**DIGITAL ACCESS, POLITICAL NETWORKS AND THE DIFFUSION OF DEMOCRACY**

*Completed Research Paper*

**Lauren Rhue**  
Doctoral Candidate  
New York University  
44 West 4th Street, New York, NY 10012  
lrhue@stern.nyu.edu

**Arun Sundararajan**  
Associate Professor and  
NEC Faculty Fellow  
New York University  
44 West 4th Street, New York, NY 10012  
arun@stern.nyu.edu

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**Abstract**

We examine the effects of digital access on the prevalence of democracy and its diffusion via trade, geographical and migration networks across 189 countries between 2000 and 2010. We find that changes in civil liberties due to digital access can be mediated by both media freedom and internal political institutions, and that different digital technologies may have varying impacts while affecting diffusion via different political networks. Our analysis suggests three key mechanisms linking information technology with democratic change and highlights the importance of a country’s “susceptibility” to political influence that is triggered by greater digitally-induced visibility.

**Keywords:** Democracy, Internet, Social media, Selection, Influence, Dynamic Panel
Overview and Motivation

On January 14th, 2011, President Zine El Abidine Ben Ali stepped down as the president of Tunisia, reacting to a localized series of protests that had begun in the central Tunisian town of Sidi Bouzid four weeks earlier. Over the next ten days, thousands of people in neighboring Egypt demonstrated for the resignation of their president Hosni Mubarak, an Egyptian Facebook page was set up to coordinate protests in Cairo, and there were widespread revolutionary activity in other regional countries including Yemen and Algeria. These protests soon fanned out across the region, and by early February, 11, 2000 Syrians had joined a Facebook page called The Syrian Revolution, over 20,000 Yemenese had participated in “A Day of Rage” in their capital, citizens of Jordan, Morocco and Oman were participating in rallies, and the government of nearby Kuwait had made key interior government changes towards pre-empting demonstrations. The short-term culmination of these events was the series of protests at Tahrir Square and the resignation of Hosni Mubarak on February 11th, 2011, which in turn spawned a civil war in Libya and continued intensive political unrest in Yemen.

The extent to which these revolutions have led to sustained political change has been mixed. However, regional diffusion of this kind is not unprecedented. Many writers have drawn a parallel between this recent “Jasmine Revolution” or “Arab Spring” and the Spring of Nations of 1848, which began in Sicily in January, was first noticed in France in February, then spread through much of Europe (and parts of Latin America) over the year (Evans and Strandmann, 2000). One theme of the ex-post analysis of the 2011 events in Northern Africa has been a focus on the role that information technologies and social media may or may not have played in diffusing and sustaining the revolution. While concurrent press coverage frequently emphasized the role of the Internet, even going so far as to label these “Twitter Revolutions” or “Facebook Revolutions”, more substantive analyses appear more cautious in ascribing any causal role to social media technologies, highlighting, however, two differing aspects of information technologies – providing access to information and providing a means for coordination – that could account for their catalyzing effect on democratic change. For example, writing for Foreign Affairs in January 2011, Clay Shirky notes that:

“The safest characterization of recent quantitative attempts to answer the question, Do digital tools enhance democracy? is that these tools probably do not hurt in the short run and might help in the long run -- and that they have the most dramatic effects in states where a public sphere already constrains the actions of the government. Despite this mixed record, social media have become coordinating tools for nearly all of the world's political movements, just as most of the world's authoritarian governments (and, alarmingly, an increasing number of democratic ones) are trying to limit access to it.” (Shirky, 2011)

Adopting a more neutral position, Fareed Zakaria summarizes his view about how information technologies might affect democratization:

“It's too simple to say that what happened in Tunisia and Egypt happened because of Facebook. But technology — satellite television, computers, mobile phones and the Internet — has played a powerful role in informing, educating and connecting people in the region. Such advances empower individuals and disempower the state. In the old days, information technology favored those in power, because it was one-to-many. That's why revolutionaries tried to take over radio stations in the 1930s — so they could broadcast information to the masses. Today's technologies are all many to many, networks in which everyone is connected but no one is in control. That's bad for anyone trying to suppress information.” (Zakaria, 2011)

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1 These revolutions were largely suppressed by the end of the year and it is generally believed that they did not lead to a great deal of reform beyond the abolition of serfdom in Austria and Hungary.
2 This is not the first new technology has been connected to the diffusion of revolution; there is also conjecture that while the information transparency facilitated by the emergence of newspapers played a role in sustaining the 1848 Spring of Nations revolution within each country (Zakaria, 2011), there were no technologies for coordinating revolutionary activity across the neighboring countries (Evans and Strandmann, 2000).
It is indeed still too early to assess whether the revolutions in Northern Africa will lead to longer-run political reform, or whether information technologies will play a pivotal role in sustaining either the activism or any subsequent democratic change. Nevertheless, these events frame the broader question we investigate in this paper: Is access to digital technologies related to the emergence of democracy within a country and the diffusion of democracy across countries? Our belief is that the effects that digital technologies may have on democracy and freedom can be more far-reaching than the effect social media might or might not have on fostering revolution. The question we pose is thus broader in its scope and timeframe than one that asks, say, whether social media technologies foster the emergence and diffusion of social or political revolutions.

The importance of our research question stems for at least two points. First, while the democratizing effects of digital access have been discussed extensively (more on this later), we believe that there is still no clear empirical evidence of these effects, nor is there any study which examines the mediating roles that political networks or existing political institutions might have on the impact of digital technologies. Further, there is also really no guarantee that the adoption of digital technologies will lead governments in a democratic direction. For example, Medina (2011) documents the attempts by Chilean President Salvador Allende to create an IBM-based computer system in the early 1970’s which would facilitate a more efficient planned economy; while this “Project CyberSyn” was only partially successful, there is some evidence that it was instrumental in thwarting a 1972 labor strike by 40,000 truck drivers in Santiago. This form of centralized control may seem less likely in today’s world of the Internet and open IP technologies; however, Lessig (2005) makes a compelling counter-argument in his discussion about the Internet and architectures of control. Ironically, the trend of digital convergence over the last decade may exacerbate the potential use of the Internet as a technology of control; as citizens of a country become more reliant on a single network for accessing textual information/news, video information, as well as for person-to-person voice and data communication, the potential for governments to exercise (anti-democratic) control through digital technologies grows.

Before providing the evidence that addresses our question empirically, we will (a) make the idea of “democracy” more precise, (b) provide a theoretical basis for the connection between “digital access” and the emergence of democracy, and (c) describe the different networks over which such diffusion, if it exists, might occur.

**Background Literature and Theoretical Basis**

Although the term “democracy” is generally associated with direct participation, political equality and popular sovereignty (O’Loughlin et al., 1998), it has a number of different conceptions. Some relate to measured outcomes which are determined in part by the form of government. Others relate to the specific form of government itself and how it is chosen. We focus on outcomes rather than the structure of government, although we control for measures of the latter. Our approach is motivated by prior arguments that suggest that to define democracy as “meaning ‘a good government’ renders it analytically useless” (Zakharia 1997). Zakharia further suggests that defining democracy merely based on how a country chooses its government may be too narrow, citing the emergence of a number of “illiberal democracies,” countries whose governments might be chosen using democratic procedures, but whose citizens lack basic liberties of speech, assembly and religion. A similar contrast is drawn by Diamond (2008) between “thick” and “thin” democracies.

In arguing against the use of definitions of democracy based on outcomes and in favor of definitions based on how the government is chosen and functions, O’Loughlin and his co-authors suggest that economic freedoms and political freedoms must be treated as distinct, and when confounding a definition of democracy with its desired outcomes, one risks losing analytical leverage. This issue notwithstanding, our objective in this paper is to study the effects of digital access on democracy itself, rather than the effect of democratic institutions on their intended outcomes. We are particularly interested in changes in civil

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3 This does not have to take the form of a complete Burma or Egypt-style Internet shutdown. Rather, control of the kind practiced by the Chinese government, wherein only specific kinds of Web-based information are available to its citizens can be equally detrimental to democracy. In a future where Internet-based news is the only available news, this form of control can be quite powerful, and since Web browsing creating the illusion of user control, even more so.

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liberties that relate to freedom of expression, the right to associate freely, and personal autonomy, since intuitively, these are most likely to be altered directly by changes in citizens’ digital access. It is possible that the path via which digital access leads to a change in civil liberties is through its impact on freedom of the media; indeed, there is a long-standing belief that a free press is an essential pre-cursor to a strong democracy (McChensky and Nichols, 2009).

There is a healthy history of discussion about the connection between digital access and democracy. For example, Faris and Etling (2008) provide an excellent and detailed analysis of the different ways in which digital access might contribute both positively and negatively to democracy. A recurring theme in many examples of digital democratization is of the technology in question playing one or both of two roles: increasing information flows and transparency, and facilitating the coordination of activities between geographically dispersed citizens. A by-product of the increased information transparency is that internal political and civil unrest becomes externally visible to other nations. The information flows and coordination enabled by digital technologies are guided by the existing network of relationships among countries and its citizenry.

The following four sub-sections provide a more detailed description of these themes. First, we examine the two roles of digital access in democratization--improving information flows and transparency and assisting in the coordination of activities. Next, we discuss how digital technologies occasion “external” visibility, and lastly, we cover the importance of inter-nation relationships in mediating the role of digital access in the diffusion of democracy.

**Information flows and transparency**

The most striking recent example of information technology’s effect on government information transparency can be found by examining the myriad documents that have been made available by Julian Assange’s WikiLeaks, a site that is feasible owing to a network of servers on the (traditional) Internet. A related kind of transparency is facilitated by the network of mobile phone users on the Usha Hidi platform, which has been instrumental in documenting information about ethnic violence in Kenya and making this information more accessible. As the cost of information acquisition and distribution continues to fall over time (Dhar and Sundararajan, 2007) and populations are increasingly connected (Bapna et al., 2011), citizens are bound to be able to create and access increasingly novel information sources of this kind, made possible by the information aggregation properties of digital media, which enable collecting and disseminating information from diverse and geographically dispersed sources, allowing individuals to acquire deeper knowledge about their government, and thus providing another means to increased transparency and accountability. Increased transparency may lead to greater accountability of the government to the citizens, but unless it also influences the internal workings of the government bodies, long-run political changes are unlikely. It is possible, however, that the Internet may also facilitate certain “good governance” practices by amplifying the transparency of existing mechanisms.

We highlight transparency because of its contrast in part with much of the current literature about the Internet’s effect on coordination and political communication, which focuses on how IT shapes processes such as campaign communication and protests. Granted, these event-driven effects from digital access are fascinating. However, there is also possibly a more gradual change induced by incremental increases in access to information and communication technologies, one that reshapes the structure and policies of the government as well as the relationship between government and citizens over time.

These information aggregation, dissemination and transparency effects of digital access also further motivate the inclusion of measures of media freedom in our analysis. A free press is a strong pre-cursor to democracy precisely because the press traditionally sets the information agenda for the country’s citizens. The media can inform citizens about government abuses as well as spur politicians into action (or inaction) through increased scrutiny on their behaviors. Digital technologies can complement this traditional role of the press: for example, the ability of bloggers to set a political agenda may also spur the media into tackling different and more controversial issues pertinent to the citizenry (McChesney and Nichols 2009). However, this discussion also highlights the double-edged sword of the impact of digital access on democracy, since, as was noted succinctly by Brin (1999), the beneficiaries of the Internet’s increased ability to record, aggregate, and distribute information on individual activities may well depend
on who is “behind the cameras”. If government leaders aggregate information on their citizens to further their ends, this may lead to a reduction in civil liberties and personal freedoms. For example, the government’s proclivity towards intrusion and oppress may lead to a reluctance of its citizenry to discuss sensitive issues online as citizens believe they are being monitored (Hill and Hughes 1999). Conversely, if the citizens aggregate information on their leaders to hold their leaders accountable, then civil liberties may increase (Faris and Etling 2008, Nissenbaum 2010). Thus, information aggregation may benefit authoritarian governments just as much as it might benefit a democratic citizenry, as governments can monitor citizens while citizens monitor the government.

### Coordination of Activities

The Internet facilitates low-cost, immediate, and interactive connections among geographical disparate citizens, which might initially suggest that universal digital access over time will herald a return to an Athenian style of democracy, with direct participation by citizens and the elimination of the need for representative government. While the political coordination effects and community visible during the events in Northern Africa in 2011 were indeed impressive collective action, they still seem far removed from this idealistic notion. However, they may reflect the more realistic future path of impact for digital technologies on democracy, since lowering the coordination costs of political organizations can have far-reaching implications. This has been particularly noticeable of late in event-driven coordination such as electoral processes and protests. For example, Goldstein (2007) documents the use of mobile phones and web-based discussion boards in fostering the Orange Revolution of 2004 in Ukraine. Faris and Etling (2008) discuss how the Burmese government shut down the Internet in their country for two weeks towards quashing the 2007 “Saffron Revolution”. In trying to mirror this strategy partially, the Egyptian government made numerous attempts to shut down protestor communications technology in 2011, blocking Twitter and mobile usage on January 25th, blocking Facebook, shutting down Blackberry and cutting network access at Tahrir Square on January 26th, and eventually shutting down all Internet services on January 27th. This reflects the emergence of a new “digital public square” -- lower communication costs enable the Internet to supplement or substitute for “built space” public square gatherings in which individuals realize their collective beliefs and opinions (Chwe 2003, Zhou et al. 2011). Put differently, social media may increase the confidence of citizens that others share their opinion, countering pluralistic ignorance while enhancing a sense of community.

The revolutions affected by this coordination capability of digital access need not be aimed at radical political change; a similar role has been conjectured for decentralized digital technology in changing the course of elections in South Korea in 2002 and the United States in 2008. Furthermore, as argued by Zhuo et al. (2011), it seems important to look beyond the explicit effects that social media may or may not have on events like the resignation of Mubarak; implicit effects like fostering “networked individualism” may actually have a greater effect on longer-run and more permanent democratic change.

Digital access may also shape political processes by altering the ease and model of communication between a country’s citizens. Early research on this point indicates, for instance, that a nation’s position in the international communications network can be predictive of its level of democracy (Sun and Barnett, 1994). The Internet also facilitates many-to-many dialogue, a shift from the one-to-many paradigm of broadcast media (Weare 2002). Telephone communication, whether mobile or fixed, provides one-to-one communication that facilitates deepening of existing relationships. In addition, for a vast majority of the industrializing world, the mobile Internet will be the only Internet, and mobile ‘phone adoption is a precursor to broader digital access.

However, capturing these effects empirically can be challenging. Communication technologies are known to exhibit network effects, so the marginal effect of Internet-based and mobile telephones on political processes may not be constant; after a certain level of adoption by the citizenry, the interactive media increases its attractiveness and the effect of the internet may be amplified. (Markus 1987). The latter point partially motivates our use of both continuous measures of access and a binary threshold model. Further, the effect of communication technologies on the political processes may be quite heterogeneous because the technologies’ designs may embed certain values and politics into their use (Nissenbaum 1998, Winner 1980).
Digital technologies and “external” visibility
Coordinating superior political organization and increasing easily accessible information both clearly have the potential to reshape the relationship between a government and its citizens. However, what may be a key (and perhaps overlooked) aspect of importance is that both social media and information technologies provide externally visible platforms for citizens to air their grievances, advance their agenda, coordinate political activities and garner support. For example, communication technologies may increase scrutiny of the pre-existing practice of public disclosure from government officials (Faris and Etling, 2008). More importantly, the information distributed online about government oppression may amplify the effects of existing channels for international pressure towards freedom; foreign media coverage and international sanctions being two common sources of such pressure. In nations with human rights violations, the ability to disseminate pictures and real-time stories has a powerful ability to constrain official misconduct and empower individual citizens. Thus, the lowered cost of information distribution may also influence the political process as international awareness of government oppression and violations may spur the international community into action. As government awareness of their citizens’ ability to document abuses and quickly protest increases, there could be a chilling effect on oppressive behavior. It is in this context that the role of mobile technologies may be of particular importance. Their portability co-locates them with the exact geographic areas where events of consequence occur; their ability to capture and disseminate audio, pictures and video makes the external visibility of these events far greater and more compelling.

It is possible, however, that political organizations with investment in the status quo may utilize the same technologies to maintain the existing political structures. Therefore, the usage of “digital access” must be considered both from the perspective of average citizens as well as from powerful political and corporate interests. (Rethemeyer 2007). For example, as digital access becomes more widespread, a government that controls access to these technologies can leverage this control to dampen the ability to coordinate protests. (Faris and Etling 2008). Governments can also shut down, monitor, or aggregate information technologies like the Internet, leading to censorship and constriction of outbound information flows. A recent example has been the March 2012 government shut down of the commenting services for microblogs run by the Sina Corporation and Tencent Holdings (which each have 300 million registered accounts in China), following rumors of a coup and photographs of military vehicles entering Beijing being posted in a manner visible to foreign media. Such censorship may temper the effectiveness of the international community as foreign political leaders may not have the knowledge, political will, or internal backing to tackle the government’s misconduct. It is also quite likely that some countries are also more susceptible to international pressure than others, a point we explicitly return to in our empirical analysis.

Networks that mediate the diffusion of information, ideas and influence
This varied susceptibility of countries to international pressure highlights a more general point: modeling inter-nation political networks that capture the relationships between countries is central in understanding how the communication technologies of the Internet and mobile phones will alter democracy. Interactions between countries clearly shape their political, social, and economic agenda, and the importance of these relationships is highlighted well in the following definition of globalization: “the spatial organization of social relations and transactions –assessed in terms of their extensity, intensity, velocity, and impact-generating transcontinental or interregional flows and networks of activity, interaction, and the exercise of power” (Monge and Matei, 2004).

However, there are many diverse ways in which different countries are linked to one another and it is conceivable that any one of these networks of links could serve as a long-run conduit for the forces of democracy. Our opening example clearly motivates the role a geographic network might play as a channel of this kind. A similar basis for diffusion was used by O’Loughlin et al. (1998) who find evidence of both temporal and spatial clustering of democracy during the period 1946-1994. Close physical proximity may indicate similar cultures and strong ties of among the nations’ political leaders and citizens. Countries with strong relationships and similar cultures are more susceptible to political pressures from each other, so we expect that civil liberties will diffuse spatially. This is consistent with (Barnett 2001), who describes the importance of geography, language, and culture in determining network positioning and the strength of the network.
Additionally, the diffusion of democracy across countries, if it occurs, will also be driven by the spread of ideas and information through different human and technological communication channels, and it is thus likely that non-geographic networks that facilitate this spread will play an equally important role. We use a couple of proxies for this kind of “idea” network. One is based on bilateral migration flows between countries. While clearly not mirroring the flow of information or ideology, migration among countries may reflect international communication and connections of inhabitants to their native country, and seem to be a natural conduit via which influence might spread. As friends and family move to different areas of the country, they remain in touch, share information, and demand increased intervention by their new country on behalf of their country of origin. There are numerous examples, both in the United States and beyond, of politicians in countries with significant immigration being more responsible and engaged in the politics of the immigrants’ homeland if they comprise a sizable voting bloc.

Another conduit for the diffusion of ideas is created by international trade. More generally, the economic relationship among countries seems like a natural mediator of influence on one another, and the bilateral trade network reflects the strength of the economic ties among countries. Previous research has indicated that trade relationships also correspond to international communication volume (Blumenstock 2011), providing further evidence that the trade network may effectively capture information exchange among countries. We therefore use two versions of this network, described in greater detail in what follows.

A final network we consider is that created by foreign direct investment (FDI), which potentially encapsulates information about the nature of influence across countries. This network is especially important in capturing a country’s susceptibility to the international pressure that potentially mediates a country’s response to “international visibility” via digital technologies.

Data
Our analysis uses a panel comprising data about annual measures of democracy, digital access, trade flows, political institutions, and economic development which we construct for 189 countries between 2000 and 2010. The countries we exclude did not report trade data or digital access data for at least one year during the analysis period.

Democracy. Our three primary measures of democracy are political rights (PoliticalRights), civil liberties (CivilLiberties) and media freedom (MediaFreedom), all of which are obtained from Freedom House (http://www.freedomhouse.org), an independent watchdog organization that specializes in the analysis of the components of freedom. The measures of civil liberties and political rights are obtained from their annual “Freedom in the World” reports from 2000 to 2010. Freedom House rates countries based on a 25-question survey, of which 10 are about political rights and 15 are about civil liberties. The questions contributing to their measures of political rights are designed to assess the electoral process, political pluralism and participation, and the functioning of government. The civil liberties questions assess freedom of expression, rule of law, right to associate freely, and personal autonomy. The survey yields a score between 0 and 40 for political rights and a score between 0 and 60 for civil liberties, which are then converted to normalized scores on a 7-point scale, with countries with the highest civil liberties or political rights receiving a 7 as their respective rating. In addition to political rights scores, Freedom House also publishes an annual list of electoral democracies.

Our measure of media freedom is obtained from Freedom House’s annual Freedom of the Press Index which gauges the autonomy of the press across the world. The composite index is created by surveying overseas correspondents and staff members regarding the legal, political, and economic environment and its influence on media content. To further our understanding regarding the links among civil liberties and pressures on media freedom, we include the sub-categories of the legal, political, and economic pressures restricting the freedom of the media.

Digital Access. Our primary measures of digital access—mobile phone, Internet, and broadband Internet subscribers—were gathered from the World Telecommunications and ICT Indicators database of the

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4 Further details and a complete list of these questions for 2010 is available at http://www.freedomhouse.org/template.cfm?page=351&ana_page=362&year=201
International Telecommunication Union, a United Nations agency (http://www.itu.int). The variables we use are:

- **MobileDensity**: The number of subscribers to portable mobile telephone service divided by the de facto population (defined below), expressed as a percentage between 0 and 100. Since subscribers may not be isolated precisely in the ITU data, this number is somewhere between the number of active mobile phone connections and the number of people who own one or more mobile phones.

- **InternetDensity**: The number of Internet subscribers with fixed access to the Internet divided by the de facto population, expressed as a percentage between 0 and 100. This measure includes dial-up, broadband, cable modem, DSL, and any other service provider. Mobile data subscriptions are not included in this measure.

- **PhoneDensity**: The number of subscriptions to wireline telephone service divided by the de facto population, expressed as a percentage between 0 and 100. Mobile and satellite telephone connections are not included in this measure.

- **BroadbandDensity**: The number of broadband Internet subscriptions divided by the de facto population, expressed as a percentage between 0 and 100.

- **HouseholdInternet**: The percentage of households with access to Internet subscriptions in their home.

These communication channels differ in their value for gathering and distributing information. Mobility, particularly the digital cameras common to mobile phones, facilitates the gathering of information whereas the convenience of Internet access and the broadcast communication capabilities enable information distribution. Information distribution promotes transparency to the country’s internal condition and invites attention from the international community for human rights violations.

Additional “softer” measures of digital access such as Internet censorship were considered but ultimately the digital technology density measures serve to proxy the citizenry’s digital access. Internet censorship measures were collected but the available measures did not contain granular data about the Internet user’s experience. Nations were evaluated into 3 categories, and few nations moved categories during the data time period of 2005-2010. Data regarding access control or users’ online capabilities were not available.

*International Influence*. Countries are heterogeneous in both their susceptibility to outside influence and in their ability to exert influence. Since economic ties are often a conduit for influence, we use the inflow of foreign direct investment as a percent of GDP as a proxy for the predisposition of the country’s leaders toward international influence.

*Country Population, Development and Economic Controls*. The economic, population, and development may mediate the diffusion of ICT and the development of political rights and personal freedoms.

- **Travel and tourism controls**: International tourism number of departures and arrivals, Air transport passengers carried, Rail lines total route(km), Motor vehicles per 1000 people, Passenger cars per 1000 people

- **Crime controls**: Intentional homicides government police sources per 100,000 people, Battle-related deaths number of people

- **Economic controls**: GDP per capita constant 2000 US, GINI index, Net foreign assets (current LCU), Foreign Direct Investment inflows as a percentage of GDP, Foreign Direct Investment outflows as a percentage of GDP

- **Population characteristics**: Urban population, Population ages 15-64, Population growth annual, Life expectancy at birth total years
Miscellaneous controls: Daily newspapers per 1000 people, Secure Internet servers per 1 million people

Network Variables. We construct the following stationary and dynamic networks to analyze the international relationships through the lens of shared proximity, bilateral migration, and economic associations for each year 2000-2010.

- Geographic Network: A graph in which each country is represented by a node, and the weighted edges are inverse distance among country capitals. We assembled and cross-checked inter-country political borders from a variety of sources, including the CIA World Factbook.

- Migration Network: A graph in which each country is represented by a node, and two nodes A and B are connected by a directed edge from A to B if Country A is an origin for migrants to their destination of Country B. The edges are weighted by the number of migrants between countries, where the number of migrants from one country to another is obtained from the World Bank's Global Migration Database.

- Trade Network (1): A dynamic graph in which each country is represented by a node and two nodes A and B are connected if they have experienced any import or export relationship during that year. The edges are weighted by the total volume of trade between the nodes. Export and import dollar volumes are obtained using the commodities export flows data from the United Nations Comtrade database (http://comtrade.un.org).

- Foreign Direct Investment Network: A dynamic graph in which each country is represented by a node and countries A and B are connected if foreign investors from country A have invested in country B according to the International Monetary Fund definition. The edges are weighted by the absolute value of the investment to capture the magnitude of the investors’ commitments.

For each network, we construct ten different network variables for each country: NeighborCivilLiberties, NeighborPoliticalRights, NeighborMediaFreedom, NeighborFixedPhone, NeighborMobileDensity, NeighborInternetDensity, NeighborBroadbandDensity, NeighborSMS, NeighborGDP, NeighborElectoralDemocracy. For example, for the geographic network, NeighborCivilLiberties for country A is the weighted average of the civil liberties of the other countries, weighted by the inverse of the distance between country capitals in the completely connected network. The other four variables are defined analogously. Because each of the networks is weighted, the network variables are all calculated using a weighted average to underscore the preferential treatment placed on some countries. In addition, the annual eigenvector centrality and GINI coefficients for the trade network is included in the empirical analysis although the results are not reported.

Results
We present our results in two groups. The first set uses a series of panel data models to assess the connection between digital access, democracy, and each of our three political networks (captured as reduced-form variables). The second set accounts for temporal aspects of both direct impacts and internation diffusion by estimating a dynamic panel model using the Arellano-Bond estimator in which lagged values are included in the model as independent variables.

Static Panel Data Models
Our initial analysis uses panel data methods (Woolridge, 2002) to provide an assessment of the relationship between democracy, digital access and our two networks of countries. We have chosen to use CivilLiberties as the dependent variable across the entire analysis of this section. This is based on our belief that civil liberties are likely to be affected more rapidly by changes in digital access than political rights which require more substantive structural changes in the way government is organized. Our outcomes of interest are the measures of Internet and Mobile density, both within countries and for neighboring countries. Our empirical design assesses the direct impact of digital access and neighbor characteristics on civil liberties; additionally, as discussed briefly in an earlier section, we include media freedom as an independent variable since it is possible that the changes induced by digital access are mediated by changes in media freedom. We have estimated models that include PoliticalRights as a control variable and those which do not, with no directionally significant differences in any of the
coefficient values. Retaining both these alternative measures of democracy in each of our specifications ensures that we are not incorrectly ascribing a change in civil liberties to a change in digital access when in fact the former may have been caused by a change in one of these other related measures of political structure or freedom.

We control for unobserved heterogeneity in our data by grouping the panel data. Each of our fixed effects specifications groups the data by country. The random effects specifications were considered, but Hausman tests indicated that the fixed effects estimations were more appropriate. Further details on these methods and of our specific implementation of them are available in Woolridge (2002) and Pinheiro et al. (2011).

Table 1 summarizes the results of our panel data analysis. A number of interesting observations emerge from this analysis. Not surprisingly, civil liberties are positively associated with both political rights and different forms of media freedom, and this relationship is strongly significant and positive for every model specification we have tried. What we found most interesting from these coefficients is that the political freedoms of the media—freedom from government harassment and arrest—are more strongly correlated with civil liberties than media freedom from restricting legal and economic pressures. This is in line with our discussion that the relationship between the citizens and the government are particularly important in understand the influence of digital access on civil liberties.

Many of our model specifications find a positive relationship between changes in civil liberties and changes in our measures of digital access: the density of Internet users, the density of broadband users, the density of mobile ‘phone users (measured by a threshold variable), and the density of traditional (wireline) phone users. The possible mediation of the relationship between digital access and civil liberties by a country’s external influencers and internal political institutions are captured respectively by the interaction terms for our measures of digital access with neighboring countries’ civil liberties. We do not find a significant complementary relationship between digital access and foreign investors; we do not draw any inference from the absence of this relationship.

We find evidence of a positive relationship between a country’s civil liberties and those of its geographic neighbors. Similar geo-political challenges seem likely to influence the trajectory of democratic institutions within a country, leading to regional correlation among civil liberties. The lower coefficient on the migration network might suggest that there is less selection: any diffusion of democracy on account of migratory flows is likely to be countered in our measurements by citizens are also more likely to choose to migrate to countries with a level of civil liberties that is different from their own. There is no significant relationship between a country’s civil liberties and that of its trade partners or foreign investors. One explanation for this is a country’s indifference on average to forming economic relationships with “like” countries.

In addition to the listed variables and the ones discussed above, additional measures of technology access and country characteristics were included in the model but the effects were not statistically significant. Overall, these findings are consistent with our hypotheses that digital access is correlated with civil liberties, and that the effect of digital access differs by the medium.
Table 1. Fixed Effect Estimation Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>(I) Estimate (SE)</th>
<th>(II) Estimate (SE)</th>
<th>(III) Estimate (SE)</th>
<th>(IV) Estimate (SE)</th>
<th>(V) Estimate (SE)</th>
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</thead>
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<td>0.261(0.020)**</td>
<td>0.239(0.019)**</td>
<td>0.230(0.019)**</td>
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<td>0.277(0.075)**</td>
<td>-0.021(0.022)</td>
<td>0.229(0.074)**</td>
<td>0.306(0.073)**</td>
</tr>
<tr>
<td>Mobile Threshold</td>
<td>0.032(0.012)**</td>
<td>0.016(0.026)</td>
<td>-0.022(0.015)</td>
<td>-0.047(0.026)</td>
<td>0.007(0.025)</td>
</tr>
<tr>
<td>Internet Threshold*</td>
<td>0.018(0.017)</td>
<td>-0.173(0.045)**</td>
<td>-0.006(0.015)</td>
<td>-0.167(0.043)**</td>
<td>-0.201(0.043)**</td>
</tr>
<tr>
<td>Mobile Threshold*</td>
<td>-0.012(0.011)</td>
<td>0.009(0.026)</td>
<td>0.006(0.014)</td>
<td>0.056(0.026)*</td>
<td>0.008(0.025)</td>
</tr>
<tr>
<td>Media Freedom</td>
<td>0.276(0.024)**</td>
<td>0.275(0.024)**</td>
<td>0.263(0.023)**</td>
<td>0.241(0.024)**</td>
<td>0.274(0.024)**</td>
</tr>
<tr>
<td>Mobile Density</td>
<td>-0.001(0.013)</td>
<td>-0.044(0.020)*</td>
<td>-0.021(0.014)</td>
<td>-0.039(0.020)</td>
<td>-0.030(0.020)</td>
</tr>
<tr>
<td>% Households with Internet</td>
<td>0.033(0.017)*</td>
<td>0.033(0.018)</td>
<td>0.020(0.017)</td>
<td>0.043(0.018)*</td>
<td>0.038(0.017)*</td>
</tr>
<tr>
<td>Internet Density</td>
<td>0.012(0.017)</td>
<td>0.053(0.021)**</td>
<td>0.015(0.019)</td>
<td>0.062(0.020)**</td>
<td>0.032(0.020)</td>
</tr>
<tr>
<td>Broadband Density</td>
<td>0.018(0.015)</td>
<td>0.004(0.021)</td>
<td>0.038(0.020)</td>
<td>0.016(0.016)</td>
<td>0.030(0.018)</td>
</tr>
<tr>
<td>Phone Density</td>
<td>-0.022(0.027)</td>
<td>-0.035(0.027)</td>
<td>0.069(0.029)*</td>
<td>0.077(0.031)*</td>
<td>-0.028(0.028)</td>
</tr>
<tr>
<td>International Incoming Phone Minutes</td>
<td>-0.011(0.008)</td>
<td>-0.015(0.008)*</td>
<td>-0.009(0.007)</td>
<td>-0.015(0.007)*</td>
<td>-0.013(0.008).</td>
</tr>
<tr>
<td>% Households with TV</td>
<td>0.013(0.007).</td>
<td>0.011(0.007)</td>
<td>0.015(0.007)*</td>
<td>0.016(0.007)*</td>
<td>0.014(0.007).</td>
</tr>
<tr>
<td>% Households with Electricity</td>
<td>-0.010(0.005).</td>
<td>-0.009(0.005).</td>
<td>-0.011(0.005)*</td>
<td>-0.011(0.005)*</td>
<td>-0.009(0.005).</td>
</tr>
<tr>
<td>International Departures</td>
<td>-0.025(0.014).</td>
<td>-0.027(0.014).</td>
<td>-0.018(0.014)</td>
<td>-0.027(0.014)*</td>
<td>-0.026(0.014).</td>
</tr>
<tr>
<td>International Arrivals</td>
<td>0.035(0.015)*</td>
<td>0.032(0.015)*</td>
<td>0.031(0.014)*</td>
<td>0.030(0.014)*</td>
<td>0.033(0.015)*</td>
</tr>
<tr>
<td>Net Foreign Assets</td>
<td>0.015(0.008)*</td>
<td>0.020(0.008)*</td>
<td>0.006(0.008)</td>
<td>0.011(0.008)</td>
<td>0.017(0.008)*</td>
</tr>
<tr>
<td>Secured Internet Servers Per 1M</td>
<td>-0.033(0.010)**</td>
<td>-0.022(0.010)*</td>
<td>-0.019(0.010)</td>
<td>-0.019(0.009)*</td>
<td>-0.026(0.010)*</td>
</tr>
<tr>
<td>GDP Per Capita</td>
<td>-0.038(0.020).</td>
<td>-0.020(0.020)</td>
<td>-0.036(0.020)</td>
<td>-0.029(0.024)</td>
<td>-0.041(0.020)*</td>
</tr>
<tr>
<td>Network</td>
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<td>Geographic</td>
<td>Migration</td>
<td>Trade</td>
<td>FDI</td>
</tr>
<tr>
<td>NeighborPoliticalRights</td>
<td>-0.094(0.033)**</td>
<td>0.005(0.043)</td>
<td>0.149(0.112)</td>
<td>0.144(0.117)</td>
<td></td>
</tr>
<tr>
<td>NeighborCivilLiberties</td>
<td>0.089(0.039)*</td>
<td>0.080(0.043)</td>
<td>-0.098(0.107)</td>
<td>0.000(0.050)</td>
<td></td>
</tr>
<tr>
<td>NeighborCivilLiberties*</td>
<td>0.007(0.012)</td>
<td>-0.026(0.020)</td>
<td>-0.020(0.011)</td>
<td>0.005(0.031)</td>
<td></td>
</tr>
<tr>
<td>BroadbandDensity</td>
<td>-0.057(0.018)**</td>
<td>0.007(0.018)</td>
<td>0.028(0.013)*</td>
<td>-0.016(0.017)</td>
<td></td>
</tr>
<tr>
<td>NeighborCivilLiberties*</td>
<td>0.008(0.014)</td>
<td>0.048(0.011)**</td>
<td>-0.018(0.009)</td>
<td>0.014(0.017)</td>
<td></td>
</tr>
<tr>
<td>InternetDensity</td>
<td>-0.039(0.017)*</td>
<td>0.027(0.011)*</td>
<td>0.090(0.033)**</td>
<td>-0.051(0.045)</td>
<td></td>
</tr>
<tr>
<td>MobileDensity</td>
<td>-0.039(0.017)*</td>
<td>0.027(0.011)*</td>
<td>0.090(0.033)**</td>
<td>-0.051(0.045)</td>
<td></td>
</tr>
<tr>
<td>NeighborBroadbandDensity</td>
<td>0.057(0.017)**</td>
<td>-0.098(0.018)**</td>
<td>-0.103(0.042)*</td>
<td>0.018(0.049)</td>
<td></td>
</tr>
<tr>
<td>NeighborMediaFreedom</td>
<td>-0.089(0.042)*</td>
<td>0.105(0.045)*</td>
<td>0.022(0.099)</td>
<td>0.055(0.052)</td>
<td></td>
</tr>
<tr>
<td>NeighborBroadbandDensity</td>
<td>0.072(0.045)</td>
<td>0.083(0.023)**</td>
<td>-0.019(0.033)</td>
<td>0.034(0.019)</td>
<td></td>
</tr>
<tr>
<td>NeighborInternetDensity</td>
<td>0.069(0.040)</td>
<td>-0.029(0.026)</td>
<td>-0.027(0.038)</td>
<td>0.003(0.021)</td>
<td></td>
</tr>
<tr>
<td>NeighborSMS</td>
<td>-0.004(0.008)</td>
<td>-0.004(0.006)</td>
<td>-0.015(0.007)*</td>
<td>-0.013(0.009)</td>
<td></td>
</tr>
<tr>
<td>NeighborElectoralDemocracy</td>
<td>0.037(0.017)*</td>
<td>0.016(0.019)</td>
<td>-0.082(0.044)</td>
<td>-0.326(0.125)**</td>
<td></td>
</tr>
<tr>
<td>NetworkDegree</td>
<td>0.005(0.022)</td>
<td>0.004(0.012)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dynamic Models

Civil liberties may not depend solely on the current state of the nation but on inertia from the existing social and political structures. Since incumbent interests may use technologies to preserve the status quo, the shift of political institutions towards increased civil liberties may lag behind technology adoption. Additionally, rather than being induced by changes in digital access, higher levels of civil liberties may cause individuals to seek greater digital access. It is also possible that countries simply form trade ties with higher export and import flows with others whose civil liberties are similar to theirs, for example, in response to their citizens not wanting to trade with countries with poor human rights records. Thus, changes in civil liberties may cause change in trade ties, rather than the ties inducing a diffusion of the changes in liberties.

To consider the temporal aspect of digital access on civil liberties, we estimate a dynamic panel model using the Arellano-Bond GMM estimator (Arellano and Bond, 1991) in which the lagged value for civil liberties (and a range of other variables) is included in the model as an independent variable. This model accounts for endogeneity between civil liberties and the digital access variables, where as we have discussed earlier, the direction of causality may be both ways. This model specification also allows us to explicitly capture the reality that it may take substantial periods of time before evidence of the impact of digital access is visible in macro data. The specification also retains the fixed effects which control for time-invariant country characteristics being correlated with the explanatory variables.

The estimates from the dynamic panel model are presented in Table 2. (We included a number of other variables and lags in the model, and have reported only on those which were significant in at least one of our model specifications.) The first column does not include any network variables, and the other columns reflect the inclusion of the Geographic, Migration, Trade and Foreign Investment networks respectively. Lagged CivilLiberties was the single largest determinant of current CivilLiberties. The Sargan test for all these models shows that the model is not conclusively over-specified. Furthermore, although there is AR(1) correlation, as expected, the AR(2) correlation is not statistically significant.

Controlling for the lag in CivilLiberties alters the magnitude of the effects of other variables; nevertheless, these results supplement and advance our findings from the fixed effects models. First, a deeper understanding of the relationship between political freedoms of the media and civil liberties is advanced by these new estimates, one that reflects the dual definition of democracy. Increased political rights may result in political institutions that favor one group of citizens, decreasing the country’s civil liberties. An interesting additional finding is the positive correlation between newspaper subscriptions and civil liberties. Newspapers are typically one of the most reliable information sources, so the newspaper volume indicates the availability of journalism. The current values of media freedoms are positively correlated with CivilLiberties, providing additional support for the importance of a free press in securing CivilLiberties. Fixed wireline telephone is not statistically significant, suggesting that the underlying effect from fixed wireline access may be the increased affluence or economic establishment of countries with extensive wired telephone access.

The results also highlight the differences between the economic and non-economic international relationships. The GDP of neighboring countries was significantly correlated with civil liberties in both the geographic and migration networks. Close proximity to less productive countries is detrimental to CivilLiberties. The results could indicate that the economic relationships between countries, correlated with country’s GDP, is a particularly important force on CivilLiberties. Further, the interactions between technologies and neighboring countries’ civil liberties were consistently significant in the two economic networks, the trade network and the foreign direct investment network. In the models that control for Trade Network and FDI Network, the lagged InternetDensity is positively related to CivilLiberties. The Neighbor attributes and communication technologies are significant in the economic networks, in which the edges change over time. This highlights the dynamic nature of the relationship between ICT and international relationships.
<table>
<thead>
<tr>
<th>Variable</th>
<th>(I)</th>
<th>(II)</th>
<th>(III)</th>
<th>(IV)</th>
<th>(V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Liberties, Lagged 1</td>
<td>0.511 (0.112) ***</td>
<td>0.564 (0.131) ***</td>
<td>0.514 (0.110) ***</td>
<td>0.500 (0.097) ***</td>
<td>0.536 (0.058) ***</td>
</tr>
<tr>
<td>Political Rights</td>
<td>0.081 (0.044) .</td>
<td>0.054 (0.048) .</td>
<td>0.072 (0.046) *</td>
<td>0.067 (0.048) *</td>
<td>0.085 (0.034) *</td>
</tr>
<tr>
<td>Political Rights, Lagged 1</td>
<td>-0.077 (0.039) *</td>
<td>-0.096 (0.044) *</td>
<td>-0.084 (0.039) *</td>
<td>-0.085 (0.033) *</td>
<td>-0.102 (0.026) ***</td>
</tr>
<tr>
<td>Internet Threshold</td>
<td>0.033 (0.016) *</td>
<td>0.067 (0.080) .</td>
<td>0.005 (0.024) *</td>
<td>0.042 (0.073)</td>
<td>0.085 (0.054)</td>
</tr>
<tr>
<td>Internet Threshold, Lagged 1</td>
<td>0.006 (0.017)</td>
<td>-0.196 (0.084) *</td>
<td>0.010 (0.024)</td>
<td>-0.088 (0.072)</td>
<td>-0.147 (0.053) **</td>
</tr>
<tr>
<td>Mobile Threshold*Mobile Density</td>
<td>-0.022 (0.009) *</td>
<td>-0.020 (0.041)</td>
<td>-0.021 (0.015)</td>
<td>0.019 (0.035)</td>
<td>-0.024 (0.029)</td>
</tr>
<tr>
<td>Mobile Threshold*Mobile Density, Lagged 1</td>
<td>0.022 (0.012) .</td>
<td>-0.023 (0.043)</td>
<td>0.004 (0.013)</td>
<td>-0.061 (0.039)</td>
<td>-0.016 (0.029)</td>
</tr>
<tr>
<td>Media Freedom</td>
<td>0.376 (0.059) ***</td>
<td>0.367 (0.062) ***</td>
<td>0.336 (0.070) ***</td>
<td>0.283 (0.055) ***</td>
<td>0.349 (0.039) ***</td>
</tr>
<tr>
<td>Mobile Density</td>
<td>0.033 (0.018) .</td>
<td>0.046 (0.028) .</td>
<td>0.035 (0.021) .</td>
<td>0.035 (0.027)</td>
<td>0.030 (0.021)</td>
</tr>
<tr>
<td>Mobile Density, Lagged 1</td>
<td>-0.019 (0.017)</td>
<td>-0.040 (0.031)</td>
<td>-0.029 (0.021)</td>
<td>-0.018 (0.027)</td>
<td>-0.016 (0.019)</td>
</tr>
<tr>
<td>Mobile Threshold</td>
<td>0.000 (0.000)</td>
<td>0.000 (0.000)</td>
<td>0.000 (0.000)</td>
<td>-0.032 (0.031)</td>
<td>-0.006 (0.024)</td>
</tr>
<tr>
<td>Mobile Threshold, Lagged 1</td>
<td>0.000 (0.000)</td>
<td>0.000 (0.000)</td>
<td>0.000 (0.000)</td>
<td>0.063 (0.032) .</td>
<td>0.027 (0.025)</td>
</tr>
<tr>
<td>Internet Density</td>
<td>0.004 (0.010)</td>
<td>-0.025 (0.023)</td>
<td>-0.004 (0.015)</td>
<td>-0.005 (0.020)</td>
<td>-0.016 (0.014)</td>
</tr>
<tr>
<td>Internet Density, Lagged 1</td>
<td>0.021 (0.016)</td>
<td>0.036 (0.025)</td>
<td>0.040 (0.025)</td>
<td>0.038 (0.019) *</td>
<td>0.044 (0.016) **</td>
</tr>
<tr>
<td>Broadband Density</td>
<td>0.014 (0.008) .</td>
<td>0.019 (0.013)</td>
<td>0.069 (0.061)</td>
<td>0.016 (0.009) .</td>
<td>0.017 (0.010) .</td>
</tr>
<tr>
<td>Broadband Density, Lagged 1</td>
<td>-0.005 (0.010)</td>
<td>-0.012 (0.013)</td>
<td>-0.046 (0.048)</td>
<td>0.011 (0.012)</td>
<td>-0.011 (0.010)</td>
</tr>
<tr>
<td>Daily Newspaper Per 1000 people</td>
<td>0.012 (0.005) *</td>
<td>0.013 (0.005) *</td>
<td>0.013 (0.006) *</td>
<td>0.019 (0.006) ***</td>
<td>0.016 (0.005) ***</td>
</tr>
<tr>
<td>Daily Newspaper, Lagged 1</td>
<td>-0.004 (0.004)</td>
<td>-0.007 (0.005)</td>
<td>-0.006 (0.004)</td>
<td>-0.005 (0.005)</td>
<td>-0.004 (0.004)</td>
</tr>
</tbody>
</table>

Table 2. Arellano-Bond Dynamic Panel Estimation Results
Finally, NeighborMobileDensity in the FDI network is significant and positive, as is the interaction between the investor’s CivilLiberties and MobileDensity, which is also positively correlated with CivilLiberties. This supports the notion that the CivilLiberties of the investing countries, as well as the ability of the citizens to communicate, affects the country’s CivilLiberties.

To summarize both panel data analyses, while there is a persistent relationship between digital access and democracy, as well as suggesting the possibility that there are spillovers in democracy across connected countries that are amplified by digital access, there may be possible alternative explanations for our findings. Furthermore, our analysis in Section 2 discussed different mechanisms that could link digital access to changes in democracy. Mobile technologies inherently have a broader range of activities that they can be integrated into, and are more powerful for coordination and information acquisition owing to their portability; thus, it is not surprising that we find their impact to be consistently more visible than that of fixed-line Internet. The speed and convenience of ICT may enhance their influence on political structures and government leaders. In addition, convenient access to the Internet may be particularly important for fomenting the perception of freedoms.

We have also analyzed a structural model (based on the actor-network model of Snijders) whose results strengthen our findings of the importance of mobile technologies in facilitating the diffusion of civil liberties. This analysis is available on request.

Concluding Remarks
We have examined the effects of digital access on the prevalence of democracy and its diffusion via trade, geographical, migration and FDI networks across 189 countries between 2000 and 2010. Our analysis is based on a publicly available data and uses state-of-the-art empirical econometric and network analysis methods. To our knowledge, our work represents the first attempt to simultaneously examine changes in digital access and the evolution of different measures of democracy while admitting the possibility of inter-country spillovers and trade partner selection effects.

There are a number of different mechanisms that might govern the impact of digital access on the emergence and diffusion of democracy. We have described three broad and sometimes overlapping mechanisms of impact in Section 2 – via the altering of information flows between governments and citizens, through changes to coordination and communication between citizens, and due to modifications to the extent a government can control external visibility and accompanying international pressure. Each of these in turn may also shift the extent to which a country’s level of democracy is influenced by that of its neighbors’, redefining the set of “neighboring” countries whose outcomes potentially diffuse. Our empirical analysis is a first attempt to capture this complex and interwoven nexus of interactions, bringing together data from a wide variety of sources and examining these data using a range of models and methods.

We believe our analysis and results shed new light on the question we started with: whether access to digital technologies related to the emergence of democracy within a country and the diffusion of democracy across countries? Although not all of our hypotheses are borne out by the data, our paper moves the discussion of this question beyond its recent focus on the coordination of political movements via IT-based social media, and towards a more general investigation of how information technologies will alter freedom.

One theme of our findings is that different forms of information technology are likely to impact democracy in different ways, perhaps mediated by different political networks. We are especially interested in encouraging further thought on the impact of mobile and broadband technologies via the third mechanism we propose, the path of increasing external visibility and the resulting foreign pressure it triggers. In particular, the portability of mobile technologies collocates them easily in regions where events of consequence are unfolding and the growing capabilities of such technologies to capture and disseminate audio, pictures and video makes the external visibility of these events far greater and more compelling, a dimension that is only likely to grow in importance as broadband access becomes more widespread. We believe that over the coming years for the effects of this important mechanism will
further manifest in data at the level of granularity we use. This certainly remains an area of active investigation for us.

We have entered an era in which new generations of socially and economically important technologies like mobile computing devices, social media and location-based software get created for and refined by consumers rather than by large enterprises, a trend often referred to as the consumerization of information technologies (Bapna et al., 2011). This contrasts the “business first” historical pattern of evolution of hardware (from mainframes to minicomputers to PCs) and software (from accounting information systems to enterprise resource planning systems and spreadsheets). The consumerization of IT is not just about a change in the target market for new technologies; it represents a fundamental paradigm shift which gives distributed people new capabilities for human endeavor and freedom, and may lead to information technologies fulfilling their true potential for societal and national transformation.

The dominance of the effects of mobile access over traditional Internet access is especially encouraging in this regard, given that this is the device that is at the forefront of the consumerization of IT, and which will be the conduit for digital access for a vast majority of new Internet users over the coming decades. The impact of digital access on freedom and its diffusion is still in its infancy. The longer-run effect of having a technologically connected world on basic civil liberties and political rights will unfold over the coming decades. Our analysis provides a first empirical step towards uncovering what this impact might look like, and we look forward to participating in and analyzing the continued democratizing effects of digital technologies in the future.
References


