A Model of Fundamental Components for an e-Government Crowdsourcing Platform

Kevin Cupido and Jacques Ophoff
Dept. of Information Systems, University of Cape Town, Cape Town, South Africa
kevin.cupido@gmail.com
jacques.ophoff@uct.ac.za

Abstract: Most e-Government implementations have resulted in failures with many implementations being one-way (government-to-citizen) and mainly informational (Dada, 2006; Cloete, 2012). However, advances in technology provide governments with the opportunity to engage with citizens using new methods, such as crowdsourcing. Successful commercial and open source software implementations of crowdsourcing have sparked interest in its potential use in the public sector. Brabham (2009) advocated for the use of crowdsourcing in the public sector to increase public participation and for governments to access citizens as a source of ideas and solutions. However, crowdsourcing lacks a theoretical and conceptual foundation (Geiger, et al., 2011; Pedersen, et al., 2013). Within e-Government there is also a lack of knowledge regarding the implementation of crowdsourcing platforms (Koch & Brunswicker, 2011). The main research questions is: How are crowdsourcing initiatives able to motivate citizen participation in e-Government? A conceptual model of critical success factors for an e-Government crowdsourcing solution is presented, based on a comprehensive review of relevant literature. The model uses Self-Determination Theory as a basis to examine citizen motivation and the influence of incentives or rewards. The model also addresses system factors such as task clarity and types, management, and feedback. In addition it also examines effort and performance expectancy, and behavioural intention to use crowdsourcing through the Unified Theory of Acceptance and Use of Technology. The results of a questionnaire-based survey (n=295) testing the model indicated that some crowdsourcing concepts may not necessarily translate well when applied in public sector initiatives. System management and support, rules and feedback as well as the UTUAT constructs were identified as important factors. This research benefits future work by building a conceptual foundation for a potential e-Government crowdsourcing solution.

Keywords: e-Government, Crowdsourcing, Critical Success Factors, Self-Determination Theory

1 Introduction

Involving all citizens in decision-making has eluded governments around the world (Brücher & Baumberger, 2003). For many citizens participation amounts to voting, with few partaking in government public participation initiatives, creating the general belief in citizen apathy. However, apathy is not the reason for low participation – rather citizen participation has changed in that citizens participate in different ways and on their own terms (Bang, 2009).

One of the ways is to leverage advances in web technologies such as Web 2.0, which allowed for greater user-generated context and, combined with the widespread availability of internet-enabled mobile technologies, have made it even easier for people to connect and collaborate. Realising this potential, businesses have used these technologies to tap into 'crowds' of people as a source of ideas, and for problem solving (Howe, 2006). Crowdsourcing using web technologies accesses the potential of a large network of people who respond to calls towards the completion of tasks, or offer ideas and solutions to problems posed (Geiger, et al., 2011). Different crowdsourcing systems use incentives as motivation, whereas others are driven by individual, social, or personal values and principles. The aim of this research is to determine what factors would influence public-sector crowdsourcing initiatives for citizen participation in government. This research will attempt to answer the question: What are the critical success factors for an e-Government crowdsourcing solution?.

This paper proceeds with a discussion of e-Government and technology, before looking at crowdsourcing as a concept. It then examines various factors that could influence a crowdsourcing solution including motivation, rewards, tasks and management. A conceptual model is presented which draws the factors together before being tested in a questionnaire-based survey. Statistical techniques are used to confirm reliability and validity of the constructs before the relationships between the dependent variable and the independent variables are explored using regression analysis. A refined model is presented and discussed before concluding.

2 Background

Uncertainty of how to contend with the increased complexity in modern-day governing has led governments to exclude citizens from the deliberation process (Li & Marsh, 2008). The political scientist Henrik Bang describes the emergence of two political identities, the 'expert citizens' and 'everyday makers' as a response to this exclusion. Expert citizens are involved and interested in politics and often speak on behalf of the everyday makers, many of whom are less privileged (Marsh, 2011). Williams (2006: 197) equates community participation to "spectator politics, where ordinary people have mostly become endorcees of pre-designed planning programmes". A possible way to address the above issues is the use of technology through e-Government.

2.1 E-Government and technology

E-Government refers to the use of technology to deliver information and services and enable digital interactions between government and other parties, such as citizens. Unfortunately many e-Government implementations have been total or partial failures, either abandoned or not achieving their intended goals. Many implementations are still one-way, government-to-citizen (G2C) in nature and mainly informational (Cloete, 2012).

According to Dada (2006: 4) there is a need for the public sector to "change and reengineer" its processes to the new technology and culture of e-Government system functions; one reason for e-Government failure is a "mismatch between the current reality and the design of the future e-Government system". Brabham (2009) also viewed the web as a means to reduce the constraints placed on citizen participation in democracies. Citizens have embraced the 'democratised' web offered by Web 2.0, which allowed for user-generated content, where consumers also became producers and publishers.

Citizens are already utilising technology to engage in 'alternative' ways through blogs, forums and on social networks (Bang, 2009). Some extreme uses of technology has led to the unseating of the Egyptian president, through extensive use of Facebook and Twitter for citizen reporting and the coordination of efforts (Cloete, 2012). Similarly, citizens have used the short message service (SMS) to organise demonstrations in the Philippines and Syria, and Blackberry messaging (BBM) has been used to coordinate riots in the United Kingdom. During the 2008 Obama election drive in the United States of America (USA) citizens interacted via social networks including the raising of election funds. What these examples illustrate is that technologies have allowed for a vast number of people to be mobilised.

As technology is a facilitator between government and citizens it is expected that advances in information and communication technologies (ICT) would increase the potential of crowdsourcing initiatives. The successful use of crowdsourcing concepts to engage large groups of people has ignited interest in its potential to mobilise citizens, and Brabham (2009) has advocated the use of crowdsourcing concepts in the public sector to not only increase public participation, but also for governments to access citizens as a source of ideas and solutions.

2.2 Crowdsourcing

As a concept crowdsourcing is not new – the term was coined by Howe (2006) and described as a means to outsource a function, previously performed by someone internal to an organisation, to a larger network of people in the form of an 'open call'. The primary components of crowdsourcing are that of the organisation, the crowd itself, and a platform to "link the two together and to provide a host for the activity throughout its lifecycle" (Zhao & Zhu, 2012, as in Seltzer & Mahmoudi, 2012: 194). The organisation component in this context is government, the crowd component refers to citizens as part of an online community, and the platform is the technology which plays a vital role as facilitator.

Estellés-Arolas & González-Ladrón-de-Guevara (2012) list forty different definitions, and even the word 'crowdsourcing' itself is sometimes used in the same breath as many others such as 'co-creation', 'open innovation', and 'citizen-sourcing'. One definition that is a good fit for the use of crowdsourcing in a public participation context is that, "It involves an organisation-user relationship whereby an organisation executes a top-down, managed process that seeks the bottom-up, open, creative input of users in an online community", and it is this management that makes it "productive and full of potential to do good" (Brabham, 2013: 127). Charalabidis et al. (2012) and Bani (2012) mention the use of an unstructured approach, such as the use of

social networking tools by citizens in Iceland to craft their constitution. However, the use of social networking can generate unanticipated outcomes and serve to disrupt participation by others, as well as a loss of control over the process (Cobo, 2012). This definition then distinguishes a government-based crowdsourcing as being a more deliberate process, and may have greater appeal to governments, being bureaucratic and more process-driven.

The crowdsourcing types show in Figure 1, range from *crowd rating* (a simple voting system) akin to a poll or Facebook Like, and *crowd processing* (micro tasks motivated by a financial reward), to the more complex types of *crowd solving* and *crowd creation* which require idea generation and collaborative problem-solving.

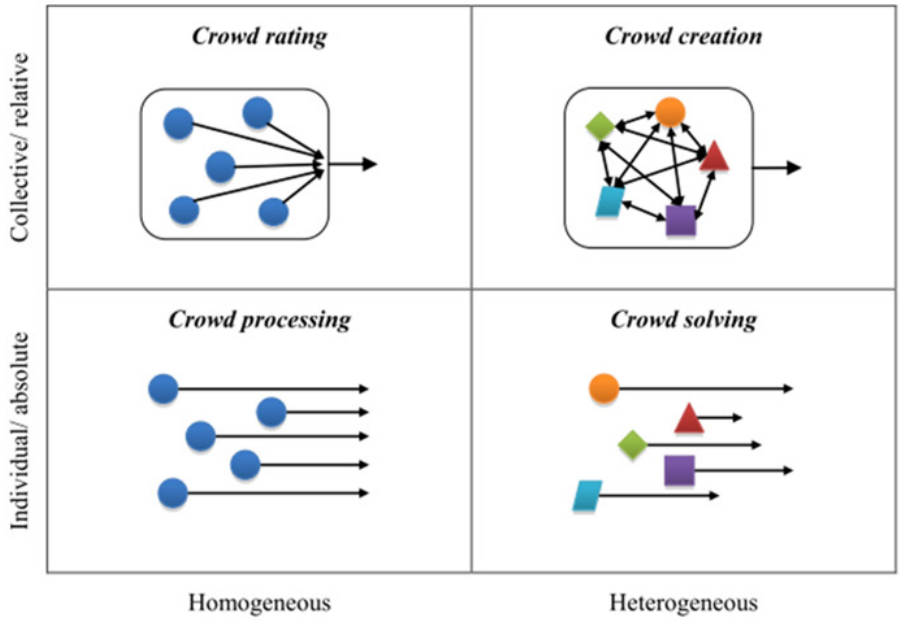

Figure 1: Types of Crowdsourcing (Geiger et al., 2011)

Depending on the application the four types often appear in various combinations. The options within a government context would range from gauging sentiment through a simple opinion poll (crowd rating), distributed task processing (crowd processing), to knowledge gathering and creation (crowd solving and crowd creation), or combinations thereof.

While crowdsourcing has emerged as a low effort and low cost way of eliciting ideas from a vast number of people (Leimeister, et al., 2009), the initial problem is how to 'kick-start' the crowd as well as how to grow a vibrant community (Brabham, 2009). Understanding the motivations for participation in crowdsourcing systems is key to the development of "best practices for governments and non-profits hoping to take the genius of crowdsourcing further into the service of the public good" (Brabham, 2010). However, there is a lack of knowledge as to the implementation of a government crowdsourcing platform and the motivation for individual participation (Koch & Brunswicker, 2011).

2.3 Self-determination theory and motivation

Ryan & Deci (2000: 54) state that "to be motivated means to be moved to do something", or moved into 'action'. Self-Determination Theory (SDT), defines different types of motivation (see Figure 2). It ranges from unwillingness manifested in amotivation, extrinsic motivation which is related to passive compliance, and personal commitment in the form of intrinsic motivation. The continuum is also an indication of levels of internalisation increasing from left to right, which is the process of adopting a value or regulation, and the degree to which this has been integrated to be a part of the self (Ryan & Deci, 2000).

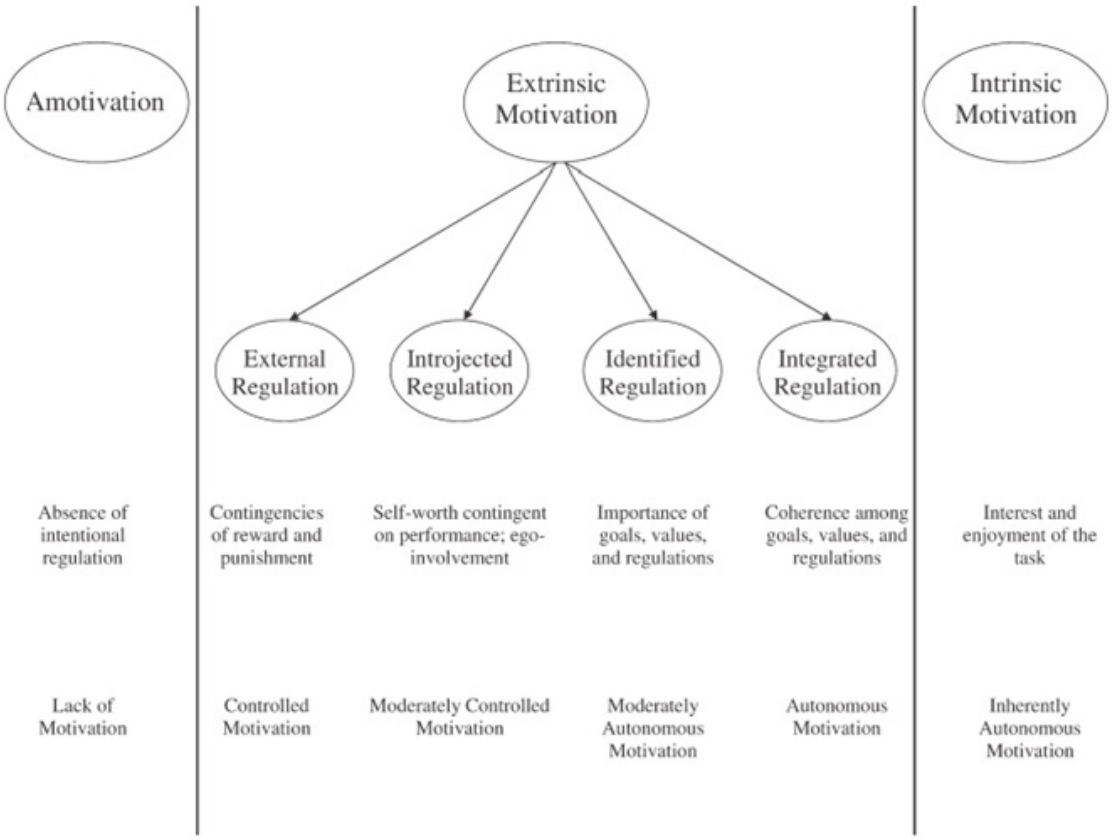

Figure 2: Self-determination continuum (Gagne & Deci, 2005)

Amotivation is the least self-determined, and is associated with a lack of intention to act. This comes about as a result of not valuing an activity, not feeling competent to do it, or not believing it would amount to anything (Ryan & Deci, 2000). On the other end of the scale, intrinsic motivation refers to being driven internally or from the 'inside', where autonomy and internalisation are at their peak and relates to an individual drive to do something because of enjoyment or satisfaction. For an individual, autonomy denotes choice and therefore being in control.

Extrinsic motivation is divided into types of behaviour regulation, being that of external, introjected, identified, and integrated. An example of external regulation would be the need for incentives or reward as 'encouragement' to perform a task (Kauffmann & Schulze, 2011). Internalisation of behaviour regulation occurs when external regulation of behaviours and their associated values no longer require the external stimulus. Introjected regulation is, "internalised extrinsic motivation" (Gagne & Deci, 2005: 334), where a behaviour regulation is taken in but is not accepted as one's own (Ryan & Deci, 2000). This would lead someone to take action because of internal pressure based on ego or the desire to increase self-worth. Identified regulation is when more autonomy is perceived even though an activity may not be intrinsically motivating. This is a sense that the activity resonates with internal values and goals, an understanding and attached importance to performing an activity. With integrated regulation this association with values and goals goes deeper, beyond just awareness and importance of the behaviour to it being perceived as a reflection of the self, or 'who you are'. Extrinsic motivation reduces autonomy, but as extrinsically motivated behaviours are internalised, they become more self-determined, and being more self-determined equates to a feeling of being 'in control', and greater feelings of autonomy (Ryan & Deci, 2000). Internalisation also increases with feelings of competence, or the ability to perform, and relatedness which is the individual association with a group or community.

Within a crowdsourcing system, some tasks may be both intrinsically and extrinsically motivated. Different crowdsourcing systems use incentives as motivation, whereas others are driven by individual, social, or personal values and principles.

2.4 Rewards

Batson, Ahmed & Tsang (2002) presents a 'rewards' perspective divided into *self, social, or material*. This would include upholding of self-esteem, recognition, status, praise and payment or prizes. Batson et al. (2002) notes that these are not exclusive categorisations as even though individuals may be driven by self-interest, the result of their actions could also have some 'unintended' benefits for the group or community.

2.4.1 Self

Some individuals are driven by self-interest, whether that is for pure enjoyment, recognition or financial gain. Batson et al. (2002) argue that individals exhibit other motives such as altruism, collectivism and principlism, with principlism relating to aspects such as juctice. Altruism is described as the motivation to assist others more broadly, on an individal level, whereas collectivism is characterised by a greater preference for a particular in-group. However, altruism is seen a means to gain an internal rather than external reward, by feeling good about oneself, or to avoid negative feelings such as guilt. Vassileva (2003) mentions that the use of emotions such as guilt, a sense of belonging and relatedness, or owing, could help to kindle feelings of altruism which can drive an individual to action. However, the intentions for altruism are not always clear and as such can encompass both self and social rewards.

2.4.2 Social

Henn et al. (2007) suggest that a strong positive relationship exists between social capital and civic attitudes. Strong or weak ties between individuals create trust networks, described using social capital (Putnam, 2000). Stronger ties are bonding relationships between homogenous groups, typically between family or close friends, characterised by frequent contact and high levels of trust. Bridging relationships on the other hand are between heterogeneous groups where there is less contact and consequently lower trust. Power relationships or linking social capital are vertical connections such as those between different socio-economic groups, or a link from citizens to government. The motivation to participate is greater if 'significant others' highlight the importance of an activity. Hence participants seek approval and in addition it promotes a 'sense of belonging', or 'sense of relatedness' in SDT terms and facilitates internalisation (Ryan & Deci, 2000). These significant others are those with whom there are close relationships and would include family members, friends, or other close members within the online community (Leimeister et al., 2009; Vassileva, 2003).

2.4.3 Material

A common crowdsourcing process would be to put out a call for ideas or solutions to a stated problem with the motivation to participate being a bounty or prize. "The crowd-sourcing model is faced with a question that has long concerned economists, psychologists, and management theorists; that is, whether and how financial incentives can be used to motivate workplace performance" (Mason & Watts, 2010: 100). Leimeister et al. (2009) mention that motivation to participate comes about with the right mix of incentives. Bayus (2013) notes that in the case of financial incentives one large prize would attract those who were prepared to put in the most effort, which typically turns out to be those who were more skilled. On the other hand those who were less-skilled put in more effort when there were several smaller prizes. Yet, the creativity of submissions was not affected by the size of the prize at all, and despite a large number of entries, a single large prize resulted in fewer creative ideas.

Lakhani & Wolf (2005) note that both intrinsic and extrinsic motivations appear to be balanced within OSS projects. Pedersen (2013) also reports a study in which a purely intrinsic-driven crowdsourcing initiative resulted in only 35% of tasks being completed, concluding that some form of extrinsic motivation (external regulation) may still be required. Whereas the other 'internalised' extrinsic motivators besides external regulation may be more desirable, financial rewards cannot be ruled out as a mechanism to drive participation.

2.5 Task purpose and type

As indicated in SDT, a goal is only internalised when it is both understood and the person has the necessary ability or competence in order to achieve it (Ryan & Deci, 2000). According to Brabham (2008) and Pedersen et al. (2013), the success of crowdsourcing solutions are dependent on the clarity of tasks or activities, and even extrinsic motivations would fail to drive participation if tasks or activities were poorly designed (Skinner, 2009).

Leimeister et al. (2009) indicate that design plays an important part in the successful implementation of a crowdsourcing competition or challenge. Pedersen et al. (2013: 7) mention that "a positive user experience is a strong predictor of continued involvement" for participants in a crowdsourcing system.

Design refers to aesthetics as well as the design of the challenge or campaign and of external incentives which can have an effect on motivation (Kauffmann & Schulze, 2011). Design considerations that would support this include planned processes with clear descriptions of purpose and tasks. A process consists of steps that have to be taken in order to arrive at a certain outcome or result (Pedersen et al., 2013). These can range from simple tasks such as idea gathering to more complex collaborative activities. Failure to implement clearly defined processes can lead to confusion or a perception that the system is not useful and could lead to amotivation. Citizens also need tasks that they feel comfortable and competant at performing, otherwise it could also result in amotivation (Elliot & Dweck, 2005).

Poetz & Schreier (2012) distinguish between needs-based and solutions-based enquiry. Needs-based would be in the form of a request for a list of problems or issues which may not have been addressed. A crowd-rating stage may follow, to identify the most pressing or popular items, and the solution itself may then still be left up to government. Conversly, tasks or challenges that request solutions may require a citizen with a different level of knowledge. Some commercial crowdsourcing solutions restrict the more collaborative types such as crowd-creation to 'expert' citizen, who are believed to have specific domain knowledge.

For some citizens participation would mean being part of a collaborative process. Some may be content with posting ideas while for others participation would be the means by which they can cast their vote on issues. A crowdsourcing system therefore needs to cater for different levels, or grading, of tasks so that it is as inclusive as possible, empowering a wide spectrum of citizens in the process.

2.6 Management and feedback

Jain (2010) advises that appropriate mechanisms be put in place to 'steer' the crowd, helping to maintain focus towards the completion of tasks. In this regard, some lessons can be learned from Communities of Practice (COP), which are voluntary associations between individuals with a common interest. In COP individuals feel that they could derive some value from association with others and therefore share learning. For an organisation COP are to be supported as it helps individuals perform better. However, as it is not a formal structure it is better facilitated than managed or controlled, otherwise "they lose their unique identity and cease to function as self-organising COP" (Grant, Hackney & Edgar, 2010: 227). As with the experience of COP, a balance is needed that allows for freedom of expression while maintaining a certain level of control. Effective stewardship would allow the crowdsourcing initiative to proceed with a purpose so as to achieve the desired outcomes.

Continued future participation has been related to the feedback provided to participant contributions and motivation is driven by the desire for recognition and status (Halavais, 2011). Wanting recognition is an important motivator for indivuduals (Lampel & Bhalla, 2007). Other motivators would include community visibility of contributions and recognition for the quality and quantity of individual contributions (Preece & Shneiderman, 2009). This underlines the importance of system features and mechanisms that allow for feedback and recognition. An effective mechanism would not only facilitate individual self-esteem and confidence but also social visibility. Besides direct individual feedback the motivation to continue in a public participation crowdsourcing initiative would be negatively affected if results or benefits were not reflected in the real-world (Warner, 2011; Lampel & Bhalla, 2007).

2.7 Conceptual model

The topics discussed above are combined in a conceptual model, presented in **Figure 3**. The model presents the critical success factors for an e-Government crowdsourcing solution and shows the relationship between factors. The factors of intrinsic motivation, extrinsic motivation, and task were derived from the reviewed literature.

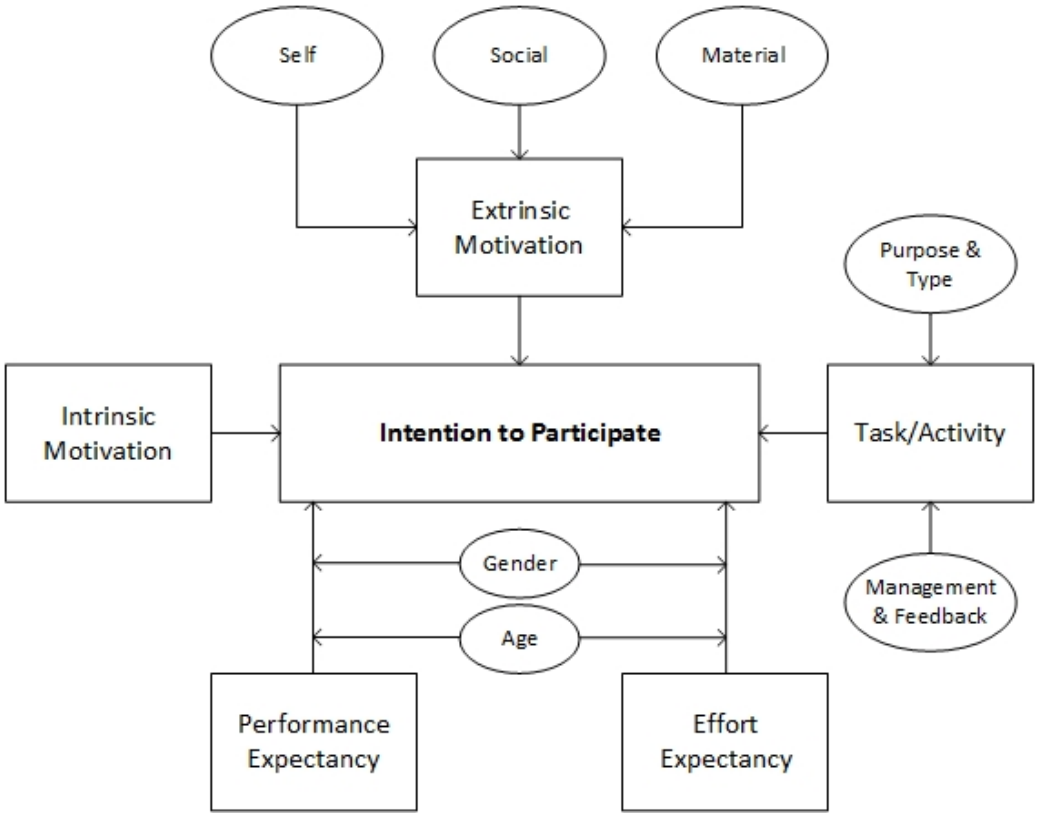

Figure 3: Conceptual model of critical success factors for an e-Government crowdsourcing solution

Two additional factors, performance expectancy and effort expectancy, are derived from the Universal Theory of Adoption and Use of technology (UTAUT). Performance expectancy refers broadly to perceived usefulness and the degree to which a person believes the system will be beneficial. In the UTAUT it is considered to be the strongest predictor of intention to use a technology (Venkatesh, et al., 2003). Effort expectancy is the "degree of ease associated with the use of the system" (Venkatesh, et al., 2003: 450).

It is noted that both performance expectancy and effort expectancy will be moderated by gender and age (Venkatesh, et al., 2003). Within the UTAUT these are both predicted drivers of behavioural intention, which is referred to as 'Intention to Participate' in the model.

3 Methodology

A quantitative approach was adopted with a questionnaire consisting of the following sections:

A. demographic information such as gender and age group,
B. a hypothetical narrative or 'scenario' of a proposed system, and
C. forty three questions that mapped to constructs defined in the conceptual model.

All questions from section C were presented on a 5-point Likert scale : 1= strongly agree, 2 = agree, 3 = not sure, 4= disagree, and 5 = strongly disagree. Questions were either deleted, rephrased, or added to constructs after running two pilots. Validity and reliability tests were performed using factor analysis and Cronbach's alpha, before testing the model constructs using regression analysis.

Data collectors were all part of a non-governmental organisation involved in outreach projects and were ideal as they were 'on the ground' and active in different communities. Data collection was guided by a data collection protocol sheet to ensure age and gender parity.

4 Data Analysis

Data collection spread across fourteen different areas in and around Cape Town, South Africa ranging from the central business district, suburban areas as well as township areas. The total number of questionnaires collected was 307, but only 295 were usable as some were excluded where there was a large number (> 50%) in unanswered questions. An additional four extreme outliers were also removed later due to their influence over the regression analysis.

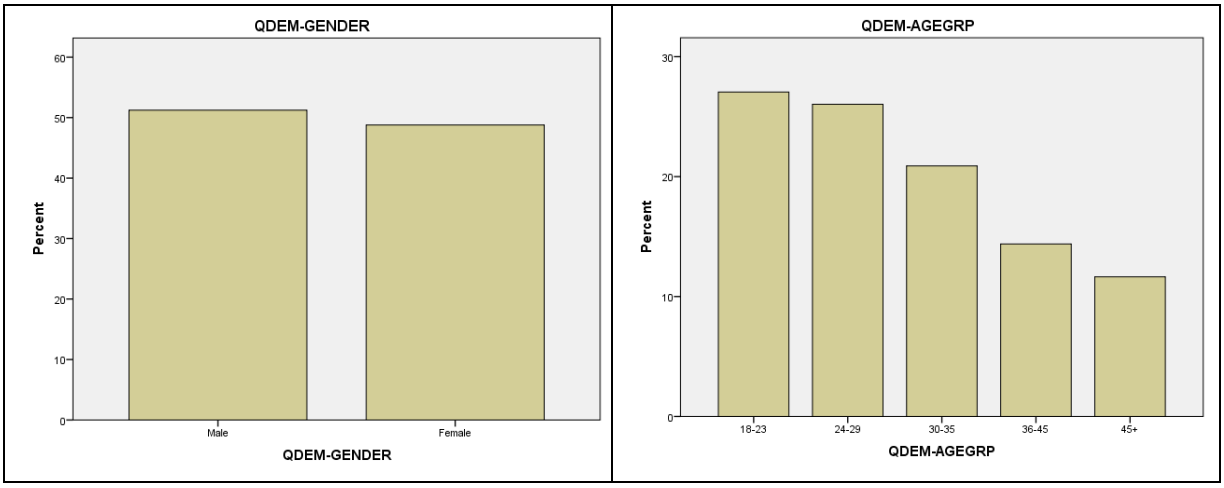

Figure 4: Gender and Age Distribution

Figure 4 shows that while there was roughly an equal gender split, the number of participants decreased as age increased. The lack of parity in data collection across different age groups was possibly due to a combination of the relative age of the data collectors and their contact with different age groups based on their individual outreach projects.

4.1 Reliability and Validity

Statistical methods were used to check reliability and validity, with internal validity being checked using factor analysis to evaluate validity (Rattray & Jones, 2005) and Cronbach's alpha to test inter-item consistency.

Principal component analysis was carried out with pairwise exclusion to minimize the exclusion of cases, eigenvalues greater than one, and varimax rotation. A Kaiser-Meyer-Olkin (KMO) of .87 as well as a highly significant (< .0001) Bartlett's test of sphericity confirmed the appropriateness of factor analysis, and the communalities were all well above the minimum .3 level. As per Stevens (2002, as in Field, 2009) only factor loadings above .4 should be interpreted and after preliminary analysis two questions were found to be below this threshold. Both were part of a six item construct defined in the conceptual model and removing them increased the Cronbach's alpha value for that construct from .72 to .74. Factor analysis was rerun and resulted in ten extracted factors with explained variance ranging from 9.3% for factor one, to 3.6% for factor 10, and a cumulative variance of 61%. Overall, questions grouped to the defined constructs of the conceptual model were extracted in the factor analysis shown in Table 1, with only a few irregularities. The items for factor one included the full set of questions for 'Clarity of task / purpose' and 'Management and Rules' which were both indicated as sub-components of 'Task / Activity' in the original conceptual model. Both address the 'system', one with how the user would perceive interacting with the system, and the other the user expectation of management, control and rules. One question from the 'Task variety' construct also loaded highly onto factor 1 and was considered as part of this factor after reviewing the content.

Table 1 : Factor Extraction

Questions	1	2	3	4	5	6	7	8	9	10
Q21	0.73									
Q22	0.62									
Q20	0.61									
Q40	0.58									
Q38	0.55									
Q19	0.54					0.36				
Q39	0.52							0.42		
Q15		0.69	0.31							
Q8		0.61				0.35				

Questions	1	2	3	4	5	6	7	8	9	10
Q13		0.6								
Q14		0.6							0.36	
Q10	0.52	0.55								
Q12		0.52			0.32					
Q7		0.48				0.4	0.44			
Q9		0.46		0.33						
Q36			0.79							
Q35			0.75							
Q37			0.71							
Q34			0.56							
Q30				0.71						
Q29				0.71						
Q28				0.68						
Q18					0.89					
Q17					0.86					
Q16					0.77					
Q32						0.63				
Q33						0.6				
Q31						0.6				
Q23	0.37					0.42				
Q3							0.75			
Q4	0.35						0.61			
Q5							0.59			
Q2							0.47		0.43	
Q1							0.46		0.39	
Q43								0.73		
Q42								0.70		
Q41								0.62		0.39
Q27				0.32					0.67	
Q26	0.31			0.36					0.56	
Q24										0.68
Q25						0.36			0.44	0.47
eigen value	10.50	3.10	2.20	1.92	1.72	1.43	1.40	1.21	1.14	1.03
% of variance	9.30	7.81	7.10	6.43	6.24	5.92	5.82	5.63	4.70	3.44

Factor two showed loadings from two sub-components of a construct also explained in the conceptual model, and contained the complete sets of questions from both. These both related to different aspects of extrinsic motivation, one being 'Self Benefit', and the other being 'Social Recognition', so it is understandable that they did load together as they are closely related. As they were two distinct components, a decision was made to split them as per the original conceptual model into 'Self Recognition' and 'Social Recognition' items. Items related to 'System Usefulness' loaded onto factor six, but also included a question which was originally

conceived as part of a different construct in the conceptual model, but was retained as part of the factor after reviewing the content of the question. Four items that were part of 'Task Types' in the conceptual model split into two additional factors. As a result of the factor analysis, composite values were generated by averaging the questions that make up the construct. Table 2 shows the relabeled factors, question groupings and Cronbach's alpha values.

Table 2 : Composite Statistics

Composites / Construct	**N**	**Mean**	**SD**	**Cronbach's alpha**	**Question numbers**
Support and Management	260	1.61	.50	.84	19,20,21,22,38,39,40
Self Benefit	273	1.97	.69	.74	7,8,9,10
Social Benefit	281	2.21	.79	.71	34,35,36,37
Easy To Use	260	2.02	.70	.81	28,29,30
Feedback and Results	286	1.61	.63	.78	16,17,18
Monetary Rewards	286	2.44	**1.14**	.85	23,31,32,32
Performance Expectancy	285	1.81	.60	.73	1,2,3,4,5
Intrinsic Motivation	275	1.80	.55	.68	41,42,43
Behavioural Intention (DV)	279	1.76	.66	.72	26,27
Have skills and Ideas	278	1.74	.72	.72	24,25
Few skills, just vote	277	2.24	.86	**.48**	12,13,14,15

The Cronbach's alpha value for "Few skills, just vote" was .48 while all other alpha values were .68 and above. On some constructs the removal of some items would have increase alpha values. However the changes in alpha levels were minimal, and these were constructs already had values over .7 with item-total correlations over .3 (Field, 2009), so they were retained. 'Monetary rewards' has a standard deviation of 1.14, while all other items were below one standard deviation indicating that the mean is a good representation of the sample data (Field, 2009).

4.2 Regression Analysis

The result of adding the independent variables (predictors) and the dependent variable (Behavioural Intention) using the Enter method is shown in Table 3. Variance Inflation Factor (VIF) and tolerance values were both well within the acceptable range indicating that there was no multicollinearity which was also confirmed by viewing the correlation matrix. Four extreme outliers were identified and removed as they exhibited great influence over the model.

Table 3 : Regression Coefficients

	Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig.**
	B	Std. Error	Beta		
(Constant)	.17	.17		1.00	.32
Support and Management	.24	.09	.19	2.59	.01
Self Benefit	-.09	.07	-.09	-1.34	.18
Social Benefit	.06	.06	.08	1.13	.26
Easy To Use	.17	.06	.19	2.85	.01
Feedback and Results	.15	.07	.15	2.14	.03
Monetary Rewards	-.06	.03	-.10	-1.75	.08
Performance Expectancy	.17	.08	.15	2.19	.03
Intrinsic Motivation	.09	.07	.08	1.25	.21
Have skills and Ideas	.05	.06	.06	.87	.38
Few skills, just vote	.09	.04	.12	2.11	.04

A scatterplot of predicted vs standardised residuals in Figure 5 indicates a violation of the assumption of homoscedasticity. This would be problematic except that the scatterplot only indicates some deviation (rotation) hence the significance and confidence intervals should be near the expected values (Cohen et al., 2013). We are primarily concerned with the fit of the model and as such heteroscedasticity or unequal variance, "does not affect the most important aspect of a regression model, which is the form of the predictor Xβ" (Gelman & Hill, 2007 : 46).

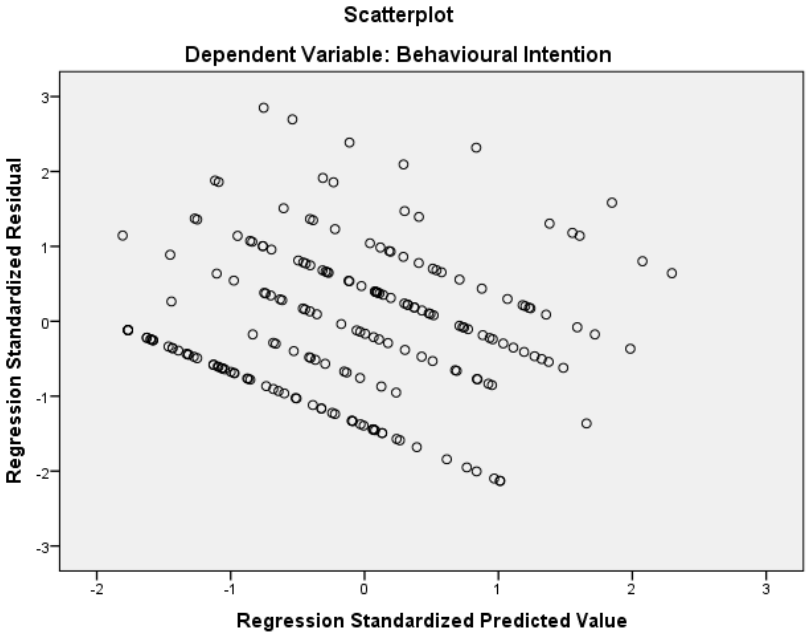

Figure 5: Standardised Residuals vs Predicted Values

In Figure 6 the residuals histogram indicates a roughly normal distribution and the residuals P-P plot shows residuals to generally be linear and clustering around the trend line, thus normality was assumed.

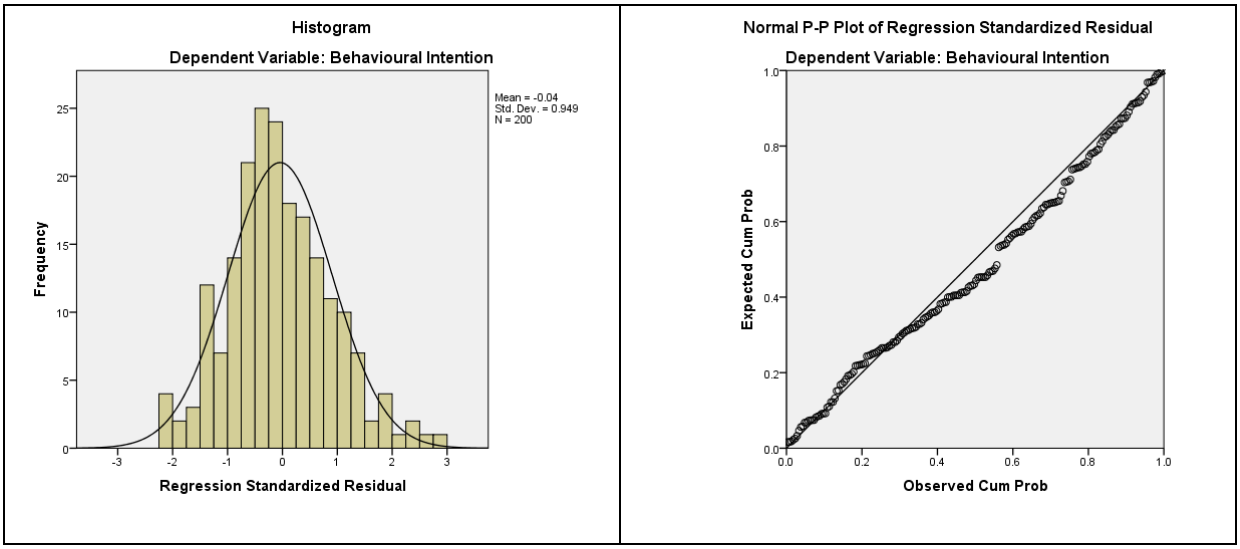

Figure 6: Regression Residuals histogram and P-P Plot

A backward stepwise regression was run to explore other possible models. One other model shared the same adjusted R^2 value as the original model, but with other models not indicating any significant improvement the original model was retained.

The coefficients in Table 3 indicate four significant predictors with the greatest contributions being 'Support and Management' (t (229) = 2.6, p < .05, beta = .19) and 'Easy to use' (t (229) = 2.85, p <.01, beta = .19),

followed by 'Performance Expectancy' (t (229) = 2.19, p <.05, beta = .15), and 'Feedback and Results' (t (229) = 2.14, p <.05, beta = .15).

All relationships were positive except for 'Self benefit' (t (229) = -1.34, beta = -.09), and 'Monetary Rewards' (t (229) = -1.75, beta = -.10). Although the 'Few Skills, just vote' construct was also significant (< .05), it must be noted that it has very low internal consistency (alpha = .48) and would need to be relooked in future models. 'Monetary Rewards' (p = with .08) was also close to the .05 significance cut-off.

Moderation tests were carried out by first centering the relevant independent variables, before creating new interaction variables. To test moderation, hierarchical regression was run with step 1 including the independent variables, and step two including the interaction variable. The result of 'Easy to Use' x gender did not produce significant results, so gender did not appear to be a factor when it comes to 'Easy to Use'. However 'Performance Expectancy' x gender was significant (t (272) = 3.80, p < .001, beta = .20), being greater for males than for females. There was no significant difference when 'Easy to Use' x any of the age groups, but it was significant when observing 'Performance Expectancy' x age groups. The groups 18-23, 24-29, and 26-45 were all significant (p < .05, beta = .53), followed by 45+ (p < .05, beta =.45), and 30-35 (p < .05, beta = .39).

The final model is shown in Figure 7, which accounts for 32.6% of the variation in 'Behavioural Intention'. Ordinarily only significant predictors would be retained in a final model leaving only a few constructs. However, even though 'Monetary Rewards' and 'Self Benefit' are negatively correlated to 'Behavioural Intention', parsimony is not the intention and all constructs are retained. These constructs will be verified in a follow-up qualitative study.

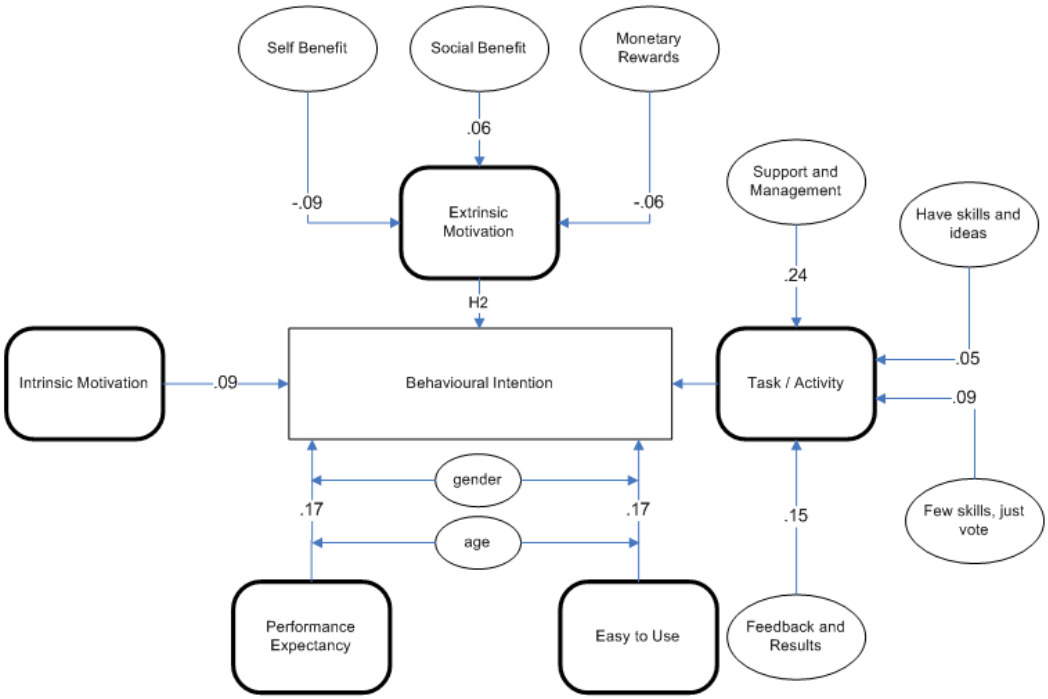

Figure 7 : Revised Conceptual Model

5 Research Findings

'Intrinsic Motivation' in the model shows very little similarity to the findings of studies of private sector crowdsourcing initiatives. When it comes to politics there may not be any desire to test or challenge oneself, or participate out of curiosity, fun or enjoyment. That 'Intrinsic Motivation' was weak (beta = .04) in the model may indicate that the measures used were not appropriate for a political participation context, rather than confirmation of a widely held belief in citizen apathy. Rather the lack of participation could be as a result of exclusion, or "uncoupling of the political authorities from … the 'laypeople' " (Bang, 2004, as in Li & Marsh, 2008: 249).

While intrinsically motivated citizens would be ideal, the challenge is to discover what would drive them. As intrinsic motivation is impossible to affect directly, extrinsic incentives have been used as possible motivators. According to SDT these could drive behaviours to become internalised and ultimately develop into intrinsic motivation. With regard to the sub-components of extrinsic motivation, the model indicates negative relationships between 'Self Benefit' and 'Monetary Benefit' with 'Behavioural intention', and a positive relationship between 'Social Benefit' and 'Behavioural Intention'. This appears to imply that participants would participate because they are altruistic, and not for self gain. However, social desirability bias could be at play as many may have provided answers based on what they think is 'expected'. Although it was not significant in the model, SDT explains the positive 'Social benefit' construct where participants seek to have a 'sense of belonging' or 'relatedness' with a group. It should also be noted that self and social motivations are not mutually exclusive as, "the decision to participate in politics may be motivated by both a desire to make things better for everyone (altruism) and a desire to specifically acquire as many benefits as possible for an ingroup (social identification)" (Fowler & Kam, 2007: 816).

Online communities typically lack the socialisation processes witnessed within organisations (Hsieh, Hou, Chen, & Truong, 2013). SDT mentions that intrinsic motivation is increased with individual feelings of competence or feeling 'in control', and autonomy. The 'Support and Management' should therefore be a key considerations in the system as it could facilitate intrinsic motivation. Mentorship is also important and according to Vassileva (2003) help and assistance from community members plays a crucial role in keeping people motivated to participate. Although excessive control is not desirable, a lack of governance can make the system uncontrollable, an example of which was the failed crowdsourced collaborative novel, the Million Penguins project (Pedersen, et al., 2013). Agreed rules and policies also facilitate trust between participants as well as in the system (Leimeister et al., 2009; Preece & Shneiderman, 2009), and failure to implement these would "destabilize an online community and interfere with the problem solving abilities of the crowd" (Brabham, 2009: 257). The support and management aspects appear to be a vital part of a successful implementation.

'Feedback and results' is closely linked to 'Support and Management', and also showed a strong, positive relationship with 'Behavioural Intention' indicating that these are important aspects to include in the system. Support for competence in the form of providing relevant feedback, opportunities to learn or explore and providing clear instructions, guidelines and rules will result in increased internalisation and hence self-determination (Ryan & Deci, 2000). This could be a broadcast to all citizens or even include individual feedback, while being minful that amotivation can be as a result of either negative or a lack of feedback (Elliot & Dweck, 2005). Although it may at first seem an obvious choice, social networking platforms such as Facebook which is privately owned and unregulated, would have to address issues around control and privacy as well as other system-related issues such as workflow, tasks, management, and mechanisms for incentives and feedback (Cobo, 2012).

As reflected in the updated model, PCA analysis split tasks into two clearly defined factors, the first being 'Have skill and ideas', and 'Few Skills, Just vote'. In retrospect this seems logical where some would prefer 'simpler' participation than others. Both constructs however would need to be expanded with some additional items to improve internal consistency, especially in the case of 'Few Skills, Just Vote'. This split ties in well with crowdsourcing types shown in Figure 1, which allow for a variety of ways to participate, from simple voting through to more complex collaboration. Crowdsourcing citizens could become 'challenging' especially where complex participation may require a certain level of domain knowledge and possibly exclude most citizens. This could be seen as 'elitist' and mirroring the kind of exclusion that exists in real-world political participation (Bang, 2009). Depending on the application, the four types of crowdsourcing often appear together in various combinations. Some may have processes of idea generation through crowd solving followed by crowd rating, thus accommodating different 'levels' of citizens, but more importantly by being inclusive it could improve buy-in and legitimacy, as well as reduce suspicion and distrust in a 'new' political process.

No gender differences were observed when it came to 'Easy to Use', which is contrary to the UTAUT hypothesis that expectations of 'Ease of Use' would be a greater predictor of intention for females than for males. There was an indication that 'Performance'or usefulness of the system was greater amongst younger participants (18-29) and dropped for the 30-35 year olds. Although, it increased again in the 36-45 age group before declining again in the 45+ age group. There is no clear explanation for this pattern, although the differences do appear to be marginal and in some agreement with Mattes & Richmond (2014 : 12) who

conclude that "across a range of indicators of how citizens think about their role and capacity as citizens, there is virtually no 'age profile' to democratic citizenship in South Africa. Thus far, across several different indicators of democratic citizenship, the youth look almost identical to their older counterparts". So it appears that age and gender differences may not play a very big role, however this may differ depending on context.

6 Limitations

This research was cross-sectional, conducted over a four week period as well as being in an election year, and it is unclear what impact these factors had over the response and outcome. The two new task type constructs revealed in the factor analysis should be revised with additional questions to improve the reliability of the construct. The limitations of presenting a hypothetical scenario, instead of a real system, is also acknowledged. A citizen shift from a 'once-off' election mind-set to one of 'on-going' participation would require changes in government employee mind-set and skills, as well as changes to existing structures and processes. This highlights a limitation of this research in that it is wholly focused on the mechanisms to increase citizen participation and does not explore the impact of crowdsourcing on government structures. Future research should address the government perspective, as it would require a shift from traditional bureaucratic processes and require government officials with different skillsets.

7 Conclusion

Successful implementations of crowdsourcing within the non-government space has managed to mobilise large numbers of people and thus it offers the possibility of addressing citizen 'apathy' and tapping citizen ingenuity. Although there has been some experimentation, government's lack of crowdsourcing could be partly due to a lack of management and skills needed to correctly implement e-Government initiatives. Another reason could be the lack of a suitable platform either because they are inaccessible to the majority of citizens, or not suitable for crowdsourcing initiatives.

This research assimilates prior research on crowdsourcing-related issues into a conceptual model, proposing critical success factors for a potential e-Government crowdsourcing solution. Indications from literature shows that individual intrinsic motivation can be affected by the implementation of components of an information system, and hence affect participation in the system. This is in part reflected in the results of the survey which highlighted the key areas of: user support, management and administration, policies and rules, participant training and mentorship, splitting of tasks to be more inclusive and ease of use. Combining these areas should result in a 'useful system' and foster participation. These insights, and the proposed model assist by providing guidelines for conducting a crowdsourcing initiative implemented on existing platforms, or highlight system features required in a new system build. While a quantitative study allows a broad understanding, it cannot answer deeper 'why' questions. Brabham (2010: 1128) calls for more crowdsourcing cases to add "rich qualitative data... to the stable of research on the crowdsourcing model, all with the intent to develop best practices and core findings for use in government." Hence, this research will be extended to include qualitative data collection following a sequential explanatory design. This will not only add richness to the quantitative data, but also serve to verify the constructs in the proposed model.

References

Bagui, L., Sigwejo, A. & Bytheway, A. (2011). *Public participation in government: assessing m-Participation inSouth Africa and Tanzania.* Johannesburg, Cape Peninsula University of Technology, pp. 5-26.

Bang, H. P. (2009). 'Yes we can': identity politics and project politics for a late-modern world. *Urban Research & Practice,* April, 2(2), pp. 117-137.

Bani, M. (2012). Crowdsourcing Democracy: The Case of Icelandic Social Constitutionalism. *Politics and Policy in the Information Age,* pp. 1-19.

Batson, D. S., Ahmed, N. & Tsang, J.-A. (2002). Four Motives for Community Involvement. *Journal of Social Issues,* 58(3), pp. 429-445.

Bayus, B. (2013). *Crowdsourcing: Fresh Thinking or Online Fad?.* [online] Available at: http://www.kenan-flagler.unc.edu/faculty/roi-magazine/spring-2013/crowdsourcing-fresh-thinking-or-online-fad

Brabham, D. (2010). Moving the Crowd at Threadless. *Information, Communication & Society,* 17 August, 13(8), pp. 1122.

Brabham, D. C. (2009). Crowdsourcing the Public Participation Process for Planning Projects. *Planning Theory,* 8(3), pp. 242.

Brabham, D. C. (2012). Motivations for Participation in a Crowdsourcing Application to Improve Public Engagement in Transit Planning. *Journal of Applied Communication research,* 40(3), pp. 307-328.

Brücher, H. & Baumberger, P. (2003). *Using Mobile Technology to Support eDemocracy.* Hawaii, Hawaii International Conference on System Sciences, p. 144b.

Charalabidis, Y., Triantafillou, A., Karkaletsis, V. & Loukis, E. (2012). *Public Policy Formulation through Non Moderated Crowdsourcing in Social Media.* Kristiansand, Norway, Springer Berlin Heidelberg, pp. 156-169.

Cloete, F. (2012). e-Government lessons From South Africa 2001 - 2011: Institutions, State of progress and Measurement. *The African Journal of Information and Communication,* pp. 128-142.

Cobo, C. (2012). Networks for citizen consultation and citizen sourcing of expertise. *Contemporary Social Science,* 7(3), pp. 283-304.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2013). *Applied Multiple Regression/Correlation Analysis for Behavioural Sciences.* Routledge.

Dada, D. (2006). The failure of E-Government in Developing Countries : A Literature Review. *The Electronic Journal of Information Systems in Developing Countries,* 26(7), pp. 1-10.

Elliot, A. J. & Dweck, C. S. eds. (2005). *Handbook of Competence and Motivation.* Newy York: Guidlford Press.

Estellés-Arolas, E. & González-Ladrón-de-Guevara, F. (2012). Towards an integrated Crowdsourcing Definition. *Journal of Information Science,* 38(2), pp. 189-200.

Field, A. (2009). *Discovering Statistics Using SPSS (and sex and drugs and rock 'n' roll).* London: Sage.

Fowler, J. T. & Kam, C. D. (2007). Beyond the Self: Social Identity, Altruism, and Political Participation. *The Journal of Politics,* 69(3), pp. 813-827.

Gagne, M. & Deci, E. L. (2005). Self-determination Theory and Work Motivation. *Journal of Organizational Behaviour,* 26(1), pp. 331-362.

Geiger, D., Rosemann, M. & Fielt, E. (2011). *Crowdsourcing Information Systems – A Systems Theory Perspective.* Sydney, s.n.

Gelman, A., & Hill, J. (2007). *Data Analysis Using Regression and Multilevel/Hierarchical Models.* Cambridge: Cambridge University Press.

Halavais, A. (2011). Do Dugg Diggers Digg Diligently. *Information, Communication & Society,* pp. 444-459.

Henn, M., Weinstein, M. & Hodgkinson, S. (2007). Social Capital and Political Participation: Understanding the Dynamics of Young People's Political Disengagement in Contemporary Britain. *Social Policy & Society,* 6(4), pp. 467-479.

Howe, J. (2006). The Rise of Crowdsourcing. June, 14(6), pp. 1-5.

Hsieh, G., Hou, Y., Chen, I., & Truong, K. N. (2013, February). Welcome!: social and psychological predictors of volunteer socializers in online communities. *16th ACM Conference on Computer Supported Cooperative Work* (pp. 827-838). San Antonio, Texas: ACM.

Kauffmann, N. & Schulze, T. (2011). *More than fun and money. Worker Motivation in Crowdsourcing – A Study on Mechanical Turk.* Detroit, s.n.

Koch, G. F. J. & Brunswicker, S. (2011). *Online Crowdsourcing in the Public Sector: How to Design Open Government Platforms.* Orlando, Florida, Springer Berlin Heidelberg, pp. 203-212.

Lakhani, K. R. & Wolf, R. G. (2005). Why Hackers Do What They Do: Understanding Motivation and Effort in Free/Open Source Software Projects. *In Perspectives on Free and Open Source Software, MIT Press..*

Lampel, J. & Bhalla, A. (2007). The Role of Status Seeking in Online Communities: Giving the Gift of Experience. *Journal of Computer-Mediated Communication,* 12(2), pp. 434-455.

Leimeister, J. m., Huber, M., Bretschneider, U. & Krcmar, A. H. (2009). Leveraging Crowdsourcing: Activation-Supporting Components for IT-Based Ideas Competition. *Journal of Management Information Systems,* 26(1), pp. 197-224.

Li, Y. & Marsh, D. (2008). New Forms of Political Participation: Searching for Expert Citizens and Everyday Makers. *British journal of Political Science,* Volume 38, pp. 247-272.

Marsh, D. (2011). Late Modernity and the Changing Nature of Politics: Two Cheers for Henrik Bang. *Critical Policy Studies,* 5(1), pp. 73-89.

Mason, W. & Watts, D. J. (2010). Financial incentives and the performance of crowds. *ACM SigKDD Explorations Newsletter,* pp. 100-108.

Mattes, R., & Richmond, S. (2014, July 1). *South Africa's Youth and Political Participation, 1994-2014.* Retrieved September 28, 2014, from Centre for Social Science Research: http://cssr.uct.ac.za/pub/wp/338/

Yle. (2014, June 25). *Legal committee votes against gay marriage*. Retrieved September 22, 2014, from Yle : Uutiset: http://yle.fi/uutiset/legal_committee_votes_against_gay_marriage/7318809Pedersen, J., Kocsis, D., Tripathi, A., Tarrell, A., Weerakoon, A., Tahmasbi, N., Jie Xiong, Wei Deng, Onook Oh & de Vreede, G.-J. (2013). *Conceptual Foundations of Crowdsourcing: A Review of IS Research.* 46th Hawaii International Conference on System Sciences (HICSS), pp. 579-588.

Poetz, M. K. & Schreier, M. (2012). The value of crowdsourcing: can users really compete with professionals in generating new product ideas?. *Journal of Product Innovation Management,* 29(2), pp. 245-256.

Preece, J. & Shneiderman, B. (2009). The Reader-to-Leader Framework: Motivating Technology-Mediated Social Participation. *AIS Transactions on Human-Computer Interaction ,* March, 1(1), pp. 13-32.

Rattray, J., & Jones, M. (2005). Essential elements of questionnaire design and development. *Journal of Clinical Nursing, 16*(1), 234-243.

Ryan, R. M. & Deci, E. L. (2000). Self-Determination Theory and the Facilitation of Intrinsic Motivation Social Development and Well-Being. *Amercian Psychologist,* January, 55(1), pp. 68-78.

Seltzer, E. & Mahmoudi, D. (2012). Citizen Participation, Open Innovation, and Crowdsourcing Challenges and Opportunities for Planning. *Journal of Planning Literature,* 28(1), pp. 3-18.

Vassileva, J. (2003). *Motivating Participation in Peer to Peer Communities.* Madrid, Spain, Spinger Berlin Heidelberg, pp. 141-155.

Venkatesh, V., Morris, M. G., Davis, G. B. & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly,* 27(3), pp. 425-478.

Warner, J. (2011). *Next Steps in E-Government Crowdsourcing.* Maryland, USA, ACM, pp. 177-181.

Williams, J. J. (2006). Community Participation : Lessons from post-apartheid South Africa. *Policy Studies,* 27(3), pp. 197-217.