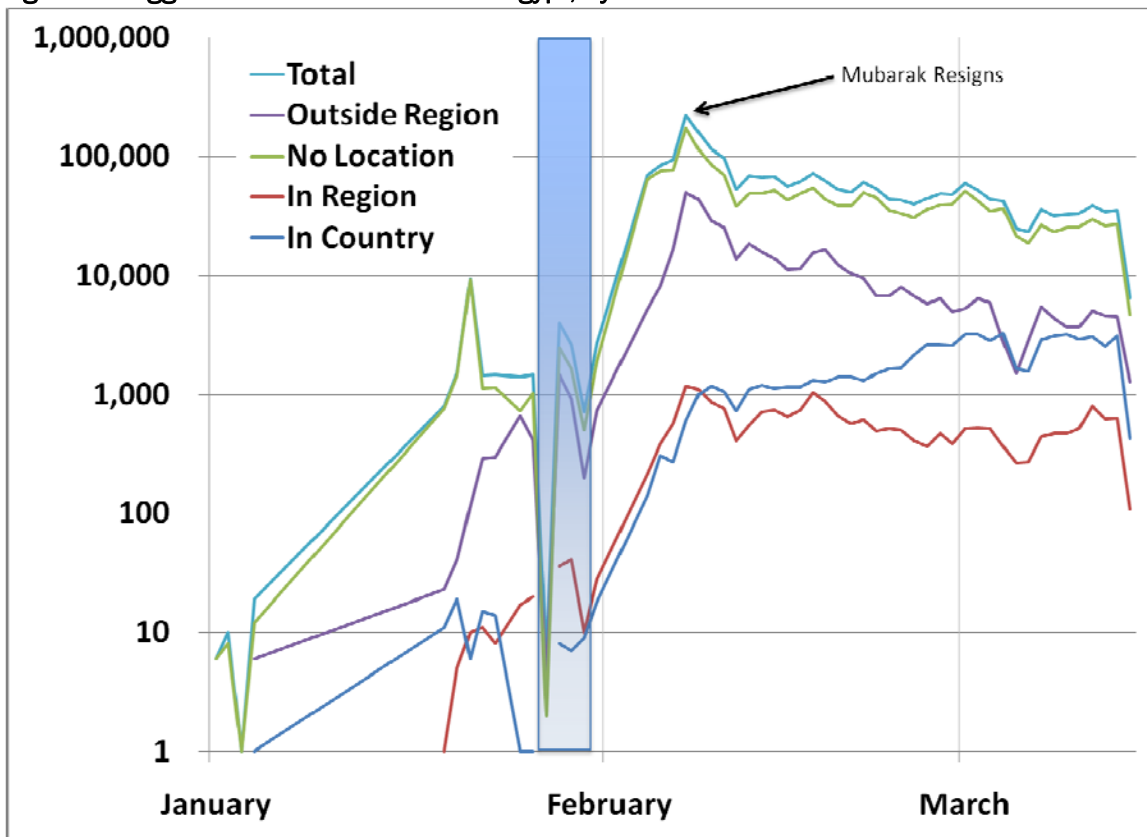
Events in Egypt not only helped to spark protest movements in neighboring countries, they also seeded a global conversation about the politics of freedom. Twitter was used to draw the international community into Egyptian events. Real-time conversations about protester turnout, regime response, and Mubarak's political options did not just occur between Egyptians. Figure 4 tracks the active number of Twitter users contributing to the primary hashtag associated with the freedom movement in Egypt—#egypt.

We find that as domestic and international pressure for Mubarak to resign was building, there was an interesting shift in the geolocation data of people Tweeting about political change in Egypt. Two weeks prior to his





Figure 4: Logged Number of Tweets on #egypt, by Location



Notes: “Outside Region” refers to Twitter profiles that had locations outside both the country and the region, and “No Location” refers to profiles that either had no location data or have been deleted or suspended since archiving began. The blue bar indicates the period in which journalists began reporting that protests had reached the level of “thousands” of participants.

resignation, we find that 34 percent of the Tweets on the topic of political change in Egypt were coming from people who self-identified as being outside the region entirely. But as public engagement with political protest grew in the week prior to his resignation, the relative contribution of outsiders dwindled to just 12 percent. In other words, the vast majority of Tweets were coming from people who were either in country, in the region, or had refused to give their location

information (a common strategy for political protesters).

The regime’s interference with digital networks interrupted online traffic on some days. Yet in-country Twitter traffic peaked on the day street protests reached into the thousands and then peaked again during the last days of Mubarak’s hold on power. Over time the number of Egyptians in Egypt Tweeting about politics surpassed the number Tweeting from elsewhere in the region.

**Table 1: Online Structure of Egyptian Political Parties, Before and After Revolution**

| Political Party, URL                              | Before Revolution |                       |             | After Revolution |                       |             |
|---|-------------------|-----------------------|-------------|------------------|-----------------------|-------------|
|   | Pages             | Unique External Links | Volume (MB) | Pages            | Unique External Links | Volume (MB) |
| April 6 Youth Movement, 6april.org                | ..                | ..                    | ..          | 378              | 8                     | 48          |
| Communist Party of Egypt*, cpegypt.tk             | 1,297             | 248                   | 62          | 3,379            | 9                     | 190         |
| Egyptian Greens, egyptiangreens.com               | 441               | 2                     | 16          | 527              | 2                     | 17          |
| Kefaya Movement*, harakamasria.org                | 4,372             | 90                    | 24          | 4,522            | 78                    | 25          |
| National Association for Change*, taghyeer.net    | 1,983             | 2                     | 35          | ..               | ..                    | ..          |
| National Democratic Party, ndp.org.eg             | 1,343             | 11                    | 43          | ..               | ..                    | ..          |
| New Wafd Party, alwafdparty.org                   | 78                | ..                    | 9           | 2,015            | 11                    | 165         |
| Progressive National Unionist Party, al-ahaly.com | 1,583             | 12                    | 22          | 323              | 7                     | 7           |
| Socialist Labour Party, el3amal.net               | 304               | 7                     | 2           | 615              | 6                     | 4           |
| Muslim Brotherhood (Arabic)*, ikhwanonline.com    | 6,123             | 66                    | 137         | 7,948            | 67                    | 459         |
| Muslim Brotherhood (English)*, ikhwanweb.com      | 4,372             | 896                   | 196         | 4,579            | 739                   | 386         |

Note: Groups marked with an asterisk (\*) were illegal political parties until recently.

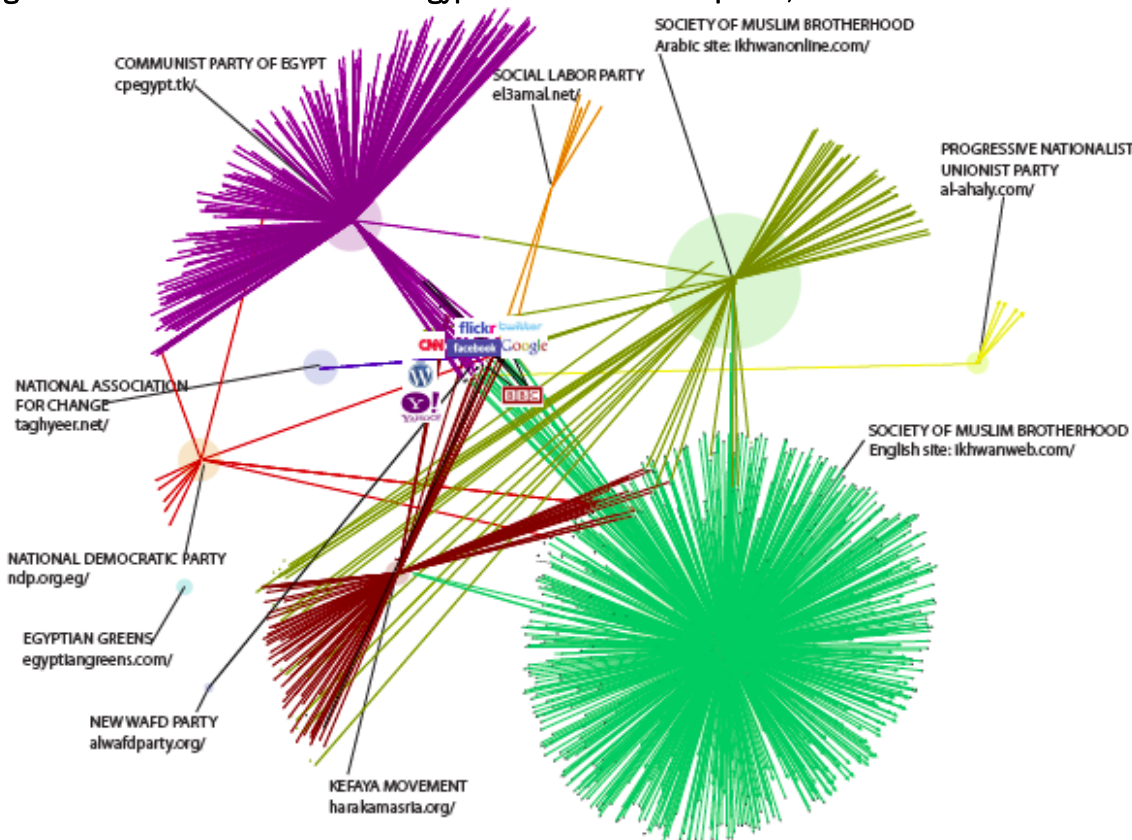
## Social Media's Centrality to Political Conversation

Between November 2010 and May 2011, the amount of content produced online by major Egyptian political actors increased significantly as they reacted to events on the street and adjusted strategy to compete for the affinities of newly freed Egyptian voters. Some observers have been skeptical of social media's relevance to the evolution of political conversations in Egypt. But we find that in Egypt, Facebook and Western news media are central to online political discourse. We mapped the digital space in Egypt twice, once in November 2010 and a second time in May 2011. What we found was that Egypt's major political actors often linked to social networking and news services. In fact, major Egyptian political Websites were far more likely to link to Facebook or Western media like CNN than they were to each other. For Egyptians, Facebook and other social

media are not simply sites used for entertainment or managing their personal lives. These social media are where Egyptians go to do politics. Political parties have learned this over the past few months, and are working hard to put new content online and connect with potential supporters — some of whom may be voters in upcoming elections.

In November 2010, the Websites of major political actors had more links to Facebook and other Western media than they had to each other. Over 20 percent of the 928 links going out of Egyptian party Websites were to social media such as Facebook, YouTube, and Twitter, and to blogging tools or Western news Websites such as the BBC or CNN. By May 2011, however, this had dropped to 15 percent of 1,332 outgoing links. Table 1 highlights the number of pages, unique external links, and overall size of the Websites of major political groups in Egypt, both

Figure 5: Structure and Content of Egypt's Online Political Sphere, November 2010



Note: See Appendix for technical details.

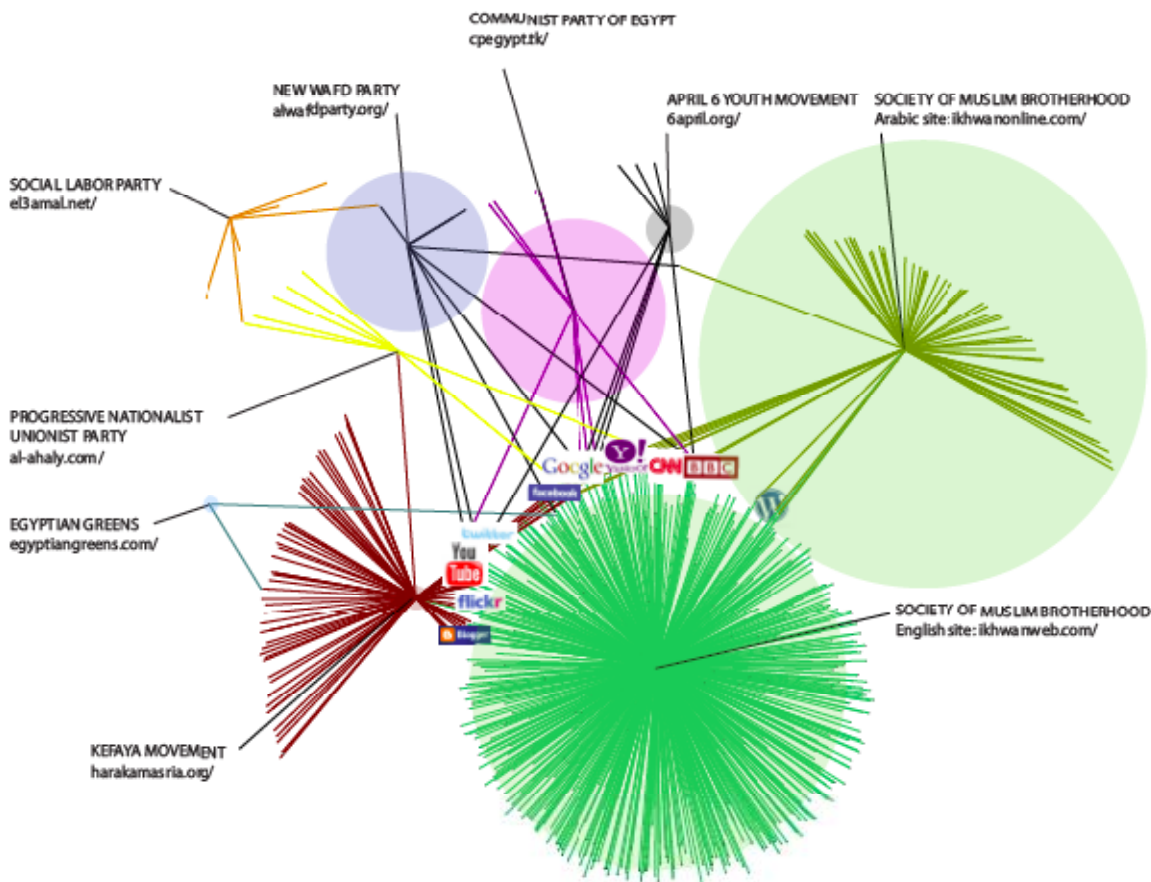
before the revolution and after. Groups that were unlicensed by Mubarak's government are indicated with an asterisk (\*). Both the number of pages and the volume (in megabytes) are good indicators of the overall size of the Website, though the first may be a good measure of text content and the second a measure of multimedia content. The number of unique external links is a good indicator of how much a political party connects its ideas and content to larger political conversations.

The network structure of Egypt's online political parties and pressure groups, along with the unique external Websites

originating from a group's homepage, is mapped in Figures 5 and 6. The shaded circle around a group's origin node represents the volume of pages within that site (the diameter of each circle directly represents the amount of content, in megabytes, that each site hosts). Comparing the ratio of unique external pages to a site's volume indicates how much any given site is relying on external and self-produced content. In the network map of Egypt's online political sphere, each dot represents an external link originating from the political parties' Websites. When two dots connect, it is a site that two parties linked to and any links



Figure 6: Structure and Content of Egypt’s Online Political Sphere, May 2011



Note: See Appendix for technical details.

position political parties closer together based on the program’s algorithm. We can see the clear arrangement around blogs and state-run media sites.

In May 2011, Western social media and news outlets are still at the center of the online Egyptian political network. The majority of common links between Egypt’s political parties are commercial, Western sites. Most central, we see: Facebook, Google, YouTube, CNN, Yahoo!, Blogger, BBC, Flickr, Twitter and Wordpress. Notably, none of the Websites crawled in November 2010

linked to al Jazeera, and there were only six outgoing links to al Jazeera when the crawl was repeated in May 2011.

The results of the May 2011 network generation show that the same Western media are still present, but are now oriented along the periphery of the Muslim Brotherhood’s Websites. And while links to Western media are found on many Egyptian sites, the Muslim Brotherhood provides a surprising amount of new content in both its Arabic and English language sites. In terms of pages, the Arabic version grew



by almost 60 percent, and in terms of size it more than tripled. Considering how large the Muslim Brotherhood's Arabic language Website is, it is interesting to note how relatively few links it makes to outside news sources or content from other political actors.

The National Democratic Party's Website [ndp.org.eg] is no longer in service. The last publicly available versions of the site were cached in Google's search engine on February 26, 2011. There is no redirect, so it appears that the host servers have been taken offline. The April 6 Movement, which had a central role in the uprising, barely existed as a standalone URL in November 2010 because most of its content was not on its own Website but almost exclusively on social networking platforms like Facebook and Twitter. The National Association for Change and the National Democratic Party ceased to exist after the uprising.

### **The Muslim Brotherhood's Changing Online Content**

Even today, Facebook remains one of the most central nodes in Egyptian networks of political information. In November 2010, before the political uprising, the Websites of major political actors had more links to Facebook and other Western media than they had to each other. By May 2011, Facebook was still central, but with Mubarak's departure, the volume of digital content produced by the Muslim Brotherhood has come to dominate these networks.

The most significant change in how political parties operate online involves

two of the Websites of the Muslim Brotherhood. In November 2010 these two Websites had 10,495 pages, with 962 outgoing links and 333 megabytes of content. By May 2011 this had evolved to 12,527 pages, 806 links and 845 megabytes of content. In other words, the number of Web pages had grown by 19 percent, the number of outgoing links had diminished by 16 percent, and the volume of content had grown by 154 percent.

The Muslim Brotherhood presence on English and Arabic Websites was dominant in Egypt's online political sphere before the November elections began and has grown significantly since then, particularly with respect to content. The Brotherhood's English site links to much more external content than its Arabic site, but it is a smaller site in terms of hosted content. This may indicate that when seeking to inform their English-speaking audience, the Muslim Brotherhood provides more links to external content to build legitimacy. This may also indicate that there is more English content than Arabic content available to link to. The Arabic version of the site has fewer external links (90 percent fewer) and more hosted content (159 percent more) than the English version.

The Muslim Brotherhood is actively developing its own social media sphere, with ikhwantube.com and ikhwanbook and ikhwanwikitube.com — Websites that offer much of the functionality of Western namesakes like YouTube and Facebook. As regional experts might expect, the Muslim Brotherhood and Communist Party of Egypt share a number of links to the same kinds of

content. Both parties were the major opponents to Mubarak's ruling National Democratic Party. Since the November 2010 elections, both parties have increased the amount of content they have online.

### **Viral Videos Spread the Freedom Meme**

YouTube became a particularly important tool for spreading news and information of Egypt's uprising—in the form of user-generated videos — around the world. Our research identifies the top viral videos as of June 2011 (see Appendix for basic statistics ). While it is difficult to measure the precise impact of these videos on audiences, some images of suffering certainly would have spurred protests and heightened moral outrage.

The first significant Egyptian video went viral on January 25, 2011. The video depicts thousands of protesters converging on Tahrir Square. The images are captured by an amateur cameraman looking out of a building near the main road. Based on the metadata reported on the uploader's YouTube account, the video was distributed by an account registered as located in the United States. Since then, this video has accumulated more than 600,000 views. Based on tracking of the embed code, it is most likely that the video received popular attention after being posted on AllMania.com, a sports commentary site that has experienced a 600 percent increase in traffic in January 2011.

RussiaToday's YouTube channel contributed 5 of the top-20 viral videos,

totaling 1,200,000 cumulative views. These videos were from citizen journalists and included live footage rebroadcasted through the news agency's outlets. Al Jazeera English's YouTube channel similarly contributed three videos, totaling more than 300,000 views. Reuters's YouTube channel contributed one video totaling more than 200,000 views.

There were four major types of content that typified Egyptian viral videos: raw protest and mobilization footage; citizen commentary; political punditry; and "soundtracks for the revolution." Raw protest and mobilization footage was the most common, totaling nearly 5.5 million views from 23 videos. One video featured a detailed 20-minute dialogue between a religious scholar and political philosopher about the future of Egypt, totaling 100,000 views. Another featured a home-made video with a young girl's commentary about political events, totaling 275,000 views. But the most popular video, a music video, was heralded as a soundtrack to the revolution and served as a rallying cry of support for the Egyptian peoples' protests. This music video was the single most popular viral video for the Egyptian revolution, uploaded on January 27, and accounted for 25 percent of the top-20 video views. A list of the most prominent viral videos about the political uprising in Egypt appears in the Appendix.



## Conclusions

Social media played a crucial role in the political uprising in Tunisia and Egypt. Using original data from multiple social media sources, we can offer some concrete conclusions about what that role was. First, social media played a central role in shaping political debates in the Arab spring. Second, a spike in online revolutionary conversations often preceded major events on the ground. Third, social media helped spread democratic ideas across international borders.

Democratization movements existed in North Africa and the Middle East long before technologies such as mobile phones, the Internet, and social media came to the region. However, with these technologies people who share an interest in democracy learned to build extensive networks, create social capital, and organize political action. In both Tunisia and Egypt, these virtual networks materialized in the streets in early 2011 to help bring down two long-standing dictators.

Anecdotally, we know that social media played an important role at key moments in the events of this year. But what are the big-picture trends in social media use that explain why public demand for democratic reform rose now, and why events unfolded the way they did? Our unique datasets reveal much about the role of different kinds of social media. The Tunisian blogosphere provided space for open political dialogue about regime corruption and the potential for political change. Twitter relayed stories of successful

mobilization within and between countries. Facebook functioned as a central node in networks of political discontent in Egypt. During the protests, YouTube and other video archiving centers allowed citizen journalists, using mobile phone cameras and consumer electronics, to broadcast stories that the mainstream media could not or did not want to cover.

Social media alone did not cause political upheaval in North Africa. But information technologies — including mobile phones and the Internet — altered the capacity of citizens and civil society actors to affect domestic politics. Social media, such as Facebook, Twitter, and YouTube, have several kinds of impact on local systems of political communication. First, social media provides new opportunities and new tools for social movements to respond to conditions in their countries. It is clear that the ability to produce and consume political content, independent of social elites, is important because the public sense of shared grievances and potential for change can develop rapidly. Second, social media fosters transnational links between individuals and groups. This means that network ties form between international and local democratization movements, and that compelling stories, told in short text messages or long video documentaries, circulate around the region. The inspiration of success in Tunisia was not just a fast-spreading contagion, for civil society leaders in neighboring countries also learned effective strategies of successful movement organizing through social media.

Social movements are traditionally defined as collective challenges, based on shared purposes, social solidarity, and sustained interactions with elites, opponents and authorities. They support a public claim against target authorities and engage in political action by forming coalitions, organizing public meetings and demonstrations, and using the media to highlight their claims. Through such demonstrations and media use, social movements display their unity, numbers and commitment. Social media, social networking applications, and consumer electronics have not changed the purpose of social movement organizing — economic opportunity and political voice are still the shared goals of social movements.

But in North Africa and the Middle East, relatively new youth movements have been surprised by the speed, size and success of protests they have organized over social networking Websites. Over several years they have found their political voice online and have held their meetings virtually. Each of the dictators in these countries has long had many political enemies, but they were a fragmented group of opponents. Now these opponents do more than use broadcast media to highlight their claims. They use social media to identify goals, build solidarity, and organize demonstrations. During the Arab Spring, individuals demonstrated their desire for freedom through social media, and social media became a critical part of the toolkit used to achieve that freedom.



## Methods Appendix

### Analyzing Twitter Data

The data for Figures 1, 3 and 5, comes from the analysis of Twitter feeds. This project is among the first to analyze the flow of text messages about the potential and strategy of democratization movements among multiple countries. In addition, we figured out how to distinguish between domestic, regional, and international contributors to the growing online consciousness about political crisis. Demonstrating Twitter's impact on regional conversations is an important contribution but was technically challenging. We processed more than 3 million tweets for their use of hashtags about events in North Africa and the Middle East. We purchased cloud computing time from Amazon to speed up the text analysis, and wrote automated scripts for identifying the relevant tweets. A significant number of the tweets provide longitude and latitude information, and that information was automatically converted into country location. Finally, we hired a translator to help with texts and location information that is in Arabic, French, Hebrew and Turkish.

This dataset was created using the Twitter archiving service TwapperKeeper (<http://twapperkeeper.com/>) to capture the flow of tweets from the Twitter Search API for Algeria, Egypt, Tunisia, Morocco and Yemen. The hashtags analyzed, in order, were “#algeria”, “#egypt”, “#feb14”, “#morocco”, “#sidibouid” and “#yemen.” Since these archives were initiated by different users at different times, they

do not all cover the same time period. The earliest, #sidibouid, begins on January 14, 2011, and the last tweets (in multiple hashtags) occur on March 24, 2011. TwapperKeeper experienced system overloading at several times during this duration, resulting in coverage gaps within some of the archives. But even for archives with no gaps, it is highly unlikely that TwapperKeeper's archive captured all relevant tweets due to limitations imposed by Twitter. All six archives combined contain a total of 3,142,621 tweets, some of which undoubtedly overlap because each tweet could contain multiple hashtags. Over 75 percent of these (2,363,139) are from #egypt. This method omits some unknown number of in-region tweeters due to blank location fields, deleted accounts, and uninterpretable information in the fields.

Twitter changed its terms of service on March 20, 2011, to disallow public sharing of tweets. The archives analyzed in this report were queued for downloading from TwapperKeeper on March 19, 2011, but due to the backlog of similar requests from other users, the downloads did not become available until several days later (which is why some of them include tweets added after March 20). The archive dates for specific hashtags vary, and the earliest data points come from #egypt on January 5, 2011. All tracking ends March 20, 2011 due to Twitter's terms of service change. TwapperKeeper, the service used to track hashtags, was crippled (See [http://www.readwriteweb.com/archives/how\\_recent\\_changes\\_to\\_titters\\_terms\\_of\\_service\\_mi.php](http://www.readwriteweb.com/archives/how_recent_changes_to_titters_terms_of_service_mi.php))

The hashtag archives included a wide array of metadata along with each tweet, including the author's name, the GMT time it was posted, and the application used to send it, among other information. However, authors' self-reported location field was not included. To gather this, a list of unique users from each hashtag was created via a custom PHP script. Each list was then used as an input into a second PHP script which automatically saved each user's location field from the Twitter REST API. Due to restrictions on the number of requests that can be sent to Twitter's REST API per hour, the user locations had to be collected one archive at a time. Location collection for the largest hashtags took longer than a day, with the exact amount of time depending on the number of unique users that contributed to it. Ultimately, between 25 percent and 40 percent of the unique users in each archive lacked any location data. Reasons for this included simply leaving the field blank, deleting one's account, or having it suspended due to misuse.

Once this script had finished collecting the location fields for all unique users from each hashtag archive, each data file was subjected to a word filter that attempted to automatically classify each user-provided location into one of four categories: (1) within the hashtag country; (2) within the broader Arabic region; (3) outside both the country and the Arabic region; and (4) no provided location. The first two filters consisted of a simple string-matching search pattern that sought the English name of each country along with the names of the top five cities by population in each country. The sole exception to this was for

countries with less than 5 percent Internet penetration, for which only the capital city was used in addition to the country name. Because many user-provided locations came in the form of latitude-longitude coordinates or were written in other languages, we decided to convert these into English before applying the filter. Google's reverse geocoding service was used for the former and Google Translate was used for locations written in Arabic script. Manually reading the translated locations, we were able to identify additional city names within the Arabic region that recurred often, so we added these to the word filter.

The above procedure resulted in a dataset for each archive that consisted of each unique username and its category ID as determined by the word filter. To combine the category IDs with the full tweet data, each pair of archive files (consisting of one full tweet set and one list of unique names and category IDs) was loaded into a MySQL database hosted on a virtual Linux computer hosted by Amazon's commercial cloud. Custom SQL queries were used to automatically graft each unique user's location to each appearance of that user within the archive. Another SQL query tallied the number of tweets in each full archive classified as coming from a user in the hashtag country, in the broader Arabic region, outside of the country and region, and with no location. These summaries were aggregated by date and used to create time-series charts showing the posting dynamics of each location category.

## Analyzing the Tunisian Blogosphere

The data for Figure 2 comes from our analysis of the Tunisian blogosphere. This dataset was created using the eCairn Conversation archiving and analysis service. The tool was used to capture the flow of information through blog posts from RSS feeds for Tunisia's key blogs. The captured data-streams begin on November 20, 2011, and end on May 15, 2011. A total of 475 key Tunisian blogs contributed a total of 26,000 posts during this period. A number of languages are represented in the Tunisian blogosphere, including: Arabic, French, and English. We were able to analyze blog centrality through eCairn Conversation, and 17 of 475 blogs were identified as the main information gateways for the Tunisian blogosphere. In order of centrality, they are: Tunisie Blogs; Wallada; Extravaganza; Tn-Bloggers; Boukornine; [كاليمازو مدونة](#); Venus et Moi; [Barbach](#); Tuniblogs; Notes; Carpe Diem; L'universe de Narwas; [ميادين](#); Desenchantee; [بيبرسا ولد](#); Mon Massir; and Blogger. These 17 blogs (3.6 percent of the Tunisian national blogosphere) were linked to the remaining sphere of 475 blogs, of which 76 (16 percent) were located in a medium level of network centrality, 262 (55.1 percent) were in low network centrality; and 120 (25.2 percent) were network outliers and did not link to or share much dialogue with the rest of the Tunisian blogosphere.

Almost all of the 17 core blogs in the Tunisian blogosphere have been hosted within Tunisia. According to IP addresses, the cities of Tunis and al-

Hammah have had the most prominent bloggers. The most central blogs in Tunis were El Fan, Tuniscope, and Tekino (all had medium network centrality in the larger Tunisian blogosphere). The most central blogs in al-Hammah were Tunisie Blogs, Tn-Bloggers, and Barbach (all had high network centrality in the larger Tunisian blogosphere). Interestingly, al-Hammah was a more critical location for the Tunisian blogosphere than Tunis. In addition, there have been several prominent Tunisian blogs maintained by people in the Tunisian diaspora. For example, the blogs Stupeur, Houblog, Arabasta, and Chroniques Absurdes were located in Montreal or Paris, belonged mostly to Tunisian expatriates, and were key mid-level blogs in the Tunisian national blogosphere.

The keywords identified for the analysis were determined using eCairn's conversation analyzer. The application used text search and identification algorithms to assess word frequencies and proximate phrases. This allowed us to specify Ben Ali, Bouazizi, Economie, Islam, Revolution, and Liberty, as important conversation items in the Tunisian national blogosphere. After identifying important keywords, we reverse-analyzed their presence through time-series analysis. By sub-selecting the portions of the blogosphere which frequently mentioned different key words, we were able to investigate their particular network-structures. For example, the keywords appearing less frequently (e.g., Islam) had less network heterogeneity and were composed of less and mostly low-influence blogs. In contrast, blogs mentioning popular keywords (e.g., Revolution) had more

network heterogeneity, were composed of larger, more diverse, and more high-level influence blogs driving those conversations. Put more simply, the networks of blogs within the Tunisian national blogosphere that were more diverse, cross-linked with others, and were key information gates, were able to drive different topics of conversation more successfully than smaller and more homogeneous blog networks.

### **Analyzing the Structure of the Egyptian Political Web**

A comprehensive list of Egypt's political party and political pressure group data was built using both the Central Intelligence Agency's World Factbook, Wikipedia, and some specialized Egyptian political blogs anticipating that this combination of "official" and "unofficial" data could bring major and minor, new and established parties to the list. Several search engines and media databases were consulted to confirm the URLs for parties that had Websites.

In the pre-uprising data set, a total of 1,332 external links were found across 10 active Websites, of which 1,225 were unique and 102 were linked to by more than one site. In the post-Mubarak data set, a total of 927 external links were found across 9 active Websites, of which, 828 were unique and 99 were linked to by more than one site. We searched for party Websites in Arabic, in

English transliterations of Arabic party names, and for the official English names of parties.

To analyze the structure, Web Data Extractor crawled each political party's URLs and extracted all external-facing URLs on the entire directory. All links from the first data set were collected by Web Data Extractor from November 11-13, 2010 and all links from the second data set were collected between May 3-6, 2011. An XML based add-in for Microsoft Excel 2007 called NodeXL, developed by a team funded by Microsoft Research, was used to create network maps with the data like that pulled from Web Data Extractor. NodeXL generated the Network Linkage Map between Political Parties in Egypt in Figures 5 and 6. An arrangement of nodes and clusters, the map is based on the Harel-Koren algorithm, which groups the nodes (individual sites as dots) based on common external links and distributes to avoid crossover.

### **Analyzing Viral Videos from YouTube**

Between May 16 and 20, 2011, the most prominent videos loaded into YouTube with the keyword "Egypt" were hand coded for author, viewing, and creation date information. The most viral videos on YouTube are identified in Table 2, ordered by number of views and then date of uploading.

**Table 2: Viral Video Content From Egyptians, By Upload Date and Number of Viewers**

| Title  | Channel                          | Views     | Date      |
|--|----------------------------------|-----------|-----------|
| Protest in Egypt - Jan 25, 2011  | <a href="#">lukasjakubicka</a>   | 676,701   | 25-Jan-11 |
| Day of anger in Egypt  | <a href="#">ReutersVideo</a>     | 217,518   | 25-Jan-11 |
| Egypt's Protests Day of Anger Riots 25 Jan 2011  | <a href="#">AusNetwork</a>       | 110,162   | 25-Jan-11 |
| Demonstrations Rare Raw Footage  |                                  |           |           |
| The Most AMAZING video on the Internet #Egypt #jan25                                     | <a href="#">hadi15</a>           | 2,127,384 | 27-Jan-11 |
| Man Shot in Egypt  | <a href="#">NeroAlex1988</a>     | 154,823   | 27-Jan-11 |
| Egypt Unrest: Video of police killing teen protester, riots aftermath                    | RussiaToday                      | 397,099   | 28-Jan-11 |
| 28th Jan. 2011 - Storyful - Egypt Cairo uprising protest video - Mohamed Ibrahim Elmasry | <a href="#">storyful</a>         | 285,628   | 28-Jan-11 |
| Demanding change in Egypt  | <a href="#">AlJazeeraEnglish</a> | 111,908   | 28-Jan-11 |
| Egyptians renew protests after curfew  | <a href="#">AlJazeeraEnglish</a> | 106,191   | 28-Jan-11 |
| Juju's message to Mubarak  | <a href="#">oneholysinner</a>    | 275,302   | 29-Jan-11 |
| Video of Egypt's bloody clashes as protesters defy curfew in Cairo                       | RussiaToday                      | 204,736   | 30-Jan-11 |
| Video of fighter jets & choppers over Cairo as military tries to take control            | RussiaToday                      | 167,422   | 30-Jan-11 |
| Egyptian Revolution 2011 COMPLETE. World MUST MUST watch this. Freedom for All!          | <a href="#">eyeinsidefilm</a>    | 484,043   | 1-Feb-11  |
| 'March of Millions' in Cairo as Egypt riots death toll reaches 300                       | RussiaToday                      | 123,965   | 1-Feb-11  |
| Video of fierce Egypt clashes as pro-govt crowds attack anti-Mubarak protesters          | RussiaToday                      | 322,708   | 2-Feb-11  |
| Fourth Horseman (death) Egyptian riots. Full Original Video                              | <a href="#">PunkersTV</a>        | 1,551,796 | 3-Feb-11  |
| The fourth horseman (of Death) at the Egypt protests                                     | <a href="#">FooledToaster</a>    | 150,532   | 3-Feb-11  |
| Hosni Mubarak, a citizen of the people of Egypt at the end of wisdom                     | <a href="#">shaghelhom</a>       | 139,526   | 4-Feb-11  |
| Riz Khan - Tariq Ramadan and Slavoj Zizek on the future of Egyptian politics             | <a href="#">AlJazeeraEnglish</a> | 107,769   | 4-Feb-11  |
| US Intervention: Pentagon sends warships to Egypt  | <a href="#">otraverdad1</a>      | 281,201   | 7-Feb-11  |



## About the Project

The Project on Information Technology and Political Islam ([www.pITPI.org](http://www.pITPI.org)) at the University of Washington's Department of Communication investigates the politics of information infrastructures in Muslim societies, and the civic and political uses of digital media in the Muslim world. The Project is funded by the National Science Foundation under awards IIS-0713074 and IIS-1144286, the GWB Institute supported research for this study, and the Education Program of Amazon Web Services contributed cloud computing services. Any opinions, findings and conclusions or recommendations expressed in this material are those of the authors, and do not necessarily reflect the views of the National Science Foundation.



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