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Introduction

Politics has become big business on the Internet. $2.1 Billion has been spent so far on the presidential campaign this year (Mosk, 2008). The Pew Internet and American Life Project (Cornfield and Rainie, 2006) predicted that YouTube will be the next "killer app" for politics. The 2008 presidential campaigns routinely release their television ads on YouTube as well as their own websites. The presidential campaigns for both John McCain and Barack Obama also have a presence on social media such as MySpace and Facebook. The blogosphere is full of political chatter.

Politicking on the Internet may be a game changer. The Internet may dramatically increase the role of citizens, provide superior information leading to better informed citizenry, and in general achieve the utopia of a direct democracy (Papacharissi, 2002). The Internet may also foster a new generation of politicians who ignore traditional "big money" tactics in favor of grassroots campaigns. For example, sites such as MySpace and YouTube are low cost and yet provide almost unlimited scalability in reaching voters. Just as the Internet has reduced the barriers to entry in many industries, it may also create a level playing field for all candidates. However, we still don't know whether the Internet can in fact revolutionize the basic nature of the political process and achieve a "cyber democracy." In sharp contrast with this utopian perspective, others such as Robert McChesney think that new media will make it easier for a few powerful entities to control global media. Finally, it is also possible that the Internet may have no effect; it may simply reflect the characteristics of traditional politics and media. In this report we explore the game changing potential of the Internet by focusing on two inter-related questions:

Can the Internet change the nature of competition in politics?
We explore the impact of the Internet on the nature of political competition. Specifically, we consider how the Internet can increase the opportunity (threat) of new entrants and how it may change the bargaining power of customers-voters and suppliers-politicians (Porter, 1985).

Can the Internet replace or complement traditional channels of communication and persuasion?
To complement the above perspective, we explore the impact of digital media, which is often characterized as highly interactive, accessible, impartial, and thus more persuasive than traditional media. Specifically, we analyze the differences in traditional, web 1.0, and web 2.0 media on presidential politics.

To address the above questions, we analyze the 2008 presidential primaries to assess the impact of the Internet on Gallup polls, and the use of campaign websites. To summarize, our analysis shows that blogs do impact a candidate's poll numbers and less well known candidates can gain ground by using YouTube and MySpace.

> "Blogs significantly impact Gallup Polls. Less known candidates can gain visibility with YouTube and MySpace."

Research approach

The analysis focuses on aggregate data for 15 candidates over 12 months starting February 2007. The candidates included: Joseph Biden, Hillary Clinton, Chris Dodd, John Edwards, Rudy Giuliani, Mike Gravel, Mike Huckabee, Duncan Hunter, Dennis Kucinich, John McCain, Barack Obama, Ron Paul, Bill Richardson, and Mitt Romney. We examined the number of times per month candidates were mentioned in traditional media, including TV, radio, and newspapers; web 1.0 media, including web publications such as CNN.com; and web 2.0 media including blogs, social networks (e.g., MySpace), and media sharing (e.g., YouTube). We also collected data on monthly Gallup polls and usage of candidate websites. Please see the appendix for further details.

In the remaining sections, we first provide a descriptive overview and then follow that up with more detailed analysis of the impact of the Internet on the 2008 presidential primaries.

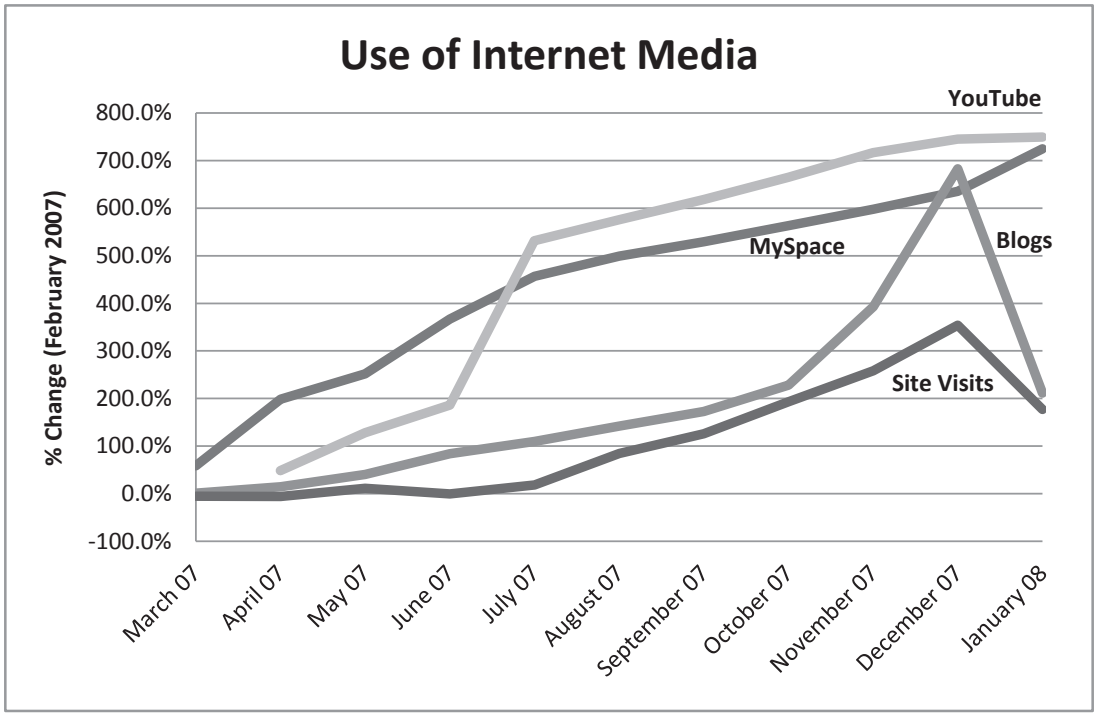

Figure 1: Use of Internet media

Presidential politics on the Internet

The Internet was increasingly used in the 2008 presidential primaries (see Figure 1). Candidates were much more active in using the technology to promote their campaign and voters were much more active in using the Internet to express their opinion, organize, and generally participate. Candidates used their campaign websites to elaborate on policy issues, post promotional materials, and to solicit and receive online donations.

Barack Obama led democratic candidates in both the number of visitors and the number of page views per visit to his campaign site (see figures 2 and 3). The relative dominance of Obama and Clinton on the democratic side suggests that in aggregate, their sites mirrored their presence in the traditional

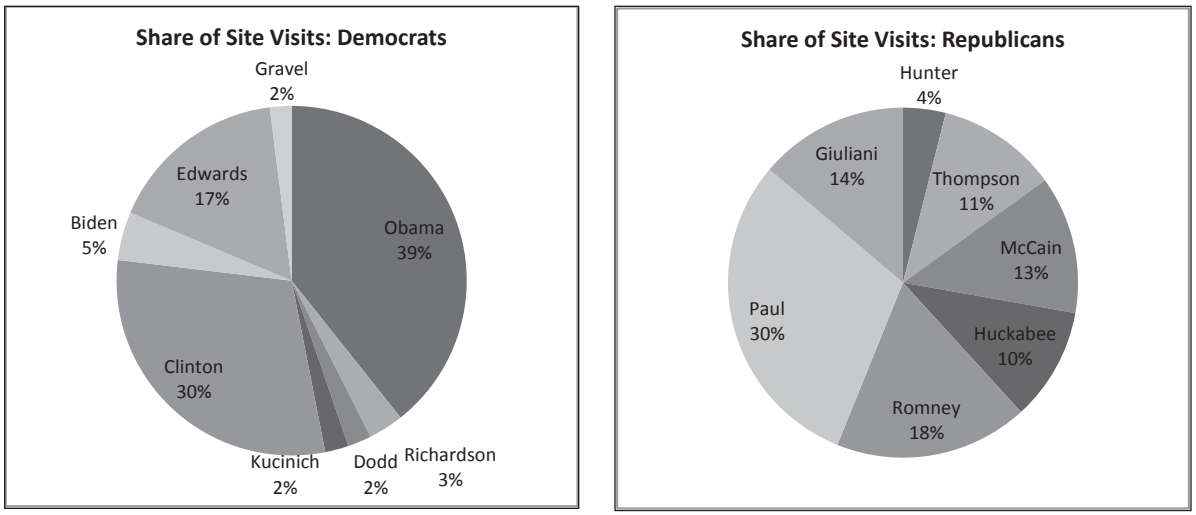

Figure 2: Candidates share of site visits

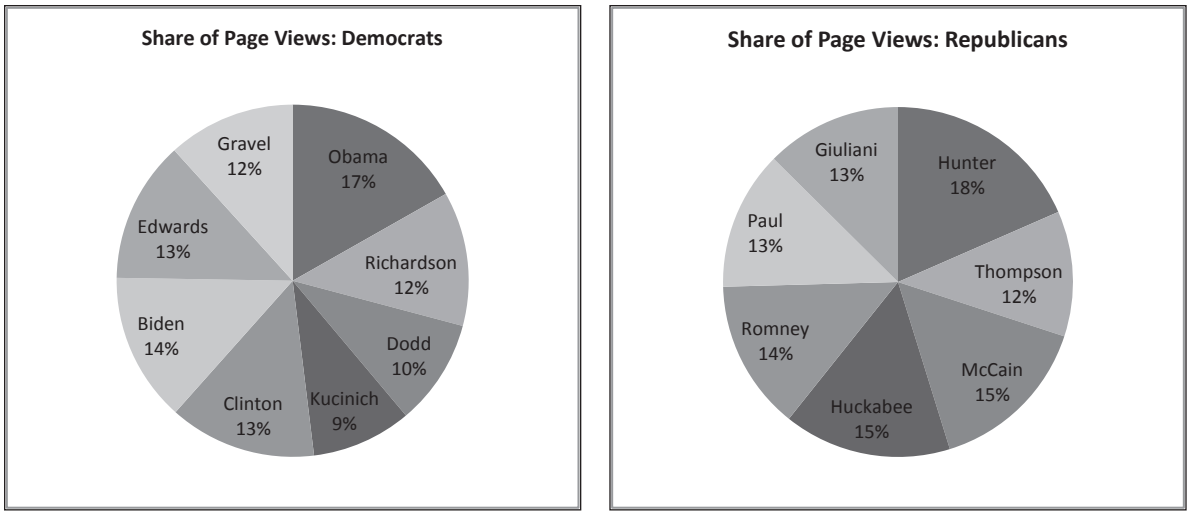

Figure 3: Candidates share of page views

media. On the republican side, Ron Paul led in the number of visitors and Duncan Hunter led in the number of page views per visit. This provides some evidence that perhaps lesser known candidates can reach a higher proportion of voters. While site visits likely indicate interest in a candidate, page views per visit likely indicates the depth of interest. The relatively balanced distributions of page views in the pie charts suggest that supporters of less well known candidates don't spend more effort learning about their candidate in comparison with others. The data is contrary to the assumption that the Internet will embolden voters to learn more about less well known candidates. In other words, if information is power,

> "Less known candidates have not done enough with their sites to change the game."

then the customers are not using the availability of information to change their bargaining power with respect to the relative knowledge they gain about candidates. It could also mean that the candidates – especially the relatively less known "suppliers" have not done enough with their sites to change the game.

Obama was generally ahead of the other democratic candidates in blogs (24%, Clinton had 33%), YouTube (71%), and MySpace (44%). Republican blog mentions were more evenly distributed, though Paul was dominant in YouTube (46%) and MySpace (34%). It is interesting that neither Obama nor Paul were frontrunners during the period of our data collection. MySpace created a section of its site dedicated to the 2008 presidential election. As of October 2008, John McCain had 116,047 "friends" on MySpace compared to 587,661 for Obama.

To further explore the overall effects of web 2.0 media we plotted the total average mentions of each candidate on blogs, MySpace, and YouTube (see Figure 4). The curves generally follow power-law relationships[1]. Given that the popularity of candidates on web 2.0 media follows the power-law it is likely that these media are not fundamentally different than other media. Note that the power law graph for blogs is kinked and there is a break between the fat belly and the long tail. The drop to the next level of candidates is steep.

Does the Internet really matter?

It seems that Ron Paul was able to leverage the Internet better than his competitors. But does presence on the net translate into meaningful results? One measure of win-ability is polling data. We conducted fixed effects regression analysis on the correlation of traditional media, web 1.0 and web 2.0 technologies to the candidates Gallup poll standings (see Table 1). To account for lags between changes

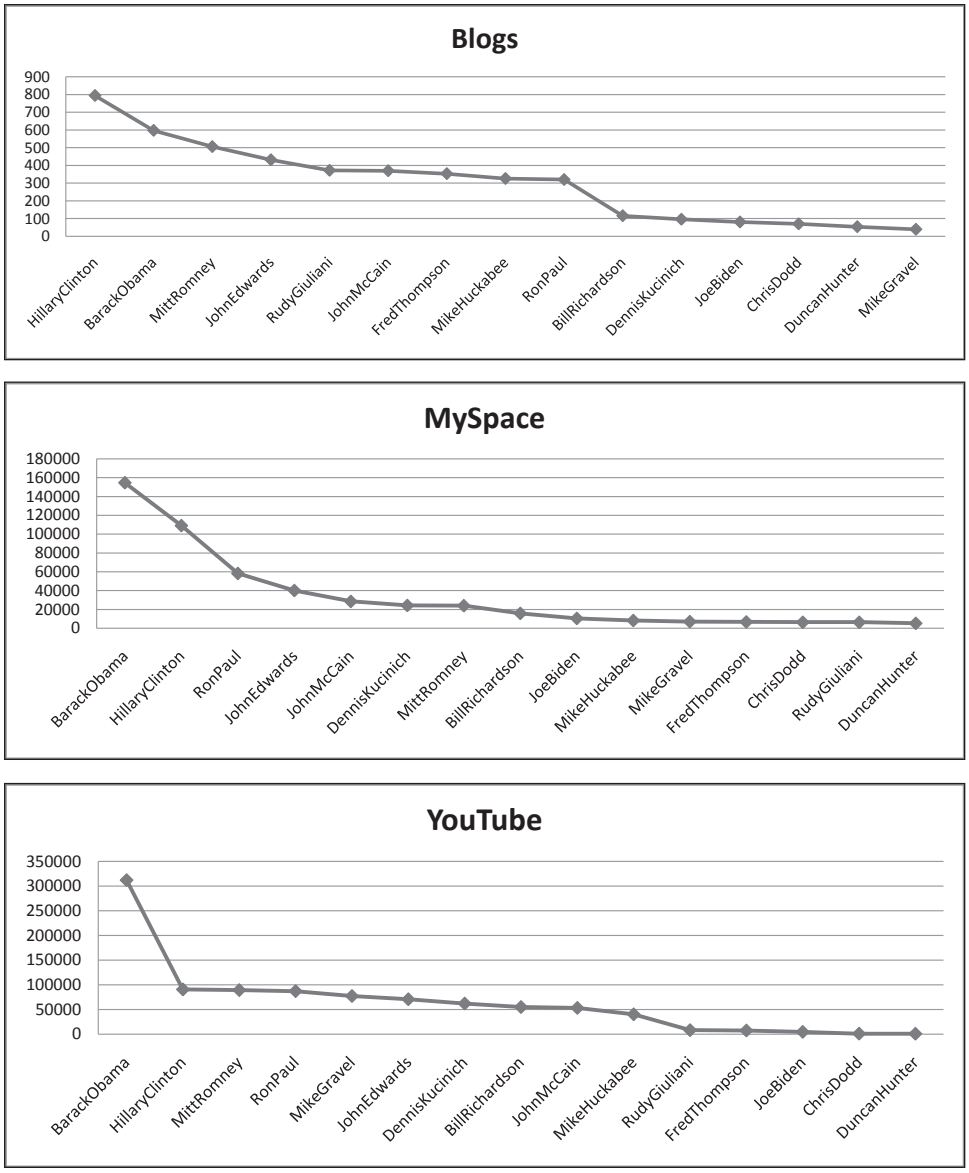

Figure 4: Total average mentions for each candidate

in Internet presence and effect on poll numbers, we matched the polling data for each month with the measures from the previous month. See the appendix for further details.

Surprisingly, only blogs are significantly correlated to an increase in Gallup polls. Traditional media, which includes TV, newspaper, and radio, and Web 1.0 media which includes candidate sites as well as mentions in web publications such as CNN.com was not significant. This result is counter to conventional wisdom about the power of TV, radio, and newspapers.

Blogs are powerful because of their ease of use, interactivity, and perceived independence, and as a

Media	Gallup polls (sd)
Traditional Media	0.24 (0.17)
Web1.0	0.13 (0.13)
YouTube	-0.01 (0.05)
MySpace	-0.1 (0.08)
Blog Mentions	**0.54 (0.17)**

Table 1: Impact of media on Gallup polls[2]
(significant results are in boldface)

result they afford many-to-many interaction (Rice, 1984) at an unprecedented scale. Johnson and Kaye (2004) found that the people who were more active readers of political weblogs also found them to be more credible than traditional media. Adamic and Glance (2004) found that communities of similar thought emerge from the blogosphere and that politically-oriented weblogs reference other blogs with similar viewpoints more often than those with opposing views. In other words, blogs can credibly *socialize* and *scale* campaign movements like no other web 2.0 (or web 1.0 or traditional media) technology. More generally, blogs change the bargaining power between voters and candidates. In the past, candidates as suppliers had much more control over the content and delivery of their message. It is hard to envision that kind of fine grained control in the blogosphere.

> "The impact of blogs is a game changing result and could change the nature of politics."

This is a dramatic game changing result and could herald a long term change in how politics is conducted and deliberated. It may move us closer to the ideal of a deliberative forum discussed by philosophers such as Habermas (Klein and Huynh, 2004), or politicians such as Al Gore (Gore, 2008), who envision an egalitarian public sphere for discussion. On the other hand, our data focuses only on the correlation of blog mentions to polls; it does not say anything about the quality and tone of deliberation. It is too early to say that the deliberation in blogs reflects an enlightened and informed debate.

The above analysis is primarily useful for assessing the overall societal level role of media in politics. Candidates arguably have very little direct control on traditional media or web publications; web 2.0 media because of its open and interactive nature is much more amenable to influence by campaigners. Therefore, it would be interesting to (only) compare the impact of web 2.0 media independent of traditional outlets. Further, many candidates use their campaign web sites to raise funds and they have the most direct opportunity to influence voters who visit their sites.

In Table 2, we examine the impact of web 2.0 on both Gallup polls and campaign site visits. Not surprisingly, blogs still have the most impact on polls and also on site visits[3]. The positive impact of YouTube views on site visits is interesting especially since there is no corresponding impact on polls. The YouTube views may be acting as a "teaser." YouTube specifically and media sharing in general may represent a complementary channel of communication that does not directly change polls but provides enough persuasion that voters want to learn more.

Can new candidates break barriers to entry?

Some candidates received a disproportionate share of attention in the traditional media such as television and radio. It is generally assumed that frontrunners like Hillary Clinton will receive more coverage of a campaign event than underdog candidates such as Ron Paul or Chris Dodd. The Internet may increase the threat of new entrants by leveling the playing field for all candidates. Candidates can circumvent traditional media and get their message across inexpensively. The distribution cost of YouTube is practically zero. Campaign workers can get

Media	Gallup Polls (sd)	Site Visits (sd)
Site Visits	0.04 (0.05)	N/A
Page Views	0.15 (0.22)	0.27 (0.3)
YouTube Views	-0.009 (0.03)	**0.32 (0.03)**
Blog Mentions	**0.16 (0.07)**	**0.66 (0.05)**
MySpace Friends	-0.004 (0.04)	0.09 (0.06)

Table 2: Overall effect of candidates' Internet presence on poll numbers and site visits

Candidates	
Well Known	**Less Known**
Hillary Clinton	Duncan Hunter
John Edwa	Ron Paul
Barack Obama	Mike Gravel
Rudy Giuliani	Dennis Kuchinich
Mike Huckabee	Bill Richardson
John McCain	Joe Biden
Fred Thompson	Chris Dodd
Mitt Romney	

Table 3: Well known and less known candidates

their message across on blogs even if the traditional media is not paying attention.

The question arises whether web 2.0 tools are more important to the less well known candidates. We used LexisNexis to collect data on the number of radio and television mentions of each candidate each month. Candidates whose average mentions were above the median were placed in the "well known" category and the remaining candidates were placed in the "less known" category (see Table 3).

The results in Table 4 show that blogs only play a significant role in influencing poll numbers for well known candidates; their effect for less known candidates is not significant. Blog mentions alone may not provide the necessary "traction" for less-known candidates. Voters who are unaware of these candidates may be overlooking associated blog entries. Instead, YouTube and MySpace have a positive and significant influence on a less known candidate's standing in the polls. These results are consistent with our descriptive analysis of YouTube and MySpace which show Ron Paul holding the largest share among republicans. YouTube and MySpace are likely partially responsible for Ron Paul's success both in terms of increasing standing in polls and in the case of YouTube in leading to site visits. Web 2.0 media may have ultimately increased the legitimacy of his campaign. Given the sharing (YouTube) and linking (MySpace) nature of these technologies it is possible that supporters are using these tools to promote their candidate to people they know.

Overall, it does seem that the internet and web 2.0 media in particular does increase the threat of new entrants and given the low barriers to entry, it is likely that this phenomena will only gain ground.

Can you win an election using the net?

Blogs seem to powerfully correlate with Gallup polls in general. However, as discussed earlier, blogs are very hard to directly influence. Other web 2.0 media does not have a powerful impact, even when the correlation is significant. For example, even though the impact of YouTube on Gallup polls is significant for less well known candidates, the coefficient is only 0.04. This means that for each 1% increase in YouTube views leads to only a 0.04% increase of Gallup polls. These numbers will not seem exciting to political strategists. However, the use of these technologies is growing rapdily by what will become the next generation of voters. The impact could very quickly increase in the next election.

There also seems to be a stage based effect of certain media. For example, our results provide early evidence that some technologies may make more sense in the beginning of a campaign and others later

	Well Known Candidates		Less Known Candidates	
	Gallup Polls (sd)	**Site Visits (sd)**	**Gallup Polls (sd)**	**Site Visits (sd)**
Site Visits	**0.18 (0.1)**	n/a	-0.04 (0.03)	n/a
Page Views	-0.002 (0.18)	0.17 (0.19)	-0.01 (0.02)	0.1 (0.1)
YouTube Views	-0.005 (0.09)	**0.37 (0.09)**	**0.04 (0.024)**	**0.54 (0.06)**
Blog Mentions	**0.77 (0.16)**	**0.78 (0.14)**	0.07 (0.07)	**0.7 (0.27)**
MySpace Friends	-0.15 (0.12)	0.04 (0.13)	**0.1 (0.04)**	-0.1 (0.17)

Table 4: The impact of web 2.0 media for well known and less known candidates[4]

on in a campaign. For example, unless new unknown candidates can gain some critical mass, unleashing campaign workers to contribute to the blogosphere is unlikely to have any impact. On the other hand, a viral approach of seeding media sharing sites with political messages early on in a campaign may afford more gain.

A note of caution

Our study has limitations and the results are more exploratory than definitive. Poll numbers obviously do not always indicate success. It is hard to infer causality from highly aggregate public data. For example, is it the blogs that are impacting the poll numbers or are the well publicized results of polls impacting the blogs? It should be noted however that we are using time series data and our model is lagged so that it matches Internet data with Gallup polls in the following month. This increases the robustness of our results.

> "The media and political industries will need to devise new ideas to leverage the Internet.

We used aggregation services such as Lexis-Nexis to collect some of our data which could bias the results. We limited our analysis of social networking to MySpace and media sharing to YouTube. There are other similar sites and including them in the analysis may change the results. See the appendix for a more detailed analysis of the research method and potential threats to the validity of our results.

Concluding comments

The ancient Greek Agora was seen as an open place for gathering, a free market both literally and in terms of ideas. It is associated with the utopian ideal of a direct democracy where citizens listen and share ideas and govern directly. The Internet is not an Agora and may never reach that ideal. Our early evidence shows that the Internet follows the pattern of other natural phenomena and there is little evidence that voters are actually using the net to learn and exchange in-depth ideas. However, the business of politics has become much more interesting, especially with the advent of web 2.0.

Our results indicate that campaign strategies that rely on sheer force of spending to reach the most voters may no longer be very effective in the future. There are many more channels, they exhibit markedly different characteristics and nuances, and they are much harder to control and influence.

We need much more research to understand the above dynamics. One promising area is social networking research which has shown that "word of mouth" interaction through casual acquaintances is very important to spreading information because these weak ties act as a bridge among dissimilar people (Granovetter, 1973). Web 2.0 media provide for the first time a mechanism to easily leverage these weak ties. Can politicians leverage these weak ties to spread their message? A second important area is the form and content of deliberation on the net (Asif, 2007). What are people really saying on the blogosphere and in their comments on media sharing sites? Is the form of persuasion different? Are people simply moving from shouting slogans on streets to slogans on the net? The result of this analysis will go a long way toward understanding the true long term impact of the Internet on politics.

The media industry will need to adjust. Reporting on campaign rallies in town halls without considering virtual rallies may in the future only tell some of the story. Advertising will need to formulate new strategies to justify the expense of traditional television and newspaper ads. Analysts will need to devise new ways of assessing the health and direction of campaigns. For example, we may need the internet version of Gallup or an index that measures the chatter in the blogosphere.

Political campaigns will need new strategies. It is unlikely that simply going out and "pressing the flesh" will by itself prove successful. The next election may be won by a politician that writes eloquently on the blogosphere rather than the one who is the most telegenic.

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Endnotes

1. The power law is a relationship between two variables that exhibits scale invariance. Power-law relationships are used to characterize many kinds of natural phenomena including the 80-20 rule, Pareto's law of income distribution, and the law of gravity. Typically, the right hand side of a power-law graph is known as the long tail and represents the less popular segment, while the left hand side is known as the fat belly and represents the few that dominate. The power-law has sparked many truisms in society such as the "rich get richer." Our application of the power-law relationship here is exploratory as the number of available data points is not sufficient for definitive conclusions.
2. Each cell in the table above and all the subsequent tables reports a correlation coefficient followed by the standard deviation in parenthesis. The coefficient show relative positive or negative impact. For example, a 1% increase in a candidate's relative blog mentions leads to a 0.54% increase in Gallup poll numbers (with a standard deviation of 0.17). The statistically significant results are shown in boldface.
3. The results of this table will differ from the previous table because we are excluding traditional and web 1.0 media from the analysis.
4. Overall sample size was 176, including 95 for well known candidates, and 81 for less known. The variance inflation (VIF) values were below the recommended level of 10.

Acknowledgements

We would like to thank Bruce Fadem, chair, Fox MIS advisory board, and former VP and CIO, Wyeth, and Ford Calhoun, former VP and CIO, GlaxoSmithKline for their valuable feedback. Thanks also to Andrew Raisej, Joshua Levy and techpresident.com for sharing data on the candidates' Internet usage.

Appendix: Research Method

Sources of data

The analysis includes aggregate data for 15 candidates over 12 months starting February 2007 with a sample size of 176 data points (four data points are missing). We collected data on site visits and number of page views per visit from compete.com, and youtube views and number of myspace friends from techpresident.com. The data for "Newspapers", "TV – Radio", "Web Publications" and "Blogs" is sourced from LexisNexis. "Newspapers" represents the number of references made to a candidate in the top 25 newspapers by circulation in the US. "TV – Radio" represents the number of references made to a candidate in the 33 TV or radio shows tracked by LexisNexis including ABC, CBS, CNN, Fox and NBC, as well as broadcasts from EuroNews, Kremlin, Al-Jazeera, Channel News Asia and CNBC. "Web Publications" are references to a candidate in 202 Web Publications including Briefing.com, BusinessWeek online, CNN.com, Economist.com, eWeek.com, Kiplinger, Salon.com, Slate, and Yachting and Boating world. "Blogs" represents the number of references made to a candidate by the 28 online blogs and blog aggregators syndicated by LexisNexis such as Billboard, Jaded Insider, Reel Pop, and Meeting Industry Gurus. Blog aggregators include NewsTex Financial, Government, Politics, Legal, Media, and Medical blogs which number in the thousands. This number changes rapidly as blogs are created and disbanded.

Data analysis

We used regression to analyze the data. The regression model included the impact of site visits, page views, YouTube video views, blog mentions, and MySpace friends on candidates' performance in the polls. The specific variables include:

$GALLUP_{i,t+1}$: The dependent variable $GALLUP_{i,t+1}$ is the Gallup poll numbers for candidate i in month t+1. In some cases, Gallup conducts more than one poll in a given month (usually 2). We measure $GALLUP_{i,t+1}$ as the average of the Gallup poll numbers for candidate i in month t+1.

Since the Gallup polls are percentages and are reported for Democrats and Republican's separately, we normalized our independent variables. Those variables are:

$VISITS_{i,t}$: is the fraction of people who visit candidate i's website in month t. For example, if there are three candidates A, B and C in the Democratic party and 20, 30 and 50 people visited their website in May 2007, then the values for the $VISITS_{i,t}$ variable for May for these candidates are 20/100, 30/100, and 50/100 respectively.

$PAGES_{i,t}$: is the normalized value of the average number of page views at candidate i's website during month t. This is a proxy for the attractiveness of a candidate's website.

YOUTUBEi,t : is the normalized value of the number of people who viewed videos posted on candidate i's YouTube page at the end of month t.

$BLOG_{i,t}$: is the normalized value of the number of blog mentions for candidate i in month t.

$MYSPACE_{i,t}$: is the normalized value of the number of friends that candidate i has at the end of month t.

Our empirical model is as follows:

$$GALLUP_{(i,t+1)} = \chi 1\ VISITS_{(i,t)} + \chi 2\ PAGES_{(i,t)} + \chi 3\ YOUTUBE_{(i,t)} + \chi 4\ BLOG_{(i,t)} + \chi 5\ MYSPACE_{(i,t)} + \chi_i$$

where i = 1…15 denotes each candidate, and t = 1….T denotes the month. The dependent variable is the candidate's Gallup poll number measured in month t+1, and the independent variables are measured in month t. Our data has observations on 15 candidates over multiple time periods, and therefore represents a panel data model. According to prior research (Hsiao, 1986), the results of OLS may be biased in panel data such as ours. Therefore, we control for the candidate specific fixed effects by including a dummy variable for each candidate. We ran another model which controlled for both candidate and time specific fixed effects. Our results are qualitatively unchanged in this alternate specification.

In addition, we are also interested in understanding

the impact of blogs, social networks and viral videos on the visits to a candidate's website. Therefore, we have created a second model to reflect this:

$$VISITS_{(i,t)} = \beta 1\ PAGES_{(i,t)} + \beta 2\ YOUTUBE_{(i,t)} + \beta 3\ BLOG_{(i,t)} + \beta 4\ MYSPACE_{(i,t)}$$

The variance inflation (VIF) values were below the recommended level of 10, suggesting that correlation between our independent variables is not a concern in our data.

About the authors

Sunil Wattal is Assistant Professor of Management Information Systems at the Fox School of Business, Temple University, Philadelphia, USA. Dr. Wattal's expertise focuses on information technology privacy and personalization, innovation, online communities, and IT security. His work has been published in *IEEE Transactions on Software Engineering* and in international conference proceedings such as *International Conference on Information Systems*, *Americas Conference on Information Systems*, and *Hawaii International Conference on Systems Sciences*. He has also presented his work at numerous conferences such as Workshop on Economics of Information Security, Workshop on Information Systems Economics, Conference on Information Systems and Technology, INFORMS, and Workshop on Statistical Challenges in eCommerce. His research has received mentions in press publications such as New Scientist Magazine, SecurityFocus, and The Register(UK).

Dr Wattal's current projects include measuring the personalization privacy tradeoff in email advertisements, studying the role of Internet in presidential elections, and the adoption of social computing tools such as blogs and wikis in organizations. Dr. Wattal has worked as a design engineer, business development executive, and analyst. Most recently, he worked as a senior analyst to analyze sales and pricing data in the healthcare industry. He holds a Bachelor's in Engineering from Birla Institute of Technology and Science Pilani (India), an MBA from Indian Institute of Management Calcutta (India), an MS (Industrial Administration) from Carnegie Mellon University, and a PhD from the Tepper School of Business, Carnegie Mellon University.

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David's teaching interests include Java programming, object oriented modeling and development, and networking. David has received the MIS department Teacher of the Semester Award several times and has been recognized for his leadership. His research interests include management of computer support in large networked organizations, issues surrounding IT valuation and assessment of total cost of ownership, and data warehousing. David has published in journals such as *Decision Support Systems*, *Information & Management*, *Computer*, and *Communications of the ACM*.

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Munir Mandviwalla is Associate Professor and founding chair of the Management Information Systems department, and Executive Director, Institute for Business and Information Technology, Fox School of Business, Temple University. Dr. Mandviwalla has published articles on collaborative systems, virtual teams, software training, peer review, and globalization. His most recent work in 2008 includes identifying and defining the concept of municipal wireless networks (Communications of the ACM) and a case study of global integration (Ivey Publishing). He is currently working on a social computing project with a large electronics and manufacturing firm and on a model to explain wireless technologies. His publications have appeared in *Management Information Systems Quarterly (MISQ)*, *ACM Transactions on Computer Human Interaction*, *Journal of Organizational Computing and Electronic Commerce*, *Decision Support Systems*, *Small Group Research*, *Communications of the Association for Information Systems*, *Public Administration Review*, and *Information Systems Journal*. His work has been supported by grants from the National Science Foundation (NSF), Bell Atlantic, IBM, Microsoft Corporation, CIGNA Corporation, Advanta Corporation, Lotus Development Corporation, and Lilly Endowment, Inc. In 2000, IBM selected him for their Faculty Partnership Award in recognition for contributions to E-Business teaching and research. In 2002, The Claremont Graduate University recognized him with their Alumni Hall of Fame award.

As executive director of the Institute for Business and Information Technology, Mandviwalla leads a full service institute that engages with industry at multiple levels including research and human capital development, and provides faculty and students with funding, scholarships, contacts, and professional development. As the founding chair of the department of Management Information Systems, Mandviwalla leads the research and teaching activities related to information systems for the Fox School of Business. He holds a BSc in Systems Engineering from Boston University, a MBA from the Peter F. Drucker School of Management at Claremont Graduate University, and a Ph.D. in Management Information Systems from the Programs in Information Science at Claremont Graduate University.

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