Chapter 2: From Evidence to Model[1]

The purpose of this chapter is to review the quantitative and qualitative evidence on the impact of the information revolution on state-society relations. As Drezner (2010) notes, "parsing out how ICTs affect the tug-of-war between states and civil society activists is exceedingly difficult." Indeed, "it is particularly challenging to disentangle political, social and technology factors (Diamond 2010). The goal if literature review is to make these effects more explicit to develop a conceptual framework that can be used to assess whether—and if so how—liberation technologies change the balance of power between repressive regimes and social movements. The first section of this chapter consists of a literature review of statistical studies on the impact of technology on protest movements and democracy writ large. Section two presents a more in depth literature view of the underlying causal dynamics that may explain the many links between access to new digital technologies and an increase in protests against authoritarian regimes. The third and final section details how the findings from the literature reviewed are applied to the mixed-methods approach used in this dissertation research (Chapters 3 and 4).

2.1: Cross-Disciplinary Literature Review

Do information and communication technologies empower coercive regimes at the expense of resistance movements or vice versa? The first section of this literature review summarizes the findings from more macro-level, quantitative studies on the impact of technology on protest movements and democracy writ large. As Groshek (2010) notes, "technological developments, especially communicative ones, have long been positioned—and even romanticized—as powerful instruments of democracy (Dunham, 1938; Lerner, 1958). This tradition goes back at least as far as the printing press and its contribution to democratic movements of past centuries (Schudson, 1999) in relation to conceptions of the public sphere and the fourth estate (Jones, 2000). Over the course of

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[1] This is a draft excerpt from the second chapter of my doctoral dissertation. Please email me (pmeier@stanford.edu) for any questions for feedback you may be able to offer. This draft version was produced on January 4, 2011.

the past century, telegraphs, telephones, radios, and televisions were all introduced as 'new' media, and each of these technologies were often ascribed broad potential for enhancing democratic development around the world (Becker, 2001; Navia & Zweifel, 2006; Spinelli, 1996)."

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Eyck (2001) notes that "the lack of attention paid to information technologies in predicting variations of political protest in cross-national studies is surprising," especially since "there is reason to believe that information technologies do play a part in the political protest at the 'street' level". Indeed, Eyck argues that quantitative models used to explain the variations in cross-national studies of political protest typically do *not* include measurements of ICTs (Eyck 2001; See also Moaddel 1994; Boswell and Dixon 1990; London and Robinson 1989; Muller and Seligson 1987; Muller 1985).

Eyck's (2001) large-N quantitative study on ICTs and political protests appears to be the only analysis of its kind. The study, which uses OLS regressions, consists of demonstrations, strikes and riots that took place in 86 countries. The findings "point to the importance of the influence of information technologies have in helping to predict politically-motivated collective behavior" (Eyck 2001). However, the study is limited to the time period between 1970 and 1977 when "computer networks and e-mail were not part of the larger information landscape" (Eyck 2001). In addition, the analysis does not take mobile phones into account since they did not exist during the time period under study. Strangely, Eyck (2001) maintains that the findings are *not* "outdated or specific to the time period." Another limitation of Eyck's study is that the frequency of protests were measured at the annual level, which is problematic: "if communication and information technologies are a part of political protests, then we must get more detailed information of the timing of the protests to see if they occur in clusters, which we would expect to happen" (Eyck 2001).

The most recent macro-level quantitative study to be published found that the democratic effects of the Internet were nil (Groshek 2010). Groshek concludes that, "Internet diffusion was not a specific causal mechanism of national-level democratic

growth during the timeframe analyzed," which was 1994-2003. The author therefore argues that "the diffusion of the Internet should not be considered a democratic panacea, but rather a component of contemporary democratization processes." Interestingly, these conclusions seem to contradict Groshek's own findings from 2009 (reviewed in more detail later).

For the 2010 study, Groshek used "macro-level time-series democracy data from an historical sample of 72 countries, reaching back as far as 1946 in some cases, but at least from 1954 to 2003. From this sample, a sequence of ARIMA (autoregressive integrated moving average) time–series regressions were modeled for each country for at least 40 years prior to 1994" (Groshek 2010). These models were subsequenty used to "generate statistically-forecasted democracy values for each country, in each year from 1994 to 2003. A 95% confidence interval with an upper and lower democracy score was then constructed around each of the forecasted values using dynamic mean squared errors. The actual democracy scores of each country for each year from 1994 to 2003 were then compared to the upper and lower values of the confidence interval" (Groshek 2010).

The results of the time-series analysis found that 3 of the 72 countries demonstrated democracy levels greater than those statistically predicted: Croatia, Indonesia and Mexico. Groshek (2010) carried out some qualitative analysis on each to "identify whether the Internet acted as a specific causal mechanism that may have contributed to democratization processes." But the results of the qualitative analysis did not provide any evidence that the Internet played an important role in the democratic growth measured in each country.

Groshek (2010) thus concludes that one should "consider the Internet a potentially potent but underutilized democratic tool, one that is only as useful as the citizens who employ and implement it for political purposes (Schudson, 2003)." Indeed, "virtuosity and democratic agency are not inherent in media technologies, no matter how interactive or participatory. Rather, these exist in individuals, and in the crucial applications and uses they make of communicative technologies (Nord, 2001; Schudson, 1999, 2003)" (Groshek 2010). One main drawback of the analysis, however, is the time period that the data covers. As Joyce (2010) correctly notes, major social media platforms used for activism, like YouTube (2005), Facebook (2004) and Twitter (2006), were created

after 2003. "According to the Global Digital Activism Data Set (GDADS), the Meta-Activism Project's open collection of 1,005 digital activism cases from 114 countries, real growth in the use of digital technology for campaigning and public political speech did not see a significant increase until 2006. While part of this jump may be due to increased reporting of digital activism, rather than increase frequency […] anecdotal evidence also supports the conclusion that online political activism did not come into its own until after 2003" (Joyce 2010).

In 2009, Groshek published findings from a large-N quantitative study using macro-level panel data on 152 countries from 1994 to 2003 and multi regression models. Groshek (2009) found that "increased Internet diffusion was a meaningful predictor of more democratic regimes." This democratic effect was greater in countries that were at least partially democratic where the Internet was more prevalent. In addition, the association between Internet diffusion and democracy was statistically significant in "developing countries where the average level of sociopolitical instability was much higher." The author thus concluded that policy makers should consider the democratic potential of the Internet but be mindful of unintended consequences in countries under authoritarian rule. In other words, "the democratic potential of the Internet is great, but actual effects might be limited because Internet diffusion appears conditional upon national-level democracy itself" (Groshek 2009). Like the 2010 study, this one is significantly limited since the data used is restricted to pre-2003.

It is important to note that the analysis carried out by Groshek (2009, 2010) does not factor in the possible impact mobile phone of mobile phones. In contrast, the large-N quantitative study carried out by Miard (2009) assesses whether the number mobile phones affect political activity. This is an area in much need of empirical analysis since "little systematic research beyond loose collections of case studies has been done so far" (Miard 2009). The study uses negative binomial regression (with one year time lag) to test whether the number of mobile phone subscribers is a statistically significant predictor of political activism. The large-N study draws on the proprietary Cross-National Time-Series Data Archive (CNTS) for data on three forms of political activism: anti-government demonstrations, riots and major government crises. This dataset is derived from articles published in the New York Times. The data used in the study

spans 191 countries between 1991-2006 but only two-thirds of the countries were actually included in the analysis due to missing values.

The results indicate that mobile density has no significant effect on anti-government demonstrations when the control variables are included. The same is true when using riots or major government crises as dependent variables. GDP per capita is small and insignificant except for riots, where it has a significant negative effect. Population has an effect on all three variants of political activism variables. Miard (2009) therefore concludes that mobile connectivity is neither negatively nor positively associated with political activism. This implies that existing case studies "are overrated and that generalization by means of a global comparative case study is not possible" (Miard 2009). He suggests that future quantitative research take into account the following two recommendations: (1) Compare the impact of mobile phones on democratic versus oppressive regimes; (2) Analyze the combined impact of mobile phones and the Internet in addition to traditional technology variables.

Howard (2010) studied how information infrastructure supports democratic transitions in countries with large Muslim populations. He developed a weighted index of technology diffusion and a democracy index for 74 countries between 1994 and 2008. "The index of technology diffusion was computed […] for mobile phones, Internet users, Internet hosts, personal computers, national Internet bandwidth, and broadband Internet users, and then averaged and transformed into set-theoretic values" (Howard 2010). Each technology variable was first weighted against the GPD of each country to hold wealth constant before computing the diffusion index. The result reveals the level of technology diffusion in a country given its share of economic output relative to the other countries in the study. Howard then used fuzzy-set statistical models to stratify the countries into three clusters based on levels of information technology infrastructure and democratic transition. Next, Howard employed correlational statistical techniques to show that 6% of the variation in democratization across the Arab World can be explained by technology diffusion.

More specifically, "for countries such as Bosnia, Georgia, and Indonesia, good ICT infrastructure supported strong democratic movements. For Azerbaijan and the Central

African Republic, the lack of technology diffusion has allowed for deepening authoritarianism. For countries such as Benin, Eritrea, and Gambia, technology diffusion has not been particularly rapid, and democratization movements in these countries have had little success" (Howard 2010). That said, Howard argues that statistical analysis alone is not sufficient to assess how information infrastructure supports democratic transitions. He therefore advocates for a qualitative and comparative research to complement the quantitative analysis. To be sure, "perhaps the best reason to proceed in a qualitative and comparative way is that the categories of 'democracy' and 'technology diffusion' are themselves aggregates and proxies for other measurable phenomena" (Howard 2010).

For his doctoral dissertation, Meier (2011) carried out a large-N quantitative study using negative binomial regression analysis to determine whether access to ICTs is a statistically significant predictor of anti-government protests. The analysis focuses specifically on authoritarian states and combines data on both mobile phones and the Internet. The study spanned an eighteen-year period from 1998 through to 2007 and controlled for autocracy, unemployment rate, per capita income, gross domestic product, population size, internal war and elections. A total of 38 authoritarian countries were selected based on their sustained level of autocracy over the eighteen-year period. The data was also stratified into 4 country clusters to better capture underlying effects that may be statistically significant but otherwise cancel out in the aggregate analysis (Barahona and Levy, 2002). The clusters are based on countries with high versus low levels of ICT access and high versus low levels of protest frequency. The regression analysis was run on each of these four data clusters in addition to one on all clusters combined.

Meier's analysis reveals that all five negative binomial regression models on the entire 18-year time panel for the study data were significant. Of note, however, is the non-significance of the Internet variable in all models analyzed. Mobile phones were only significant in the regression models for the "Low Protest" cluster, the "High Mobile Phone Use" cluster and for "All Clusters" combined. However, the relationship was negative in the former case and in the latter. In other words, an increase in mobile phone users in countries with low protest counts decreases the number of protests. The same is true when the data for all countries are combined. The overall correlation analysis

showed a strong significant negative relationship between mobile phone use and unemployment. This may imply that an increase in mobile phone users in low protest countries leads to a decrease in unemployment and hence fewer protests. Another explanation might be that regimes in the "low protest cluster" are tech-savvy and able to prevent mass social unrest. The regression analysis on the "high mobile phone use" cluster revealed a significant positive relationship between mobile phone users and protests. In other words, an increase in the number of mobile phone users is associated with an increase in the frequency of protests. This may imply that social unrest is facilitated by the use of mobile communication in that cluster of countries.

Meier's (2011) conclusions require some qualifications. First, the protest data may suffer from media bias. Second, the protest data does not provide any information on the actual magnitude of the protests, i.e., the number of individuals involved. Third, economic data on countries under repressive rule need to be treated with suspicion since some of this data is self-reported. For example, authoritarian regimes are unlikely to report the true magnitude of unemployment in their country. ICT data is also self-reported. Fourth, the data is aggregated to the country-year level, which means potentially important sub-national and sub-annual variations are lost. Fifth, the dataset used runs through 2007, just one year after Twitter was first launched and three years after Facebook. This may not be enough time to capture the impact of these social media tools on the frequency of anti-government protests. Sixth and finally, the regression results may be capturing other dynamics that are not immediately apparent.

Micro-level Review

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