WORKING PAPER # 006 PREDICTING CIVIC HACKATHONS IN LOCAL
COMMUNITIES: PERSPECTIVES FROM SOCIAL CAPITAL AND CREATIVE
CLASS THEORY

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Predicting Civic Hackathons in Local Communities: Perspectives from Social Capital and Creative Class Theory

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Abstract

The growth of technology-led voluntary efforts has blossomed in the past decades. While some of these are online, others are face to face. Hackathons are a part of the latter group. Volunteers come to work on community problems that involve technology. They are mostly short term face to face events. While they might be considered instances of episodic volunteering, they represent a regular series of volunteering opportunities for others. Hackathons are generally associated with the Civic Technology Movement, which aims at involving citizens, nonprofits and other stakeholders in reinventing government.

Civic hacking is a new phenomenon, and the literature is limited. An important issue that has not been explored is why certain communities have hackathons while others do not. In this research effort, we hope to fill that gap in the literature by exploring the following questions:

1) Are there variations among communities in their use of Civic Hackathons to solve community issues?
2) Which factors account for this variation (if any)?

Theoretical Framework: To explain this variation we will need to account for differences in community problem-solving and labor-force characteristics. The theoretical framework uses Social Capital Theory (Putnam, 2000) and Creative Class Theory (Florida, 2003). Social capital theory speaks to the participatory nature of community problem solving while Creative Class Theory deals with the nature of the labor force.

Methodology: This is cross sectional study using secondary data. The unit of analysis is U.S. counties. The dependent variable is the presence or absence of a Hackathon. The independent variables are an index of social capital and an index of creative class employment. Statistical analysis is accomplished with a generalized linear analysis using logistic regression.

Findings: The results suggest that creative class workforce and location in a metropolitan area are better predictors of the location of a Hackathon than social capital.

Predicting Civic Hackathons in Local Communities:
Perspectives from Social Capital and Creative Class Theory

Introduction

In the past few decades there have been a number of developments that have combined technology with civic engagement to create new structures that support civil society. Online political campaigns, Internet fund raising, and virtual communities and associations are all examples. Some of these are decades old, while others are of more recent vintage. Civic hacking and the development of civic hackathons is one of the most recent. Civic hackers use technology and open civic data (Goldstein& Dyson, 2014) to solve civic problems. While some civic hackers operate individually, many group-based civic groups (such as Code for America's Brigades) offer an opportunity to work on civic problems in a cooperative and competitive environment.

This type of activity is definitely voluntary action and might be considered a case of episodic volunteering, although the relationship with the client is frequently more complex than in many other volunteer situations. It is an exciting new area for exploration, and the research community has produced comparatively few studies. Most of the studies that are available look at general policy issue or focus on individual events. The present study is one of the first to look at an entire population of Civic Hackathons and some of the characteristics of the communities that host these events.

Research Questions

As a new phenomenon, civic hacking has not yet been widely studied, and offers a significant future direction for nonprofit research. While there is some research on civic

hackathons (Ahn & Stepasiuk, 2015; Stepasiuk, 2014), it generally deals with the Internal

dynamics of hackathons. An important issue that has not been explored is why certain

communities have hackathons while others do not. In this research effort, we hope to begin

to fill that gap in the literature by exploring the following questions:

1) Are there variations among communities in their use of Civic Hackathons to solve

    community issues?

2) Which factors account for this variation (if any)?

These questions are important because civic hackathons are part of an emerging range

of social interventions that hold the promise to redefine the relationship between the third

sector and government through technology. The nonprofit sector is highly integrated into

local communities. Understanding how communities vary in their adoption of these new

interventions will help us understand their potential path and how they might affect local

third sector dynamics.

Literature Review

The literature review for this exploration looks at civic hacking and civic hackathons,

the larger context provided by civic technology and how these aspects relate to other

nonprofit issues, particularly the relationship with episodic volunteering. This is followed by

a theoretical framework that uses social capital and creative class theory to explain the

differences between communities in their adoption of civic hackathons.

Civic Hacking and Hackathons

The academic literature on civic hacking and civic hackathons is limited (Baraniuk,

2013; Hébert, 2014; Snook, 2014), although there is a substantial gray literature on the topic.

Hacking is a word with a great deal of negative connotations because it is frequently used to describe cybercriminals or cyber vandals (see Snook, 2014 for a discussion of the issues) but the word can also describe more positive activities. In general, civic hackers are people who want to use their technology skills to make society better. Not all hackers are civic hackers. Civic Hackers are also different from so called "ethical hackers". Ethical hackers are technologists who break into organizational information systems to expose vulnerabilities.

Whether civic hackers are actually volunteers is a question of interpretation. In some cases, they clearly are volunteers, but in other situations other labels might apply. In any case, the relationship between the organization that is deriving the benefit and the one sponsoring the volunteer will be different in many cases.

The idea of episodic volunteers seems relevant in this regard (see Hustinx, Haski-Leventhal & Handy, 2008; McDuff, 2008; 1990; Cnaan & Handy, 2005). Episodic volunteers generally work for short periods of time, rather than regularly volunteering with an organization. This creates a number of management, policy and liability issues. It also creates issues in conceptualizing who episodic volunteers are when compared to more traditional volunteers (see Cnaan & Handy, 2005).

Prior to the digital revolution, integrating episodic volunteers would be difficult from a management standpoint. Technology can facilitate episodic volunteering by facilitating the management of volunteers, even those who volunteer for extremely small blocks of time. If the volunteer work is knowledge work, the extent to which it can be divided often makes it possible for a large force of volunteers to do a task in very small increments. One example is citizen science, in which a massive number of volunteers do small amounts of

data collection that is aggregated into substantial datasets (Dickinson, Zuckerberg & Bonter, 2010).

While hackathons are not essential for civic hacking, they provide a space where civic hacking can take place, the opportunity for cooperative programming, and often a variety of other resources (Ahn & Stepasiuk, 2015; Stepasiuk, 2014; Johnson & Robinson, 2014). They engage those with common interests on a set of common problems. This might be considered a community of practice or possibly a transient voluntary association.

It should be noted that the creation of Hackathons has also been a useful strategy in a wide range of efforts unrelated to civic betterment. Business interests often use them to develop new technologies and business processes and they are often used by technologists who have an interest in a given application (Leckart, 2012; Irani, L. (2015).

Civic Hackathons often involve request from government for specific applications. Some civic hackathons involve a competitive element and some have a prize or award of some kind.

The National Day of Civic Hacking was begun in 2013 to provide a national exposure for civic hacking and civic hackathons. Events are held throughout the nation and there is substantial support from civic technology thought leaders, government agencies, local governments and nonprofit organizations. On June 6, 2016 the fourth National Day of Civic Hacking was held. While there are hackathons throughout the world, the National Day of Civic Hacking provides a showcase for these activities.

Civic Hacking and Civic Hackathons are components of an overall civic technology movement.   Civic technology is an overall effort to re-envision communities through the use of technology.
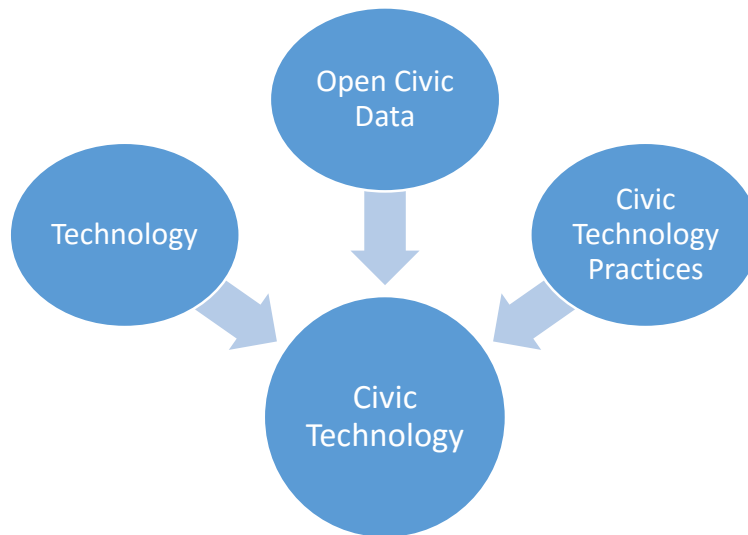
Civic Technology

Civic technology is a nascent force in communities throughout the world. It brings together open civic data, new (and old) technology and a variety of new practices, including civic hacking and civic hackathons (McNutt, Justice, Melitski, Ahn, Siddiqui, Carter & Kline, 2016; Goldstein & Dyson, 2013; Patel, Sotsky, Gourley, & Houghton, 2013).   According to Living Cities, civic technology is "The use of digital technologies and social media for service provision, civic engagement, and data analysis [in ways that have] the potential to transform cities and the lives of their low income residents" (Living Cities. 2012, 3).

This is a worldwide movement that is especially active in North America and Europe. Other areas of the world are beginning to develop their efforts as well. There are a number of foundations, think tanks and other nonprofits active in the effort.

There are three major components of civic technology: Open Civic Data, Civic Technology Applications and Civic Technology Practices. Figure One portrays the relationship between these three components.

Figure 1: Components of Civic Technology

Open Civic Data is the major driver of civic technology efforts. Open civic data is part of the transparency and open data movement (Justice & McNutt, 2013-2014). The data underpins most of the other functions. Governments collect a large variety of information, including administrative records, property records, and transaction data, and releasing some of it in machine readable form can ignite a vast range of civic innovation (Goldstein & Dyson, 2013).

Technology is the second major part of civic technology. This generally includes a wide range of technology ranging from older technology such as databases, e-mail and websites), to currently popular technologies. Especially significant here are the Web 2.0 (sometimes called social media) applications (blogs, social networking sites and so forth), mobile technology, and the beginnings of semantic web technology (Web 3.0). The technology applications work in large part because they are supported by open civic data. For example, one local civic hacker used GPS data from the local highway department to create a mobile application that allowed drivers to follow snow plows on an interactive map.

The third component of civic technology is the civic practices through which

motivation and expertise are mobilized to put data and technology to use for urban

governance and service improvement. These are social arrangements created to facilitate

the development of civic technology. The most visible such arrangement might be the

fellowships created by the nonprofit Code for America (The international version is Code for

All). This arrangement is similar to national service volunteers in that volunteer

technologists are placed with local governments to build specific types or applications of

technology.   In addition, there are coding Brigades, which are local groups that work as

volunteers to address local technology issues and organize contests and civic hackathons.

While the target of civic technology is government, much of the ecosystem is run by

nonprofits, business organizations and volunteers. The idea that we can fix government

directly from the outside (by developing technology-based solutions) differs sharply from

the usual social action strategy that we can change government by pressuring decision

makers to make changes in government from the inside.

Civic technology incorporates many aspects of conventional nonprofit advocacy

efforts to change and improve government. The approach differs in whether we come

together to change government from above or we come together to make the change

directly. The framework presents this choice.

Theoretical Framework

Communities will differ in their approach to using technology to make change in

government and in other aspects of their local social systems. Some communities will offer

a highly developed and functional political system that can address governmental problems

in a positive and effective way. On balance, other communities will have a political system

that finds change difficult. In this second type of community, change from the outside can

be attractive.

The first type of community tends to be characterized by high levels of social capital.

Citizens know how to organize and use their civic skills to get things done. They would

probably not be as accepting of some of the things that civic hackers might like to do. The

second type, communities with low levels of social capital, would be accepting of any

positive force for change. Those communities would be more amenable to civic hacking. It

would be difficult to organize a hackathon, however, unless the local labor force

incorporated people with a desirable skill set. These skills include a wide variety of technical

and professional abilities, such as those that members of Richard Florida's (2003) creative

class should possess.

Social Capital Theory and Creative Class Theory form the basis of our theoretical

framework. Social Capital theory suggests which communities are likely to want a civic

hackathon, while creative class theory suggests which communities can actually implement

one. Figure 2 portrays this model.

Figure 2: Theoretical Framework Choice Points

	Small Creative Class	Large Creative Class
Low Social Capital	Cannot Implement Strategy	Can Implement Strategy
High Social Capital	Will use other techniques	Will use other techniques

Social Capital Theory

Social Capital is one of the most important concepts in the social sciences and, perhaps, the most important theoretical construction in nonprofit and third sector studies. While there are many approaches to social capital, Robert Putnam's formulation seems particularly salient to this study because of his attention to participation and collective problem solving. Putnam (2000, 18-19) observes that "… the core idea of social capital theory is that social networks have value". He argues that social capital is an important element in numerous benefits that society has to offer the individual, including good government and a fully functional democracy. Putnam (1994; 2000) also argues that social capital is a critical factor in political participation and that, without social capital, traditional political participation is difficult.

His (Putnam, Leonardi & Nanetti, 1994).) early work looked at the relationship between social capital and the effectiveness of political institutions in rural Italy, concluding that effective government and acceptable political action were dependent on the reciprocal trust networks working in those communities. He termed this network of relationships social capital, building on the work of earlier scholars, particularly Coleman.

He then turned his attention to the United States. In *Bowling Alone*, Putnam argued that social capital in the United States was in decline. Armed with an enormous array of statistical evidence, Putnam (2000) documented the decline of civic participation (both political and civic participation were included). He also dealt with the implications for democracy and for civil society. Pointing to the decline in U.S. voter participation, as well as

other measures, Putnam held that the implications for American democracy were ominous. In the decade and a half since the book was written, it is difficult to say that conditions have improved.

Social capital supports political organizing and facilities participation. Some of this is through the development of what Verba, Schlotzman and Brady (1995) call civic skills. Both Putnam (2000) and Skocpol (2003) lament that the nonprofit advocacy system has become more professionalized thus making developing this skill base more difficult. Particularly important was the decline in association membership and the move to less participatory public interest groups. These are advocacy groups with nominal membership and where decisions and advocacy activity were left to professional political operatives. In many cases, the participation of average people was confined to donating funds.

Other research advises that there is a relationship between traditional social capital and traditional political participation. Agnitsch, Flora and Ryan (2006), for example, found a strong relationship between traditional social capital and traditional community action activity.

If one had taken the opportunity develop civic skills and there were opportunities to exercise these skills in one's local community, it would be unlikely different approaches would be supported. You would use those tools. On balance, if either or both of these situations were not present, the alternative might be attractive.

One would expect that communities that had substantial stores of social capital would use it to promote a fully effective government. They would be less likely to see the

need for civic hacking and might regard it as government procurement. On balance, those communities without social capital might find such a strategy attractive.

Creative Class Theory

While an influential and controversial thread in the literature of economic and regional development, creative class theory is a rarity in third sector studies. In a significant book, Richard Florida (2003) argued that cities, in a post industrial nation like the United States, vary in their presence or absence of the "Creative Class".   The creative class is composed of professionals, scientists, artist and other creative and knowledge workers. While Florida's (2003) argument that the future of economic development depends on this class of workers is tangential to the present issue, these are exactly the type of workers that would tend to fuel a civic hackathon. This would suggest that higher levels of creative class employment would lead to a greater likelihood that a community would host a civic hackathon. Given the urban orientation of creative class theory (see McGranahan & Wojan, 2007 for a counterpoint), it is also likely that counties within a larger metro area would be more likely to have the resources to create civic hackathon, especially one that could participate in the National Day of Civic Hacking.

Hypotheses

Given the overall framework, we would expect communities with lower levels of social capital and higher levels of creative class employment to be more likely to host a hackathon, especially if they are part of a metro area. This allows us to propose the following hypotheses:

H_1 Counties with higher levels of social capital will be less likely to host civic hackathons

H_2 Counties with larger creative class workforces will be more likely to host civic hackathons

H_3 Counties that are part of metropolitan areas will be more likely to host civic hackathon

Research Methods

This is a cross sectional study of the relationship between community characteristics and presence of civic hackathons. The research uses secondary data analysis. The unit of analysis is counties (n=3109) in the continental United States. The dependent variable is the presence or absence of a National Day of Civic Hacking Hackathon in either 2013 or 2014. These were the first two years in the National Day of Civic Hacking and should qualify for what Everett Rogers (2003) identified as early adopter status. The independent variables were metro status, creative class labor force and social capital.

Data Sources

Data for the dependent variable was collected from the 2013 and 2014 Annual Reports of the National Day of Civic Hacking (NDCH). A binary variable was created indicating if the county had hosted a NDCH event in either or both of the two first years. This data was coded by county and combined with other data for analysis. The data for measuring the independent variables were taken from the United States Department of Agriculture's Economic Research Service (USDA/ERS) Creative Class County Codes (see also Mcgranahan & Wojan, 2007) and the supporting data for Rupasingha, Goetz, & Freshwater (2006). These are both open datasets. We combined the two creative class labor variables (general and arts related) to create a composite factor. The resulting measure of creative class labor force is the total number of workers in occupations classified as creative in each county. Social capital is the composite index of social capital variables in each county

(Rupasingha, Goetz, & Freshwater, 2006). Metro status indicates whether the county is part of a designated metropolitan area.

Results

All data was coded and cleaned.   In order to test the hypotheses, we conducted a zero order correlation analysis and a binary logistical regression.

Correlational Analysis

A correlation matrix was developed for all independent and dependent variables. The values for the zero order correlations are presented in Table 1.

Table 1: Zero Order Correlations

		Civic Hackathon	Social Capital	Metro	Creative Labor Force
Civic Hackathon	Pearson Correlation	1	-.081[**]	.274[**]	.487[**]
	Sig. (2-tailed)		.000	.000	.000
Social Capital 2009	Pearson Correlation		1	-.276[**]	-.136[**]
	Sig. (2-tailed)			.000	.000
Metro	Pearson Correlation			1	.311[**]
	Sig. (2-tailed)				.000
Creative Labor Force	Pearson Correlation				1
	Sig. (2-tailed)				

The largest correlation coefficients are between the size of the creative labor force and presence or absence of a civic hackathon. The next largest is the relationship between metro status and presence or absence of a civic hackathon. The relationship between social capital and the dependent variable is both small and negative.

Regression Analysis

A logistical regression was conducted using simultaneous inclusion of all variables. The results for the Omnibus Tests of Model Coefficients are presented in Table 2. These test results suggest a reasonably dependable model. The model summary is presented in table 3.

Table 2: Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	433.498	3	.000
	Block	433.498	3	.000
	Model	433.498	3	.000

Table 3: Logistical Regression Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	601.957[a]	.130	.459
a. Estimation terminated at iteration number 10 because parameter estimates changed by less than .001.			

The classification table is presented in Table 4. The procedure correctly classifies 96.7% of the cases. of the cases. It is much stronger at predicting when a Hackathon will not occur than when one will occur.

Table 4: Classification Table

	Observed		Predicted		
			Civic Hackathon?		Percentage Correct
			No	Yes	
Civic Hackathon?		No	2969	15	99.5
		Yes	89	34	27.6
	Overall Percentage				96.7
a. The cut value is .500					

Finally, Table 5 presents the variables in the equation. The regression coefficients clearly suggest that creative class employment is the strongest predictor, followed by metro and social capital. The coefficient for Social capital is not statistically significant at the .05% level (p=.108), but the other two predictors are.

Table 5: Regression Coefficients

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Creative	.000	.000	112.606	1	.000	1.000
	Social Capital	.142	.088	2.584	1	.108	1.152
	Metro	4.773	1.014	22.169	1	.000	118.274
	Constant	-7.713	1.002	59.295	1	.000	.000
a All variables entered on step 1.							

The results overall suggest that Creative Class Employment and Metro Status are the most promising predictors of the dependent variable. Both variables are positively and significantly associated with the occurrence of civic hacking events in the regression model as well as in the zero-order correlation matrix. The relationship with social capital is weaker and has an inconsistent sign: negative in the correlations, but positive in the regression.

Discussion

Civic Hackathons are a relatively new social innovation and it is important to determine which communities are more likely to host a civic hackathon. This paper proposed that social capital and creative class labor component size might shed some light on the issue.

One would expect, from the theoretical discussion, that communities with higher levels of social capital would prefer more collective strategies that made use of their substantial capacity to organize and seek collective solutions. Those with lower levels of social capital would opt for more individualized strategies. The latter would find the civic hackathon an attractive way to access and coordinate individual effort.

The statistical results do not support that contention. Social capital is negatively related to civic hackathon presence in the zero-order correlation analysis. It is a weak and positive predictor in the regression analysis. This does not support the hypothesis that social capital will be negatively associated with the presence of civic hackathons.

Creative class labor force statistics do appear to predict civic hackathon enactment. This was the strongest predictor of the presence of a civic hackathon. This supports our

second hypothesis. Having a large body of creative class workers tends to support having a civic hackathon. This provides a base to recruit participants and a larger talent pool. The correlation analysis presented here also suggests a weak negative relationship between social capital and the size of the creative class. Metropolitan county status also appears to predict civic hackathons, consistent with our third hypothesis. Social capital appears to be negatively related to metro status, which confirms the theoretical argument that we advanced in the discussion above.

These results indicate that mobilization for civic hacking events appears to be influenced by community characteristics that are largely independent of pre-existing levels of familiar forms of traditional, associational social capital. What this analysis appears to suggest is that we have two types of communities, those that are receptive to novel, externally created solutions and those that are not. Some of the first group will make use of the civic hackathon strategy. That will depend on capacity and motivation. Metropolitan counties and counties with large numbers of workers in creative (broadly construed) occupational categories may have advantages of scale and urban agglomeration, and may also be more targeted by efforts to promote civic hacking, compared to non-metro counties and those with smaller creative workforces. There might also be individual-level dispositions at work on the part of metro-area residents and members of the creative labor force.

This study and these results must be considered in terms of their limitations. All secondary analysis research runs the risk of error due to unknown flaws in the original research and the subsequent datasets. This study is also limited to one type of civic hackathon and to the first two years of operation. As time goes on the dynamics could

change. This analysis is also limited to the United States and the continental United States at that. Efforts in civic technology and civic hacking are a worldwide phenomenon. Future research will be needed to determine if these findings are reflected in other parts of the world.

Nevertheless, the results do appear to point toward some promising questions and propositions for further research. First, might it be the case that civic hacking engages and mobilizes individual and collective contributions from individuals who have not been involved with the more traditional forms of association? If so, will civic hacking thereby contribute eventually to an increase in the stock of traditional social capital in a community, or will it lead to the creation of some new form of social capital, or will it exist as a phenomenon largely independent of social capital as it has been heretofore understood?

Conclusions

This study looks at an exciting budding social intervention in the way that community problems are solved. In many ways, the difference is whether communities seek to effect change through the familiar collective-action institutions of governments and nonprofit advocacy organizations, or through individual action. That might be considered a false dichotomy, however, because government often actively promotes these types of efforts.

This research contributes to our understanding of a new and emerging for of voluntary action. It also adds to our body of knowledge about community behavior. The research should be seen in light of its limitations. The dependent variable represents Hackathons in the National Day of Civic Hacking during the first two years of operation.

Other types of Hackathons are not considered. There can be unknown issues in the administrative data used.

Further research should consider other variables, such as e-government level and technology or network penetration.   Additional county level government variables would also be of potential usefulness.

The relationship among the three sectors is becoming more complex, and we may be moving to a point where the divisions are less analytically viable and harder to define. This might mean we are seeing a new form on the horizon. Hackathons may represent part of this new form as part of the general movement toward civic technology

Hackathons are part of a new set of social practices that promises to change how we think about voluntary action. The implications are enormous and growing every day.

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