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A Time-Series, Multinational Analysis of Democratic Forecasts and Emerging Media Diffusion, 1994–2014

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In the last decade, the Internet has become more widely diffused and mobile, developing into a more interactive, globalized space with greater potential for democratic participation and mobilization. An earlier study by Groshek (2010) found that from 1994 to 2003, the Internet had limited national-level democratic effects, which suggested that Internet diffusion should not be considered a democratic panacea, but rather a component of contemporary democratization processes. Updating those analyses, this study used the same sample of 72 countries to examine the democratic effects of the Internet and mobile phones from 2004 to 2014 by replicating Groshek's time-series statistical tests. This study also found very limited evidence that emerging media diffusion resulted in augmented democratization, with only four countries—Bhutan, Myanmar, Nepal, and Kyrgyzstan—demonstrating greater democracy levels than were statistically predicted. Within a framework of diffusion of innovations and demand for democracy, this study extends the current understanding of emerging media's role in democratic development, and represents an important step in identifying the limited agency that emerging media diffusion has shown in cultivating democratic growth nationally.

Keywords: democratic development, Internet access, mobile phones, diffusion of innovations, ARIMA forecasting, time-series analysis

In a 2010 BBC World Service poll, four in five adults from 26 countries, representing a range of democracy levels and development, reported that they consider access to the Internet a fundamental human right. This statistic signals just how embedded online technologies have become in everyday life (Ogan, Ozakca, & Groshek, 2008) and that widespread societal changes from consumer to political culture have been attributed to the diffusion of emerging media. Notably, forms of emerging media such as Internet access and mobile phones have come to embody a narrative that communication technology would incite positive democratic change even before the highly visible Arab Spring. Scholars and pundits in this area have regularly advanced a framework in which online, social, and mobile media have facilitated the more effective flow of information to a wider array of citizens, thereby diminishing the

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traditional barriers of time and space that have constricted earlier democratic development (Ayres, 1999; Groshek, 2012).

In this context, this study explicitly examined how emerging media diffusion can interrelate with increased democratization, particularly given Rhue and Sundararajan's (2014) assertion that "access to digital technologies" corresponds with a country's democratic development and "diffusion of democracy across countries" (p. 41). More specifically, this study replicated and extended Groshek's (2010) study that examined Internet diffusion's democratizing effects from 1994 to 2003. Although that original study found that only three countries were consistently more democratic than could be statistically forecast, it was also limited by data and a timeline that predated widespread social media use and Internet-enabled mobile phones (Joyce, 2011). This study thus fills an important gap by following Groshek's methodological technique and bringing those analyses into a contemporary timeline through 2014, which incorporates a wide range of geopolitical events including, but not limited to, the Arab Spring.

Other previous research on the marked growth of a networked population that is "gaining greater access to information, more opportunities to engage in public speech, and an enhanced ability to undertake collective action" (Shirky, 2011, p. 29) has shown mixed results, particularly in terms of politically democratizing events and institutional processes (Groshek, 2009, 2012; Stoycheff & Nisbet, 2014; Stoycheff, Nisbet, & Epstein, 2016). Still, as Zuckerman (2015) suggested with his "cute cat theory" (p. 132) of digital activism, social media platforms generally have mundane, but widespread uses that are difficult for regimes to control and therefore can be transformed into centers of activism and protest against governments. It thus follows that information circulated through online and mobile platforms—compared with older and more hierarchical mass media formats—is less likely to conform to existing national-level ideological and hegemonic structures because of the increased potential for individual participation in an online environment (Groshek, 2010; Meyer, 2006).

To more fully examine that potential as it unfolded over the decade from 2004 to 2014, this study built on the data and analyses of Groshek (2010) to forecast statistical democracy levels and compare those values with actual, observed shifts toward increased democracy or autocracy. The study's findings are therefore vitally positioned to contribute to a still pressing question that remains hotly debated and difficult to answer: Have emerging media, namely the Internet and mobile phones, made the world a more democratic place?

In following the earlier work and research design of Groshek (2010), we begin with a review of the literature, describe the replicated methodology, and then report statistical findings of instances in which countries' observed democracy levels were significantly greater than statistically forecast. Based on this output, we provide detailed and contextualized country-level case studies for these nations. The case studies delve into each country's historical, sociopolitical, and cultural factors that might also explain the significant shifts in democratization more fully than emerging media diffusion alone.

Emerging Media Diffusion, Sociocultural Context, and Democratic Potential

The potential for the diffusion of communication technologies to promote democratic change consistently has been moderated by other sociopolitical factors and cultural norms that contribute to states' democratization. Shirky (2011) noted that recent studies measuring emerging media technologies have found that these communicative tools were most effective in countries with an existing "public sphere [that] constrains the actions of the government" (p. 30). The findings of Nisbet, Stoycheff, and Pearce (2012) and Groshek (2009, 2011) also support the proposition that access to the Internet and mobile phones presents the greatest potential in countries where changes toward more democratic systems have already begun or a democratic system exists.

Therefore, although digital technologies enable user creation and reflexivity (Hardey, 2007), in practice the resulting content and its societal influence often reinforce existing systems, mirroring the society's cultural, technological, and political tendencies. Guillen and Suarez (2005) further wrote that the Internet would most likely benefit those countries that are "already rich, high-status . . . and democratic" (p. 697), rather than serve as a technological panacea to "spread the cause of democracy around the world" (p. 697). Emerging media diffusion can thus be best understood generally as a component of a much larger ongoing process that is influenced by factors such as states' economic growth, safeguards on freedoms of expression, historical and cultural traditions, and even geography (Bailard, 2012; Guillen & Suarez, 2005).

Similarly, others have positioned emerging technologies, namely the Internet and mobile phones, as trend amplifiers that propagate online echo chambers and filter bubbles rather than change catalyzers (Rainie & Wellman, 2012; van Dijk, 2006). Shirky (2010) also suggested that on the Internet, and particularly in social media, opinions are repeated by a network of core contributors. This repetition leads to the formation of political opinions among users and content consumers and thereby underlines the unique power of online technologies, specifically the Internet and mobile phones (for a historical pre-Internet overview of this process, see, e.g., Gitlin, 1980). Although past scholarly work has shown the mass media's (e.g., print and broadcast) capacity to promote civic values and increase political interest (Groshek, 2011; Nisbet, 2008), these technologies do not always abet national-level democracy. Instead, mass media have helped cultivate democratic revolutions in some parts of the world while strengthening autocratic regimes in others (Eyck, 2001; Meier, 2012).

This body of research thus proposes that communication technologies serve as potential disseminators of ideological values that reinforce the status quo and dominant asymmetric power relations (Hallin, 1986). In fact, some research has found that mass media do not result in expanded information diversity (Boczkowski & de Santos, 2007) and may not increase political participation (Delli Carpini & Keeter, 2003) or knowledge (Groshek & Dimitrova, 2013). Specifically, van Dijk (2006) found scant evidence that the widespread "Internet activity in online forums, polls, communities and pressure groups" (pp. 107–108) had any influence on official political decision making.

Refuting this argument, however, Howard (2010) cited Internet diffusion as a predictor for democratic growth by the online technology's capacity to create new spaces for political discussion.

Schmidt and Cohen (2010) likewise defined Internet and mobile technologies as "an 'interconnected estate'—a place where any person with access to the Internet, regardless of living standard or nationality, is given a voice and the power to effect change" (p. 75). Going a step further by examining collective influence rather than just individual actions, Schmidt and Cohen found that online activism efforts can "constitute a meaningful change in the democratic process" (p. 76) by removing intermediaries in the flow of information.

Supporting this position to a certain extent, Stoycheff and Nisbet (2014) reported that a higher level of Internet diffusion has been shown to create a "demand for democracy" (p. 628) and thereby facilitates democratic transitions. Still, these scholars noted that citizen attitudes and media uses are important moderating variables of these transitions (Stoycheff et al., 2016). Furthermore, they also found a mix of individual and contextual factors that determines the relationship between Internet use and demand for democracy. These conflicting findings of media in democratic transition support Castells's (1996) assertion that technology's influence within society is derived from a confluence of multiple factors. That is, each country has unique societal and state conditions that contribute to the state's unique adoption of innovations and ideas (including the Internet and mobile phones) across temporal and spatial dimensions that vary from the traditional S-shaped diffusion curve originally pioneered by Rogers (2003).

The observed effect of prevailing sociopolitical norms on technology's influence raises the issue of the digital divide—its impact, importance, and the efforts to bridge it—because the diffusion of the Internet and mobile phones is often coincidental with more stable democratic regimes and wealthier states (Roy, 2005). According to Milner (2006), the spread of the Internet is influenced by international and domestic politics, and the reciprocal "spread of democracy around the globe may . . . help reduce the digital divide and indirectly accelerate economic development" (p. 196). Further evidence has shown that emerging media technologies "complement rather than displace existing media and patterns of behavior" (DiMaggio, Hargittai, Neuman, & Robinson, 2001, p. 307). In short, despite the widespread popularity and mobile adaptability of more interactive social media platforms, the impact of the Internet has yet to be classified as a democratic complement, supplement, or replacement to traditional media.

Relatedly, even Howard and Hussain's (2011) article, most cited for its finding that Internet access was vital in the Arab Spring of 2010, also rightly noted that the Middle East/North Africa region has a history of activism, and the upheaval cannot be entirely attributed to the presence of online and mobile media technologies (Groshek, 2012). That is, even though the "countries that experienced the most dramatic protests were among the region's most thoroughly wired" (Howard & Hussain, 2011, p. 121) and those citizens had knowledge and experience using such media effectively, those countries' history of activism at least helped to ripen its citizenry for democratic change. This analysis is in accord with the slow hunch among scholars that the Internet and social media may give voice only to already-existing platforms rather than being catalyzers of democracy themselves.

Thus, it is crucial—especially some 20 years into their ongoing and widening global diffusion—to examine whether Internet access and mobile phone diffusion actually act as liberation technologies that can create a "synchronized public" (Meier, 2012, p. 2) capable of truly constraining the actions of undemocratic rulers through institutionalized democratic reform. Given the still uneven and widely

debated role of emerging media in facilitating such democratic change more than five years after the Arab Spring, the study reported here is positioned to make a pertinent contribution to the existing body of knowledge and contribute to closing a longstanding gap in the literature. We therefore proceed with two research questions that are patterned explicitly after the work of Groshek (2010), which focused on only the first 10 years (1994–2003) of the global Internet era, as follows:

RQ1: *Are there countries where actual, observed democracy scores are significantly greater than forecast democracy scores that were statistically predicted by the distribution of prior years' democracy levels?*

RQ2: *In the event that some countries are more democratic than statistically predicted, are Internet access and/or mobile phone diffusion reasonable causal mechanisms of that significant democratic augmentation?*

Method

As mentioned previously, this study is a replication of and extension to Groshek's 2010 study that examined the potential democratizing effects of Internet diffusion from what could effectively be considered the initial Internet phase of 1994 to 2003. Thus, the methods performed in that study were necessarily identical, but updated to cover another decade (2004–2014), when more participatory online technologies such as social media platforms have emerged and proliferated. This approach maintained consistency and produced evenly comparable results as the Internet and mobile phones have continued to diffuse at an enormous rate. As such, the methods described in detail by Groshek (2010) are briefly outlined again.

The analyses investigated whether democratic change could be linked to Internet and mobile phone diffusion at the national level. The nation-year was the unit of analysis, and the original sample of 72 countries fielded by Groshek in his 2010 study was again used. This study applied identically informed ARIMA (autoregressive integrated moving average) forecasting models as those of Groshek (2010) to examine how observed democracy measures compared with mathematically projected ones based on historical data and as applied to a series of econometric tests. As noted in Groshek, a true experimental design was not possible to assess causality, given that these variables cannot be controlled in the real world. Following the template in the original 2010 study, we used a series of longitudinal panels to input data across a maximum of 69 (but no fewer than 40) discrete nation-year data points, which extended the timeframe of the earlier study by 11 years, through 2014.

Country Selection and Case Studies

To meet the stability demands for this kind of analysis, countries must have had no fewer than 40 unique observations of democracy scores (Poole, McPhee, & Canary, 2002). Groshek (2010) established 1994, the year after the Mosaic browser was introduced, as the cut-off point for his predictions. Therefore, given the 40-data-point stipulation, countries were excluded from analysis in this study if democracy data were missing for any years from 1954 to 2004. All countries also had to show

variance in their democracy scores to fit the models used, and because a constant cannot predict anything other than a constant (Enders, 2004), countries with constant democracy scores every year (e.g., United States and Canada) were not included. Finally, country selection had to account for shifting nation states and, therefore, excluded some countries without consistent borders as a result of decolonization or unification, in the case of the Soviet Union's dissolution. For more details on the construction of the sample and "parent" and "child" nations, see Groshek (2010).

Once the analyses were completed, the actual observed democracy scores were examined and compared with the time series' model forecast values, and countries with democracy scores greater than those that could have been statistically predicted were selected for further evaluation as historical case studies. The countries' relevant historical events, political figures, and policies were summarized, and it was considered whether the Internet and mobile phone diffusion might be identified as a potential causal mechanism for the higher democracy levels (Groshek, 2010).

Democracy

Democracy levels were gathered from the Polity IV database's "Polity 2" scores, which are a combination of "Democracy" and "Autocracy" scores that range from −10 to +10. "Democracy" (on a scale of 0 [*no democracy*] to 10 [*strongly democratic*]) comprised three components, according to the Polity IV (2012) user's manual: (1) institutions that enable citizens to express disagreement with leaders or show support for alternative policies, (2) institutional constraints on executive power, and (3) guaranteed civil liberties for citizens and their abilities to participate politically. "Autocracy" (on a scale of 0 [*no autocracy*] to −10 [*strongly autocratic*]) is based on "the competitiveness of political participation, the regulation of participation, the openness and competitiveness of executive recruitment, and constraints on the chief executive" (Polity IV, 2012, p. 16).

These democracy scores have been determined based on Gurr and Gurr's (1978) work in developing a codebook that uses "historical and contemporary analyses of democratic institutions and processes" (Groshek, 2010, p. 150). Although some previous research investigating similar questions has often used the Freedom House government accountability figures, those numbers only go back to 1972, which was inadequate for this study's time series model. Furthermore, Groshek (2010) used factor analysis to demonstrate that Polity 2 scores loaded highly with those of the Freedom House.

Internet and Mobile Phone Diffusion

Internet and mobile phone diffusion data were collected from the International Telecommunications Union via the World Development Indicators database. Internet diffusion was measured by Internet users per 100 people, and the World Development Indicators define "Internet user" as "individuals who have used the Internet . . . in the last 12 months . . . via a computer, mobile phone, digital TV etc." (World Bank, 2016a, "Details"). Mobile phone diffusion was measured by the number of mobile cellular subscriptions per 100 people (World Bank, 2016b), and the International Telecommunications Union uses both annual surveys and estimates of users to determine Internet and mobile phone diffusion (International Telecommunications Union, 2005), with approximations being

among the most reliable in the field (cf. Groshek, 2010). Recently, Stoycheff and Nisbet (2014) suggested that there are three different dimensions of Internet penetration—hardware, users, and broadband. This study measured only diffusion of Internet access and mobile phones, which Stoycheff and Nisbet found was the only dimension that influenced neither individuals' demand for democracy nor perceptions of their countries' supply of democracy.

Forecasting Models

In replicating the work of Groshek (2010), we applied ARIMA time-series regressions to model each nation's democracy level. The minimum 40 data points of democracy scores prior to 2004 statistically predicted, based on dynamic forecasting estimations, each country's forecast democracy level for the years 2004 to 2014. The actual observed Polity IV democracy scores were then compared against the models' forecasted upper and lower confidence intervals, and countries were identified for additional case study analysis when their actual, observed democracy levels were greater or lower than was statistically predicted (i.e., scores that were greater or less than the 95% confidence interval for predictions given prior democracy levels).

To explicate further, these regression models used the previous minimum 40-year distribution to inform its prediction from the year 1993, where Time 1 predicts Time 2, Time 2 predicts Time 3, and so forth, to "statistically forecast" democracy levels from 1994 through 2003 in Groshek's (2010) study and from 2004 to 2014 in this study. This regression was fit to all 72 countries in the sample, and those countries whose observed democracy scores fell outside of the upper or lower forecasting limits were examined in greater contextual and historical detail. In particular, countries that demonstrated democracy scores consistently higher than were statistically predicted were explored as case studies to consider whether Internet and mobile phone diffusion could be attributed to the countries' democratization.

To statically fit time-series regression models to the data, we transformed countries' democracy scores "using a natural logarithm for the purposes of stationarity" (Groshek, 2010, p. 152). When the logarithmic transformation did not produce stationary data, as was the case with many countries in the sample, these countries were differenced one time (I = 1). An autoregressive operator of 1 year (AR = 1) was applied to all countries, as was a null moving average figure (MA = 0), which matched the democracy distributions. Thus, the general model identifications were ARIMA (1, 0, 0) or ARIMA (1, 1, 0) models.[1]

Results

In answer to the first research question of whether or not there are countries where actual democracy scores are greater than statistically predicted democracy scores, there was, indeed, an increase in the number of those cases from the three countries that Groshek (2010) reported in his earlier study. In the study reported here, there were four countries that "permanently" demonstrated higher actual democracy scores than those statistically predicted (with no fluctuations in observed values that

[1] A complete list of all models and ARIMA specifications are available on request.

declined to less than the upper confidence interval of the predicted values): Bhutan and Kyrgyzstan from 2005 onward, Nepal from 2006 onward, and Myanmar from 2011 onward.

Somewhat interestingly, although not formalized into RQ1, there were 14 countries that proved to be less democratic than could have been statistically expected. Presented in alphabetical order, these were Bangladesh (2007–2008), Ethiopia (2009–2014), Honduras (2011–2014), Iran (2004–2014), Latvia (2011–2014), Lithuania (2011–2014), Mexico (2011–2014), Moldova (2012–2014), Mongolia (2012–2014), Portugal (2014), Spain (2013–2014), Thailand (2006–2007 and 2014), Ukraine (2011–2014), and Venezuela (2009–2014). Space constraints do not permit much elaboration, but we feel that exploring these case studies would be of exceptional value in a later study, and it is vital to note that there has been a greater trend toward de-democratization than increased democratization from 2004 through 2014.

Furthermore, in accordance with earlier findings by Groshek (2010), it should be noted that all of the other countries in this study except those 18 mentioned had actual democracy levels that fell within the 95% confidence intervals of predicted democracy levels that were calculated with dynamic mean squared errors in the ARIMA forecasting models. In other words, 75.0% of all countries were within statistical democracy forecasts, 19.4% of all countries were less democratic than could have been statistically expected, and just 5.6% of countries were more democratic than estimated in the forecasting models. These findings altogether indicate that Internet diffusion and mobile phone adoption rates should not be considered a panacea for democratic change globally, or even in most nations. Indeed, the vast majority of countries studied still showed democracy levels well within (and even below, as in the case of 14 countries) the confidence intervals constructed around the forecast democracy scores, generated by dynamic mean squared errors. Therefore, as Groshek (2010) asserted, it is "vital to not overstate such relationships or their transformative capacity scores" (p. 154).

Still, it is useful to consider that the present study found four countries that had consistently higher actual democracy levels than were statistically predicted. Considered with the greater expansion of the public Internet, social media, and increasingly capable mobile devices since 2003 (when Groshek [2010] first examined these research questions), the democratic development of these countries suggests some very limited support for the notion that this wave of emerging media diffusion from 2004 to 2014 contributed to democratic augmentation. The following section thus further examines these four national case studies of what can be considered "permanent" democratic growth, with higher than statistically predicted confidence intervals and no decline of actual values to less than the forecast values of those confidence intervals at any point in time. In so doing, we analyzed the second research question in contextual and historical detail, probing more specifically to what extent Internet diffusion and mobile phone access could translate into reasonable causal mechanisms of that statistically significant democratic growth in countries displaying permanent democratic growth, which was the basis of RQ2.

Four case studies were applied to investigate the countries found as "permanently" more democratic in the present study, but not in the original Groshek (2010) study: Bhutan, Nepal, Myanmar, and Kyrgyzstan. Before moving into these case studies, a brief review of past findings from Groshek is important. Groshek found three countries—Croatia, Indonesia, and Mexico—that demonstrated "permanently" higher democracy levels from 1994 to 2003. Croatia was the only country where Groshek

tentatively attributed Internet diffusion as an underlying causal-type mechanism, instead citing other exogenous issues (both national and global) as having more certainly contributed to Indonesia's and Mexico's rapid democratization.

Even in the case of Croatia, whose people demonstrated by cyber participation and activism, Groshek (2010) declined to attribute Internet diffusion as the "defining feature of this democratic transition" (p. 155). Indeed, whereas Internet and mobile phone diffusion increased steadily for these three countries, their democracies did not continue to grow apace at a significant level during 2004–2014. Croatia, Indonesia, and Mexico demonstrated stable (but stagnant) democracy scores from 2004 to 2014. Mexico in particular had polity scores below what could have been statistically predicted from 2011 onward, reversing the trend Groshek had found there. The unchanged democracy level of Mexico in the study reported indicates that democracy has not increased as swiftly (or at all) as the original forecasting model predicted it would, based on democratization trends in previous years. Furthermore, as noted, despite widespread Internet and especially mobile phone diffusion, 14 countries in this sample actually showed lower democracy scores, many in the latter half of the decade. Although case studies of countries with statistically significant de-democratization are somewhat outside the scope of this study, these findings certainly suggest a more nuanced dynamic between the diffusion of emerging media technologies and democratic change than a simple linear or exclusively unidirectional relationship.

To examine these nuances, we now shift to historical case study analyses of the countries that were more democratic than statistically forecast, beginning with Bhutan. A small, remote kingdom in the Himalayas, Bhutan meets the selection criteria for more detailed examination based on its sustained democratic growth that was greater than statistical forecasts from 2005 through 2014, as graphed in Figure 1. Notably, Bhutan held its first national elections in December 2007, in which a prime minister was nominated and a parliament assembled (Turner, Chuki, & Tshering, 2011). Prior to these elections, in 2005 Bhutan's King Jigme Singye Wangchuck released a draft constitution that declared Bhutan a "democratic constitutional monarchy" (Hutt, 2006, p. 123). According to Turner et al. (2011), Bhutan's democratization does not fit "conventional explanations" (pp. 184–185) such as a grassroots movement, economic crisis, or international pressure. Rather, the country's democratic transition can be attributed primarily to the "transformational leadership" (Turner et al., 2011, p. 185) of Bhutan's king, who insisted on and ushered in democratization on the country's sometimes-skeptical public. This approach ensured a gradual and stable transition to the new system, and is also considered unique among cases of democratization, given its top-down nature (Sinpeng, 2007). Indeed, Mathou (1999) noted that whereas most monarchies resist democratization, Bhutan's kings have been a "leading force of change" (p. 614) for a public traditionally low in "political consciousness" (p. 616).

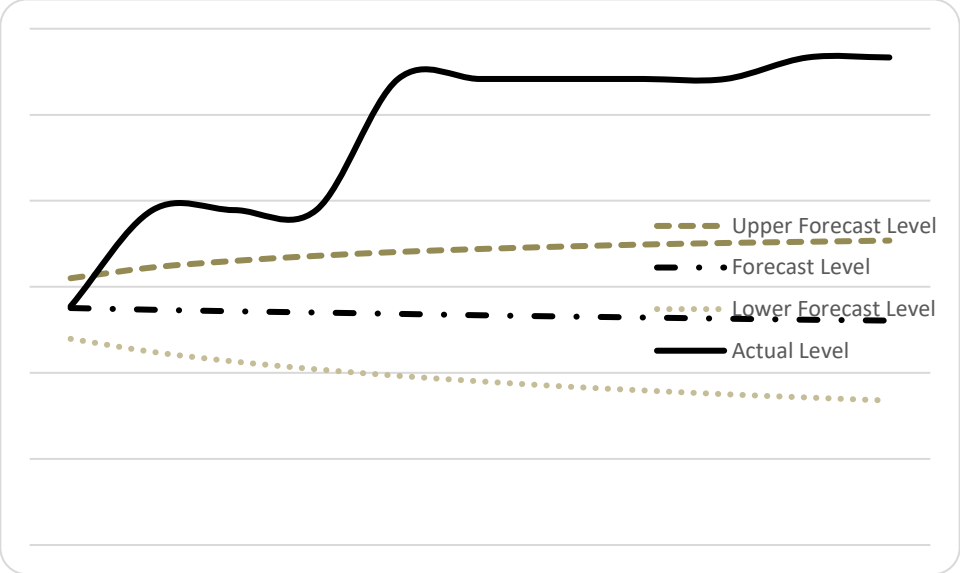

Figure 1. Statistically forecast and actual democracy levels (ln), Bhutan, 2004–2014. Forecast 95% confidence intervals are based on dynamic mean squared errors.

Here, the trajectory of Bhutan's democracy scores follow the "decreed" democratization timeline almost identically. The first year that democracy was greater than statistically predicted was 2005, and Bhutan's democracy score jumped again after 2007, when the first national elections were held. By 2007, the Internet reached only about 6% of Bhutan's population, a percentage that increased nearly six-fold by 2014. Closed for centuries because of geography and explicit policy, Bhutan "is traditionally an oral culture" (Avieson, 2015, p. 2489) of 23 spoken languages, only one of which is written. As such, literacy and newspapers have not been predominant in Bhutanese culture, and, once introduced, radio, TV, mobile phones, and the Internet have been much more readily adopted by the public (Avieson, 2015).

Following this explication of historical and sociopolitically contextual factors, the Internet and mobile phones were not summarily causal mechanisms in Bhutan's initial democratic transition in the late 2000s. Nevertheless, more recent events suggest that emerging media have had a more vital role in citizens' political expression and participation. Specifically, Avieson (2015) points to Facebook as a main news disseminator and calls the social networking site a "dramatic success" (p. 2495) for online civic participation. To wit, in 2013, the Bhutanese people overwhelmingly voted in an opposition party, which Avieson contends "demonstrated the people's confidence in exercising their new democratic rights and showed that Bhutan's nascent media industry had successfully played its role enabling a working democracy" (p. 2487). This continued democratic progress, coupled with significant Internet and mobile phone diffusion (nearly 30% and 72%, respectively, by 2013) and evidence of its embrace by the Bhutanese people, suggests that these emerging media technologies have and might continue to play an important role in Bhutan sustaining and growing its democracy.

Similar to Bhutan, Nepal's 2006 jump in democratization (see Figure 2) can be attributed to the end of the country's monarchy and its transition to a republic (Pokharel & Sengupta, 2006b). Nepal reached this milestone, however, after a decade of violence in the Maoist rebellion; by the 2006 ceasefire, Nepal's civil war mounted at least 13,000 deaths (Sharma & Najar, 2015). Myanmar's democratization (see Figure 3) also followed years of violence and oppression by the country's authoritarian military regime, which relinquished control in 2011 after the first national elections in 20 years overwhelmingly voted in a civilian government (BBC Asia-Pacific, 2011).

Unlike Bhutan's top-down transition to a democratic constitutional monarchy, both Nepal and Myanmar's democratizations were characterized by bottom-up protest-driven movements that more or less forced a change. In Nepal's case, the Maoist rebels joined forces with the country's other democratic political parties to protest the monarchy, whose king had taken absolute governmental power the year prior (Pokharel & Sangupta, 2006a). Myanmar's transition occurred many years after its 2007 Saffron Revolution, when the Burmese people revolted against the military regime. Protesters used Internet technologies such as message boards and blogs to share information about the events, sending civilian-produced videos and stories abroad and inciting an international human rights campaign (Chowdhury, 2008). Although ultimately the Saffron Revolution was stifled, this heightened global awareness may have put pressure on Myanmar officials to move toward more democratic processes.

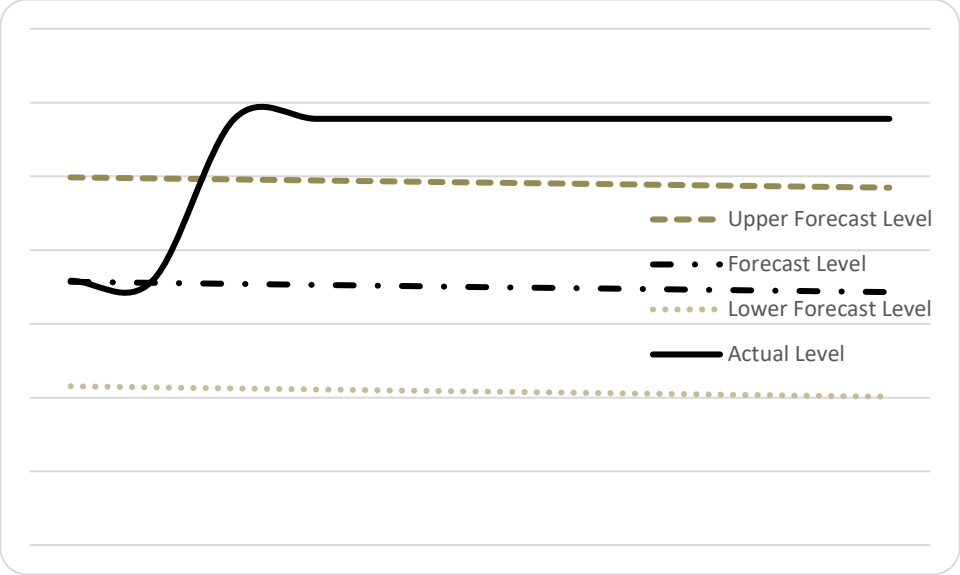

Figure 2. Statistically forecast and actual democracy levels (ln), Nepal, 2004–2014. Forecast 95% confidence intervals are based on dynamic mean squared errors.

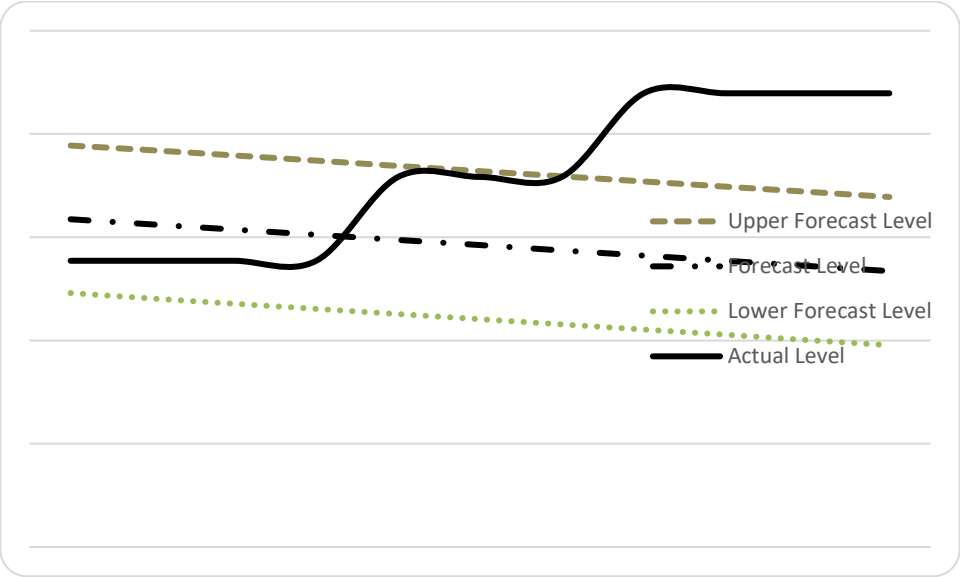

Figure 3. Statistically forecast and actual democracy levels (ln), Myanmar, 2004–2014. Forecast 95% confidence intervals are based on dynamic mean squared errors.

Despite what appears to be grassroots, prodemocracy movements, it seems unlikely that Internet and mobile phone diffusion played much of a role in stoking and coordinating actions, particularly in the case of Nepal. As shown in the Appendix, both countries had very low diffusion rates for both technologies at the times of their significant increases in democracy scores. Furthermore, Nepal's and Myanmar's regimes were known for heavy censorship; at various points in civilian protests, the regimes shut down communication infrastructure entirely (Acharya, 2012; Pidduck, 2012). In the case of Myanmar, however, some have suggested that the Internet played a critical role in disseminating information about the oppressive conditions to a global audience, which resulted in considerable outside pressure on the country's militaristic regime (Krebs, 2001). Where citizens within the country were hamstrung by repressive freedom of expression policies, "diasporic" and "exile" media took up the mantle to share information about the country's situation on the ground. Interestingly, Pidduck (2012) noted that because of Myanmar's suppression of Internet technologies, opposition media relied most heavily on broadcast methods to reach people within the country.

Kyrgyzstan also had a considerably less peaceful and stable democratization, although Kyrgyzstan had the highest democracy score by 2014 (see Figure 4) of the four countries being analyzed (see the Appendix). Of note, Kyrgyzstan is the only country of the former Soviet "child" nations that showed consistently and significantly higher democracy scores in its trajectory after the Soviet Union's dissolution in 1991. For comparison, by 2014, the Internet reached more than 28% of the Kyrgyzstan population, whereas another former Soviet nation, Tajikistan, had around 17% penetration. Central Asian nations have been known to demonstrate "a pronounced tendency toward heavy Internet censorship"

(Warf, 2012, p. 57). However, Kyrgyzstan showed higher democracy scores and presents valuable contextual and historical details as a case study. Kyrgyzstan's democracy scores became greater than statistically predicted in 2005, when Kyrgyz citizens launched massive protests against the current political leadership, demanding more civil liberties and forcing then-president Askar Akayev to flee the country (Kulikova & Perlmutter, 2007; Srinivasan & Fish, 2009).

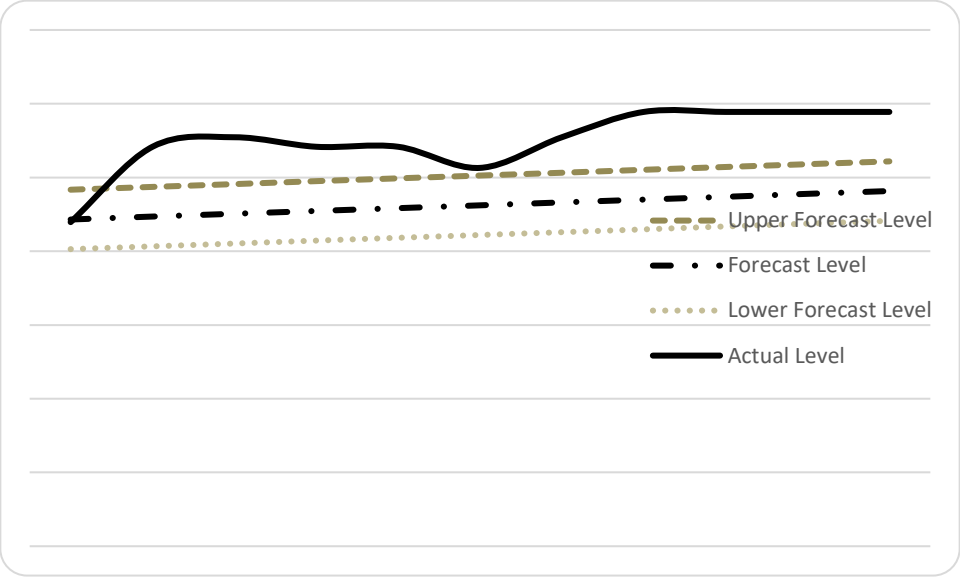

Figure 4. Statistically forecast and actual democracy levels (ln), Kyrgyzstan, 2004–2014. Forecast 95% confidence intervals are based on dynamic mean squared errors.

Scholars have credited emerging media with helping to facilitate this "Tulip Revolution" via information dissemination and protestor mobilization (Srinivasan & Fish, 2009) in an otherwise repressive media environment (Freedman, 2009; Kulikova & Perlmutter, 2007). In particular, Srinivasan and Fish (2009) noted that Kyrgyzstan stands out among other post-Soviet republics for its deregulated Internet, which McGlinchey and Johnson (2007) attributed to the involvement of external groups such as nongovernmental organizations and foreign aid.

Whereas traditional media (e.g., print, radio, and television) represent top-down, elite information dissemination with high barriers to entry through large production and distribution costs, the Internet provided an outlet for the Kyrgyz people to engage in political discourse and to develop civic communities without such obvious barriers of expense and distance (Srinivasan & Fish, 2009). In their examination of Kyrgyz opposition blogs leading up to and during the revolution, Kulikova and Perlmutter (2007) did not directly link the Internet activity with President Akayev's ousting, but they did argue that the blogs were a "significant producer, collector, sifter, distributor, and exhibitor of information" (p. 31) for engaging in political discourse and developing civic communities. In this case, it seems that the Internet was a contributing factor, but again likely not the main driver of democratization.

Indeed, Lewis (2008) asserted that two revolutions occurred in 2005. He wrote,

> One was an almost virtual revolution, staged by the supposed actors of "colour revolutions" elsewhere . . . [whose] positions did not reflect the underlying dynamic of political change, which used an entirely different discourse and language, followed different rules and norms, and was moving in an alternative political direction. (p. 266)

It also should be mentioned that some scholars dismiss the Tulip Revolution as a mere shift of power rather than a democratic transformation (Freedman, 2009; Lewis, 2008). Based on the premise that free, independent media are vital to a functioning, vibrant democracy, Freedman (2009) argued that little progress was made following the Tulip Revolution and those observations about the state limitations on a Kyrgyz free press make an expansive Internet seem more critical to democratization. Yet, Srinivasan and Fish (2009) found evidence that an online space existed for Kyrgyz citizens to engage in alternative political discourse and civic community building, while warning that these online spaces could be mitigated or quashed "when and if the government decides to push back with the policy and practice of intensive surveillance and policing" (p. 574).

Tajikistan has been coupled with Kyrgyzstan as a former Soviet republic with a deregulated Internet, relative to other Central Asian states (McGlinchey & Johnson, 2007). However, more recent reports have indicated a more repressive governmental stance toward Internet access, with the government blocking such sites as YouTube and Facebook in 2010 to 2011, and then again in 2012 to 2014 blocking access further, thereby adopting an aggressive type of "'networked authoritarianism' that sought to repress the new freedoms the Internet provided" (Shafiev & Miles, 2015, p. 303). A comparison of these two cases of Central Asian, post-Soviet nations is particularly illustrative: In Kyrgyzstan, where Internet diffused earlier and more widely, democracy also seems to have gained a more stable foothold, which has not been the case in Tajikistan.

Furthermore, both countries held elections in 2005 with quite different results: Kyrgyzstan actively protested and arguably upended the country's authoritarian rule, while Tajikistan maintained the status quo of its "soft authoritarian" rule (Markowitz, 2012). Tajikistan's case makes the argument stronger for the Internet's role in Kyrgyzstan's democratization. Both are "child" nations from the "parent" Soviet Union, and both faced similar democratic tests at around the same time. However, Kyrgyzstan demonstrated higher Internet and mobile phone diffusion (around 10% each) at the time than Tajikistan (around 0.3% and 4%, respectively), and indeed, Kyrgyzstan had a more democratic "revolution."

Discussion and Conclusion

To cite the study on which this study proceeded, "Under any circumstances, the opportunity to evaluate national and global patterns of communication technologies and the democratic effect they may impart on their social systems is a valuable one" (Groshek, 2010, p. 157). Since that work, relatively few studies have investigated cross-national time-series investigations of emerging media and democratic change. None have again attempted to replicate the forecasting models carried out here. The results from this study not only fill a void left by previous research but also update a line of work that has been

previously criticized for not taking into account more recent updates in social media platforms and mobile technologies that have proliferated since 2003, the end point of the earlier study. The findings from this study thus inform a debate well beyond that original work and also speak to more recent research that has suggested that online and mobile media have augmented democratic shifts, at least under certain circumstances (Stoycheff et al., 2016).

Still, much like Groshek's (2010) findings, there was extremely limited support for the notion that emerging media diffusion directly stimulated democratic growth globally, beyond that which could have been expected statistically based on historical trends. This study found only four countries (5.6% of the 72 countries tested) that were consistently more democratic than could be statistically predicted, and for a fraction of all nation-years. Furthermore, these countries' diffusion rates of emerging media were, much like Groshek found, remarkably low (the highest range of Internet diffusion across four countries was 2.10% to 34.37%) in the years in which democracy levels exceeded statistically predicted values. In fact, the 14 countries with observed democracy scores lower than statistically forecast values had considerably higher average 2014 Internet diffusion rates (44.88%) than those of the four countries with statistically greater democracy (20.05%). In short, countries that de-democratized between 2004 and 2014 had much higher levels of Internet access than countries that became much more democratic during this timeframe, which suggests a complex dynamic between emerging media and democratization.

Altogether, given this limited evidence in this study combined with the previously even more limited evidence from the Groshek (2010) study, it is practically impossible to suggest that Internet access and mobile phone diffusion have made substantive and generalizable contributions to those democratic transformations—and, as Groshek pointed out, "even more difficult to make promising generalizations about other countries based on measures of diffusion, rather than those of influence and uses" (p. 158). Indeed, this study's findings clearly demonstrate that utopian prognostications about emerging media and their democratic potential at the national level are unlikely to be realized. To the extent that significant increased democratization occurs only rarely beyond that which can be statistically expected, Internet and mobile phone diffusion can be considered underlying causal mechanisms only under specific and rare conditions, such as those explored in the case studies reported, and even then only as components of larger social and political processes.

Continuing, commercially driven social media platforms now have more than 1.5 billion global user bases (Statista, 2016), yet only four of 72 countries in this study have shown an increase in their national democracy level such that they are now more democratic than they could have statistically been expected to be 10 years prior. From a normative standpoint, these findings suggest something of a failure of the prevailing political media economy (McChesney, 2013) and the now-fanciful conception that the Internet itself could have been something other than a rigidly controlled ecosystem managed by a handful of for-profit corporations (Hauben, 1994). Nonetheless, it is interesting to consider the potential for Internet and mobile phone technology to serve as sustaining, rather than catalyzing, mechanisms in a growing or permanent democracy. To this end, it should be noted that countries with perfectly stable democracies (and autocracies) were excluded from the analysis because the forecasting model required change over time. Therefore, this study could not consider how emerging media might interact with existing and stable nations where democracy levels were unchanged.

Nonetheless, the implicit understanding is that emerging media diffusion was not connected to any sort of democratic growth at the national level. In the case of Bhutan, whose democracy was initiated by royal decree, it is conceivable that greater access to information through the Internet could facilitate and bolster the nascent democratic systems. Furthermore, it would be interesting to examine the complementary functions of both information dissemination via the Internet and mobile online engagement, particularly as they might relate ultimately to offline civic and political participation (as suggested, e.g., by Campbell & Kwak, 2010, 2011; and Gil de Zúñiga, Molyneux, & Zheng, 2014).

It seems prudent to continue to examine the interplay between emerging media diffusion and democratization, particularly given the potential for continued Internet growth in many young democratic states. However, although emerging media diffusion grew significantly for the three countries in Groshek's (2010) study, Croatia, Indonesia, and Mexico's actual democracy levels remained relatively stable over time. For example, from 2005 to 2014, Croatia's Internet diffusion doubled (from reaching 30% of the population to more than 60%), but its democracy score was unchanged. Findings such as this might suggest a saturation point, where increased penetration produces diminishing returns on incremental democratic growth. More analyses would need to be conducted to be able to say with any certainty, if there even is a general diffusion threshold for democratic effects, where that point might lie.

Still, despite the potential for emerging media technologies to be wielded as a democratic tool, "virtuosity and democratic agency are not inherent in [these] technologies, no matter how interactive or participatory" (Groshek, 2010, p. 158). Although many observers have taken note of online and mobile technologies in bringing about the Arab Spring, several also identified the region's history of and predisposition toward activism (Groshek, 2012; Howard & Hussain, 2011). In other words, emerging media are not effective democratizing agents unless individuals use them as such (Nord, 2001; Schudson, 1999, 2003), and even then, the net democratic effect may still fall within statistically expected parameters. This study, in conjunction with Groshek's (2010) earlier work, clearly supports the conclusion that Internet and mobile phone technologies have "*not* catalyzed transformative, national level democratic growth" (p. 159) and that they are unlikely to do so. This finding is particularly crucial given the additional heft of another 10 years of data in which there were tremendous advances in emerging media that had ultimately little effect on democratization beyond a few individual cases.

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Appendix

Table A1. Comparing Actual Democracy Scores (ln) to Upper and Lower Forecasted Values of 95% Confidence Intervals Constructed Around Forecasted Democracy Scores (ln), With Internet and Mobile Phone Diffusion Rates, 2004–2014.

Year	Upper forecast democracy value	Actual observed democracy level	Lower forecast democracy value	Internet access per 100 citizens	Mobile phone subscriptions per 100 citizens
		Bhutan			
2004	1.555	1.387	1.198	3.157	3.019
2005	**1.613**	**1.946**	**1.122**	3.847	5.535
2006	**1.651**	**1.946**	**1.066**	4.518	12.332
2007	**1.680**	**1.946**	**1.021**	5.920	21.997
2008	**1.703**	**2.708**	**0.983**	6.550	36.614
2009	**1.720**	**2.708**	**0.951**	7.170	48.108
2010	**1.734**	**2.708**	**0.922**	13.600	54.999
2011	**1.746**	**2.708**	**0.898**	21.000	66.379
2012	**1.755**	**2.708**	**0.876**	24.000	75.610
2013	**1.762**	**2.833**	**0.857**	29.900	72.198
2014	**1.769**	**2.833**	**0.839**	34.370	82.070
	Kyrgyzstan				
2004	2.417	2.197	2.014	5.090	5.247
2005	**2.436**	**2.708**	**2.033**	10.534	10.742
2006	**2.455**	**2.773**	**2.052**	12.307	24.830
2007	**2.475**	**2.708**	**2.072**	14.030	42.232
2008	**2.494**	**2.708**	**2.091**	15.700	65.304
2009	**2.513**	**2.565**	**2.110**	16.000	85.222
2010	**2.532**	**2.773**	**2.129**	16.300	98.899
2011	**2.552**	**2.944**	**2.148**	17.500	116.169
2012	**2.571**	**2.944**	**2.168**	19.800	124.179
2013	**2.590**	**2.944**	**2.187**	23.000	121.450
2014	**2.609**	**2.944**	**2.206**	28.300	134.461
	Myanmar				

2004	1.944	1.386	1.230	0.024	0.185
2005	1.921	1.386	1.203	0.065	0.257
2006	1.896	1.386	1.178	0.182	0.424
2007	1.871	1.386	1.153	0.217	0.487
2008	1.845	1.792	1.128	0.220	0.718
2009	1.820	1.792	1.103	0.220	0.974
2010	1.795	1.792	1.078	0.250	1.144
2011	**1.770**	**2.197**	**1.053**	0.980	2.376
2012	**1.745**	**2.197**	**1.028**	1.069	7.064
2013	**1.720**	**2.197**	**1.002**	1.600	12.829
2014	**1.695**	**2.197**	**0.977**	2.100	54.039
	Nepal				
2004	2.493	1.792	1.077	0.450	0.469
2005	2.486	1.792	1.069	0.827	0.899
2006	**2.479**	**2.890**	**1.062**	1.141	4.514
2007	**2.472**	**2.890**	**1.055**	1.410	12.597
2008	**2.465**	**2.890**	**1.048**	1.730	16.000
2009	**2.458**	**2.890**	**1.041**	1.970	21.088
2010	**2.451**	**2.890**	**1.034**	7.930	34.253
2011	**2.444**	**2.890**	**1.027**	9.000	49.176
2012	**2.437**	**2.890**	**1.020**	11.149	60.451
2013	**2.430**	**2.890**	**1.013**	13.300	76.850
2014	**2.423**	**2.890**	**1.006**	15.440	81.866

*Note: Forecast and actual values in **bold** identify those years for each country where the actual democracy score was greater than the statistically predicted upper or lower democracy levels.*