resistance. Prior e-Government studies on adoption often cite employee resistance (Chou, Chen, & Pu, 2008; Janssen & Shu, 2008; (Ndou, 2004). We seek to advance the understanding of citizen driven resistance. The overarching research question was:

What are the enabling and inhibiting factors that contribute towards citizen e-Government adoption resistance?

2.2 Development of the conceptual model for e-government resistance

Our study leaned on the Bovey and Hede (2001) approach who view resistance in the context of the defense mechanisms employed by agents undergoing organizational change. This was coupled with the Kim & Kankanhalli (2009) model that sought to understand factors underlying resistance to IS driven changes. The Bovey and Hede (2001) study considers two types of defense mechanisms: Adaptive and Mal-Adaptive. The defense mechanisms are unconscious mental processes that arise in response to perceived threat or danger with the aim of reducing ones anxiety (Bovey & Hede, 2001). Psychology literature indicates that defense mechanisms are not only unconscious but also non-intentional and dispositional in contrast to coping processes that are conscious, used intentionally and are situationally determined (Cramer, 2000).The Bovey & Hede (2001) model focused specifically on defense mechanisms and assert that human agents with higher maladaptive defense mechanisms will have higher levels of resistance to change while human agents with higher adaptive defense mechanism will rather have a propensity to support change. We use their findings to theorize that citizens who reflect adaptive defense mechanisms are more like to support and adopt e-Government products and services whereas citizens with maladaptive defense mechanisms are likely to resist e-Government products and services. These defense mechanisms represent the inhibitors of e-Government adoption.

The Kim & Kankanhalli (2009) paper focused on combining literature from three areas: Theory of Planned Behavior, Status Quo Bias Theory and Equity Implementation Model to understand user resistance to change. The study is founded on the view that people have a preference for maintaining their current situation and will evaluate change positively based on deriving net equity through the comparison of various costs and benefits (Kim & Kankanhalli, 2009). By combining the two approaches, a "dual factor" model of understanding resistance was hypothesized. We sought to understand what enables and what inhibits citizen resistance towards e-Government. Additionally resistance is also an inhibitor towards ICT adoption. We identified several constructs (Table 2) that may be used to understand inhibiting and enabling aspects of citizen resistance towards e-Government adoption.

Table 2: Conceptual model constructs

Key Constructs	Description	Reference
Resistance to Change	Behavioural intention to resist	(Bovey & Hede, 2001) (Kim & Kankanhalli, 2009) (Bhattacherjee & Hikmet, 2007)
Maladaptive Defence Mechanisms	Unconscious process in response to perceived loss or danger due change. Includes denial, dissociation, isolation of affect, acting out and projection.	(Bovey et al. 2001)
Adaptive Defence Mechanisms	Unconscious process in response to perceived loss or danger due change. Includes humour and anticipation	(Bovey et al. 2001)
Perceived Value of e-Government	Perceived net benefits of e-Government (benefits less costs)	(Kim & Kankanhalli, 2009)
Switching Costs	Perceived costs that the citizen will incur due to using e-Government	(Kim & Kankanhalli, 2009)
Switching Benefits	Perceived utility that the citizen will gain in using e-Government	(Kim & Kankanhalli, 2009)
Positive Friend/Colleague Opinion	The influence and opinions of friends towards e-Government	(Kim & Kankanhalli, 2009)
Self-efficacy for Change	This is an individual's internal capacity to cope with change and gain control.	(Kim & Kankanhalli, 2009)
Organizational Government Support for Change	Represents the resources government makes available to help citizens when switch to e-Government	(Kim & Kankanhalli, 2009)

Central to this study is the argument that defense mechanisms are inhibitors and antecedents of resistance towards e-Government. These inhibitors are to be understood simultaneously with the enablers of resistance

towards e-Government adoption. Together they influence e-Government use, contributing to increased e-Participation and leading towards the achievement of t-Government. Figure 2 highlights the model:

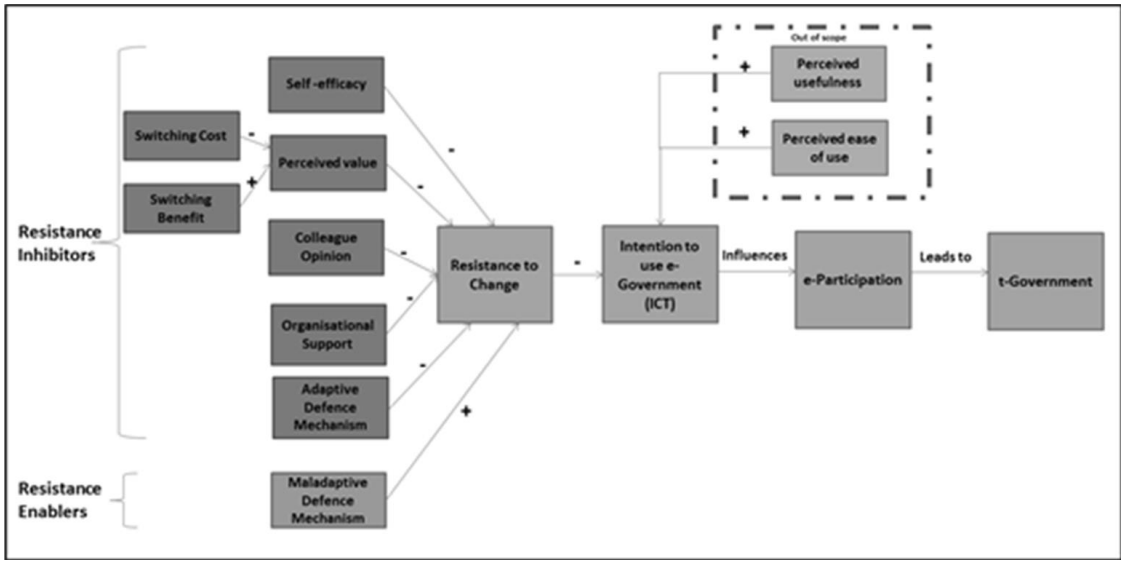

Figure 2: Proposed model for e-government adoption towards t-government

3. Research methodology

A quantitative survey methodology, fundamentally rooted in the positivist paradigm, using a structured questionnaire to collect data was used in this study. Surveys have been criticized for various limitations such as lacking depth, providing a snapshot of a single point in time and may overlook details that cannot be captured through counting and statistical analysis. However, the research benefited from using the survey method since it allowed for a more widespread and inclusive domain coverage.

3.1 Instrument development

The conceptual model evolved above formed the basis for building a research instrument consisting of a self-administered questionnaire which was structured in two parts. The first section aimed to capture the demographic profile of respondents (including gender, age, qualification level and job level). The second section aimed to assess e-Government adoption resistance by providing to respondents, 31 statements related to resistance enablers and inhibitors. The five constructs for the inhibitors and enablers assessed were: switching costs; colleague opinion; self-efficacy for change; organizational support and defense mechanisms. A five point Likert scale was used to assess respondent's feelings towards the statements (Strongly Disagree, Disagree, Indifferent, Agree and Strongly Agree). The matters of validity and reliability were assessed by the research team. The researchers subsequently reviewed the statements through several iterations to ensure that they were drafted in a simple and easy to understand English and reflected the concepts being tested correctly.

3.2 Research procedures, population and sample

The target population was South African citizens in general with a particular focus on those that are socially and digitally excluded. The fieldwork was undertaken in Pretoria, Gauteng province, the economic hub of South Africa. The 171 respondents were from Mamelodi, a township that was setup by the former apartheid government of South Africa to house black African workers. The township has an estimated population of 1 million residents. Given the poverty of the residents, University of Pretoria runs subsidized ICT courses for poor families that cannot afford mainstream education. The basic ICT literacy course attracts students that have no prior computer experience, and sometimes have no formal education. The 171 respondents were from the 2014/2015 class whose demographics are provided in the chart and diagrams below (See Table 3).

Table 3: Cluster sampling

Site Name	Respondents (N)	Description
Pretoria University – Mamelodi Campus	171	Members of the local community attending a Basic Computer Literacy course.

In total, 200 questionnaires were administered, with 171 completed correctly and free from errors resulting in a response rate of 86 percent. The questionnaire resulted in quantitative data that was captured and analysed statistically using the IBM's SPSS tool.

4. Analysis and discussion of results

4.1 Descriptive analysis

Three variables (gender, age and education) were used to capture the demographic profile of the 171 valid responses that were received. 63 percent of the respondents were female while 37 percent were male (Figure 3). Part of the research agenda of capturing data on socially excluded groups is thus met, since a majority of the respondents are female, who are typically disadvantaged in society.

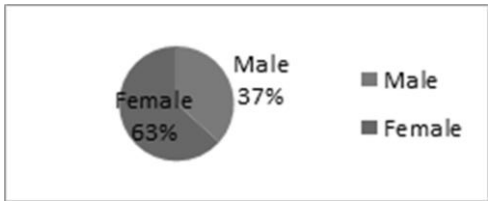

Figure 3: Gender of respondents

Figure 4 captures different age ranges of the respondents, with 5 percent below 20 years; 25 percent between 20 and 25 years; 18 percent between 26 and 30 years; 22 percent between 31 and 35 years; 16 percent between 36 and 40 years; while 14 percent were above 41 years. From the proportions captured by the bar graph, it is noticeable that there is almost a symmetrical representation between the millennial at 47 percent (those below 30 years) and the non-millennial at 53 percent (those above 30 years).

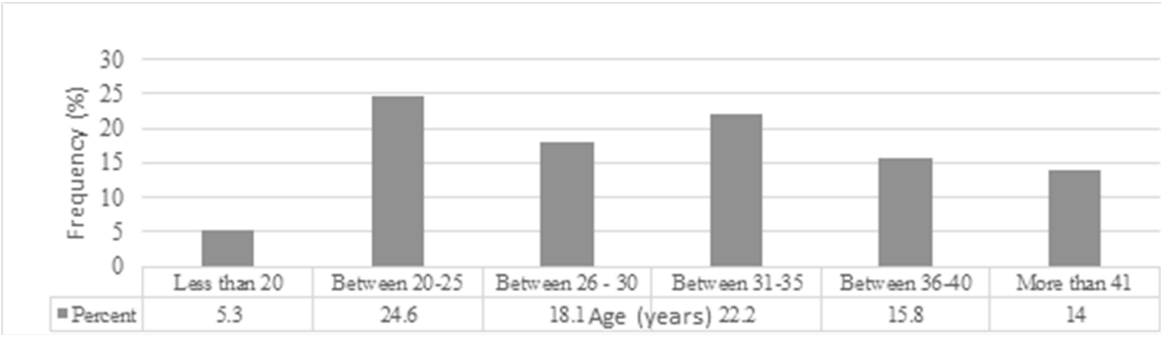

Figure 4: Bar graph representing the age ranges of respondents

The demographic section of the questionnaire also captured the educational qualifications of the respondents (Figure 5).

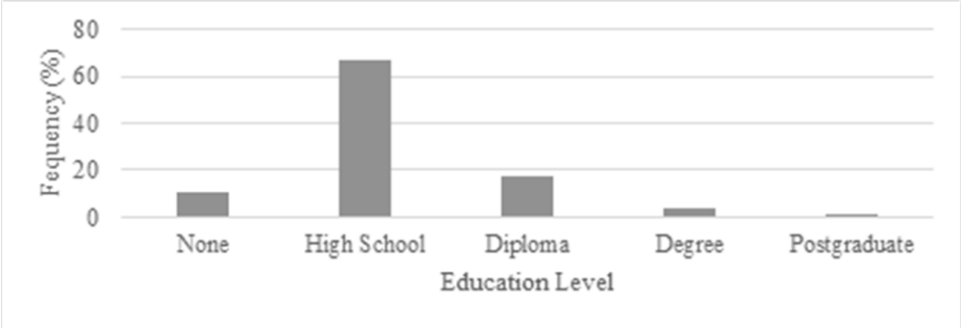

Figure 5: Bar graph representing the educational level of respondents

Figure 5 shows that 67 percent of the respondents at most had a high school certificate; and the sample frame revealed that all the members of this cohort did not have any formalized computer literacy training and lived in economically disadvantaged communities. The respondents were also not in any form of formal employment, were classified as poor, with some of the elderly members receiving social grants of some sort. Thus, our

theoretical sample realized a respondent profile that can be considered as socially excluded (socially, economically and digitally).

4.2 Exploratory factor analysis

Exploratory principal components analysis (PCA) technique was conducted to investigate the internal structure as well as to determine the smallest number of factors that were used to robustly represent the interrelations among the sets of variables. In deciding on the number of factors to extract, a combination of the Kaiser-Guttmann Rule (K1 rule), the scree plot and practical considerations were utilized to determine the most appropriate component solution using orthogonal rotation. The factors considered significant were based on a criteria proposed in the literature. Hair, Black, Babin, Anderson, & Tatham (2006) suggests that there should be due consideration of the sample size when deciding on the threshold for the loadings, and a larger sample size will yield optimal results. According to their guidelines, the ideal factor loading for a study with a sample size of 171 would fall between 0.65 and 0.60. However, given the exploratory nature of this research as well as the use of factor analysis as a heuristic tool (Williams, Brown, & Onsman, 2010), a cutoff of 0.55 was considered appropriate. This decision was reached based on the restrictions of the sample size as well as Comrey & Lee's (2013) criteria in which a weighting of 0.55 is considered to be good.

4.2.1 Dimension reduction of resistance inhibitors

Results presented in (Table 4) indicated that the KMO measure to be 0.812 and the Bartlett's test was statistically significant as its p-value was less than 0.05, thus confirming that the factor analysis procedure was appropriate for the data.

Table 4: KMO and Bartlett's test: Resistance inhibitors

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.812
Bartlett's Test of Sphericity	Approx. Chi-Square	791.332
	df	120
	Sig.	0.000

The resistance inhibitors scale (perceived value, switching benefits, colleague opinions, self – efficacy, organizational support) was assessed for factorial validity to confirm underlying interrelationships among the 16 variables. The results of the factor analysis are presented in Table 5. From the 16 variables of resistance inhibitors from the 171 observations (a ratio of 1:10), a factor analysis resulted in the retention of 4 possible components or factors which were significant (Table 5). The re-produced rotation component matrix in Table 5 reveals the loadings of the 4 components and their names. The first factor, which can be named "*Switching Benefits"* had three significant loadings (SB1, SB2, and SB3), all three were initially theorized correctly. Factor 2, named "*Colleague Opinion"*, had all three variables (CO1, CO2, and CO3) as earlier theorized having significant loadings. Factor 3, named "*Self – Efficacy*" had two significant loadings (SE2 and SE3). Factor 4, named "*Organizational Support*" also had three significant loadings (OS1, OS2 and OS3).

Table 5: Exploratory factor analysis results: Resistance inhibitors

Component: Switching Benefits	**Factor 1**
Government workers will be more productive (SB3)	0.765
Government Workers will be more effective (SB2)	0.692
Access to government services will be more effective (SB1)	0.632
Switching to e-government will result in less errors being made by staff than they currently are (SB4)	0.573
Component: Colleague Opinion	**Factor 2**
Most of my friends/colleagues encourage me to accept e-government (CO3)	0.829
Most of my friends/colleagues think that e-government is a good idea(CO1)	0.795
My peers/friends are supportive of changing to e-government (CO2)	0.768
Component: Self Efficacy	**Factor 3**
I can use Internet to get government services on my own (SE3)	0.725
I am able to use e-government without help (SE2)	0.705
Component: Organizational Support	**Factor 4**
Government leaders provide the support and resources for change to e-government (OS2)	0.795
I am given the necessary support to change to e-government (OS3)	0.746
Government provides the necessary help for me to use e-government (OS1)	0.692

4.2.2 Dimension reduction of resistance enablers

Factorial validity was also performed on the "*resistance enablers*" scale, which was theorized to have three main constructs (switching costs, adaptive and maladaptive defense mechanisms) of 11 items. KMO and Bartlett's test (Table 6) confirmed that a factor analysis would be appropriate. Results presented in (Table 6) indicated that the KMO measure to be 0.669 and the Bartlett's test was statistically significant as its p-value was less than 0.05, thus confirming that the factor analysis procedure was appropriate for the data set.

Table 6: KMO and Bartlett's test: Resistance enablers

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.669
Bartlett's Test of Sphericity	Approx. Chi-Square	182.453
	df	55
	Sig.	0.000

The rotated component matrix of the study's four factor solution is represented in (Table 7). The factor analysis resulted in four interpretable factors. Factor 1, named "*maladaptive mechanisms*" had three items ('isolation affect', 'acting out' and 'projection'). Factor 2, named "switching costs" had two significant loadings as per earlier theorized. Factor 3 had mixed item loadings: one item from the adaptive defense mechanism variables and one item from switching costs variables. Factor 4 also had mixed item loadings from adaptive and maladaptive defense mechanism.

Table 7: Exploratory factor analysis: Resistance enablers

Component: Maladaptive Mechanisms	**Factor 1**
E-Government is foreign to our culture and therefore is unacceptable (ISOLATION OF AFFECT)	0.788
I will continue to use manual government services, even if e-government is available (ACTING OUT)	0.661
E-Government is a hype and people will lose interest in it (PROJECTION)	0.611
Component: Switching Costs	**Factor 2**
Switching to e-government may results in job losses, which is not good (SC4)	0.776
Using the Internet/Mobile Phone to provide government services can result in unexpected problems (SC3)	0.742
Component: Adaptive Mechanism + Switching Cost	**Factor 3**
I only use the Internet to get information about the government when there are amusing or ironic things about the government (HUMOR)	0.802
It would take a lot of time and effort to understand how e-government works (SC2)	0.681
Component: Anticipation + Denial	**Factor 4**
While I have not used the Internet much for e-government, I continue to find new ways of using it for e-government (ANTICIPATION)	0.738
I refuse to acknowledge that the Internet will change the way the government works (DENIAL)	0.641

4.3 Reliability analysis

After confirming factorial validity of the study's two scales (resistance inhibitors and enablers), reliability of each scale (inhibitors, enablers, user resistance) was undertaken to check for the internal consistency of the measuring scales. Analysis was carried out only on those variables that had significant loadings on the resistance inhibitors and enablers. The three scales had acceptable values as captured in (Table 8). The Cronbach's alpha values indicates that 79.7%, 50.3% and 71.4% of the scores in resistance inhibitors, resistance enablers and user resistance respectively provide a reliable variance.

Table 8: Reliability analysis

	Mean Score	Cronbach's Alpha
Resistance Inhibitors	3.532	0.797
Resistance Enablers	2.846	0.503
User Resistance	2.336	0.714

4.4 Cluster analysis

A hierarchical cluster analysis of the summated scales for resistance inhibitors (Switching Benefits, colleagues opinion, self-efficacy and organizational support), resistance enablers (switching costs, defense mechanisms) and citizen resistance was undertaken as a confirmatory procedure to identify the associations between and within the variables. Various cluster outputs (7, 6, 5, 4, 3, and 2) were analysed and a three and two cluster

solution when interpreted made theoretical sense and aided in understanding the associations between of the variables. The cluster analysis outputs that were considered relevant for further analysis were: cluster membership (Table 9) and the Dendrogram (Figure 6). The Dendrogram provides a graphical insight into the study's homogenous cluster solution. Three major clusters were extracted from our variables, which are confirmed by the cluster membership table.

Table 9: Cluster membership output

Cluster Membership						
Case	7 Clusters	6 Clusters	5 Clusters	4 Clusters	3 Clusters	2 Clusters
User Resistance	1	1	1	1	1	1
Switching Benefits	2	2	2	2	2	2
Colleague Opinion	3	2	2	2	2	2
Self-Efficacy	4	3	3	3	2	2
Organizational Support	4	3	3	3	2	2
Switching Costs	5	4	4	4	3	1
Adaptive Defense	6	5	5	3	2	2
Maladaptive Defense	7	6	4	4	3	1

From the cluster membership (Table 9), a 3 cluster solution identifies users' resistance as part of its own cluster (1); switching benefits, colleagues opinion, self-efficacy, organizational support and adaptive defence in another cluster (2); while maladaptive defence and switching costs form a third cluster (3). A two cluster solution bands together user resistance, switching costs and maladaptive defence mechanisms as belonging to the same cluster; while switching benefits, colleague opinions, self-efficacy, organizational support and adaptive defence as another cluster.

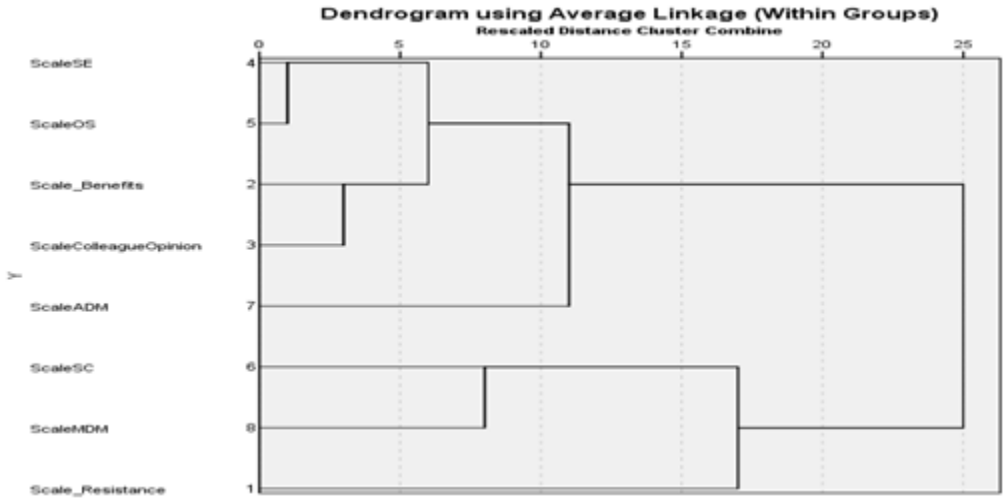

Figure 6: Dendrogram: Variable clusters

The hypothesized model sought to highlight the dual perspective that recognizes the role of resistance inhibitors and enablers in influencing intention to adopt e-Government products and services. The inhibitors, under Cluster 2 comprised of the following variable items: Switching Benefits, Colleagues Opinion, Self–Efficacy, Organizational Support and Adaptive Mechanisms. Switching benefits, colleague's opinion, self – efficacy and organizational support were derived from Kim & Kankanhalli (2009) and are related to factors that enhance the intention to adopt a particular technology or reduce intention to resist adoption. What is insightful is that the items consistently banded together with adaptive defence mechanisms (Bovey & Hede, 2001). An adaptive defence mechanism is considered as an unconscious process in response to perceived loss or danger due to change. Factorial validity that was undertaken earlier identified the use of *humor* ("I only use the Internet to get information about the government when there are amusing or ironic things about the government") and *anticipation* ("While I have not used the Internet much for e-government, I continue to find new ways of using it for e-government") as a coping mechanism to try out new technologies. Thus, what is evident is how adopters of technology, after realizing the inevitability of a particular innovation, creatively use adaptive mechanisms to manage the perceived loss accruing from new innovations, while at the same time taking into account factors (such as switching benefits, colleagues opinions, organizational support and self – efficacy) that nudge them towards adoption. We characterize these factors and adaptive mechanisms as "***resistance inhibitors***".