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Supervised Research Thesis Submission

"Policymaking prior to decision-making in the Digital Age"

Master of Public Policy and Management

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1. Introduction

This thesis will examine the application of information and communication technology (ICT) innovations over recent times in the policymaking process, focusing on the policy stages prior to decision-making stage. Recent developments in technology innovation have led to a re-examination of citizen involvement in government processes and the expansion of opportunities for citizens to engage in the policymaking process. This new form of communication has shifted the power and influence dynamic between policymakers or decision-makers and citizens, with citizens previously resigned to the periphery of policy development. This developing field has drawn the attention of policymakers as well as a growing academic community, driven by the rising impact the first generation of digital natives entering the political discord and gaining in political influence has had on western democracies. Creating the need for policymaking professionals and decision-makers to understand how to effectively utilise these technological advancements during each stage of the policy process. The creation of a universal understanding of the application of digital technologies to policy development will continue to grow in importance and must be understood if future policies are to be effectively developed and implemented to reach its goal. The size of this thesis has restricted the scope of the discussion of the policy cycle. While this thesis will sufficiently address the question of the impact of recent innovation technologies on the policymaking process, there is a limitation due to the size of this thesis restricting the scope of the discussion only to the stages prior to the decision-making of the policy cycle. There are extensive case studies and academic literature to efficiently discuss each stage of the policy cycle in excellent depth. Unfortunately, the length of this thesis makes doing so impossible.

The structure of this thesis will begin by discussing the traditional policy cycle theory of policy development; this theory is the prevailing academic theory on the process of policy development from agenda-setting through to policy evaluation. The section following will discuss the decades of ICT development leading to the invention of what is widely described as Web 2.0 applications. Leading to a brief examination of the impact this has had on citizen interconnectivity and the ability for a citizen to become involved in the development and publication of information through social networks and the internet. The previous two sections will inform an essential discussion by this thesis into the convergence of technology

innovation and government activities. The intersection between government, citizens, and technology has created an essential discussion into the utilisation of technology on government endeavours both internal and external; both outlined in this thesis. Furthermore, the application of technology on the external facing government activities has form two sections E-Government and Policymaking 2.0. While the focus of this thesis is the convergence of policymaking and innovative technology leading to the development of the Policymaking 2.0 field. However, E-Government is of vital importance to any discussion involving the development and implementation of Policymaking 2.0. E-Government was the first application of technology to government endeavours, starting slowly it ultimately demonstrated the ability of technology to reduce the distance between citizens and government to assist government operations. This makes a discussion of E-Government vital to the discussion of technology innovation and policymaking. This section will also discuss the digital divide in application to Web 2.0 technology. An important part of the discussion of using technology to enhance citizen engagement is the ability of citizens to utilise and access these applications effectively. Understanding that access and digital literacy isn't universal must be acknowledged in any discussion of using technology to enhance government processes in a democratic society.

The central discussion of this thesis is how this convergence has changed both the agenda-setting and policy design stage of the policy cycle. This will begin with a discussion of traditional agenda-setting processes in contrast to modern agenda-setting in the digital age. This discussion will contribute to the understanding of how technology development has dramatically shifted policymakers approach agenda-setting and how agenda-setting 2.0 has changed using the case studies of Opinion Space an opining mining platform developed at the University of Berkley and social media response to the BP Deepwater horizon oil spill. This will illustrate two key applications of innovative technology to agenda-setting. Firstly, Opinion Space is a government endeavour to engage in opinion mining through the creation of an application for citizens to discuss the direction a government departments and policy areas, it still relies on citizens to engage with a government created platform. The second will discuss the social media response to the Deepwater Horizon offshore oil drilling platform explosion and the government response to the overwhelming social media reaction to the policy failure to effectively regulate offshore oil drilling and direct the government response leading to future policy changes and continued impact on citizen awareness of the need to

correct the policy problem. This thesis will conclude examining policy design in the digital age, following the same process discussing the process of policy design and the infusion of Web 2.0 technology using case studies. Using the case studies Urgent Evoke and Vibat London to discuss the application of Web 2.0 specifically visual imagery and gaming software to engage citizens in the designing of policy options and collect policy design information. Urgent Evoke was an online alternative reality game developed and implemented by the World Bank Institution, with the goal of producing an innovative social solution to policy problems and developing the user's problem-solving skills for future engagement in policy design processes. Vibat London was a more direct engagement in the policy design process with users given access to the full range of information in the form of the transport and carbon simulator. Giving the users a wide range of information and policy positions to tinker with to develop a long-term simulation that will reduce carbon emissions and reach the government's long-term goals. These four case studies are discussed as either ground breaking applications or watershed situation of new technology impacting government policy development. The success or failure of these and similar case studies are greatly impacting the direction of policymaking in the digital age, with policy professional examine them closes to consider the advances of infusing technology advancement in policymaking. Thus, will form the central evidence of this thesis.

2. Public Policy Formulation

Public policy has a multitude of meanings and is without a clear consensus definition, amongst academics or professional practitioners. The term is often used as a shorthand encompassing all analysis of past political decisions to the current political thinking (Althanus, Bridgman, & Davis 2007, 6). One definition of public policy is the instrument of governance or the decisions that direct public resources; another definition is that it is whatever the government chooses to do or not to do (Howlett 2011, 15). Others consider public policy as a complex phenomenon, consisting of numerous decisions made by many individuals inside the government (Howlett, Ramesh, & Perl 2009, 10). The underlining theme is the government's decision to pursue their objectives. A statement of public policy is, therefore, a statement of political priorities (Althanus, Bridgman, & Davis 2007, 12). The study of public policy, since the mid-1980s, has relied substantially on the development of several pivotal analytical frameworks to assist in the understanding and to help to capture the main characteristics, complexities, and dynamics of policy processes (Pump 2011, 2). These frameworks contribute to the understanding of academics and practitioners of the complex set of socio-political activities that constitute policymaking, as well as its outputs and outcomes (Howlett, McConnell, & Perl 2017, 65).

Public policy development as a discipline has gained academic momentum to select the policy cycle concept as the primary analytical framework to the policy process. The idea of the policy processor cycle has often been used to view policymaking in essentially pragmatic terms, as the embodiment of effort to improve the human condition, by involving human activity in the process of governing (Howlett 2011, 19). The policy cycle is defined by the most well-known conceptualizations as a sequence of steps in which an agenda is set; a problem is defined; alternative policies to address the problem are designed, analysed, and refined; and a proposed policy is selected, implemented, enforced, and henceforth re-evaluated, challenged, and revised (Althanus, Bridgman, & Davis 2007, 37) (Janssen & Helbig 2015, 3) (Howlett 2011, 19) (Osimo, Mureddu, Onori, & Armenia 2012, 10). The set of interrelated stages through which policy issues are deliberated flows from the input of policy problems to the output of government policy (Howlett, Ramesh, & Perl 2009, 11). Each stage of the development and implementation of government policy contributes a vital

element to public policy, and any stage failed or ignored can often determine policy success or failure in later stages.

2.1. Five stages of the policy cycle

2.1.1. Agenda-Setting

The contest for political discord is an ongoing challenge to parties, interest groups, parliaments, the media, government departments, and private companies, all competing to draw attention to their critical issues of both the community and decision-makers (Althanus, Bridgman, & Davis 2007, 43). In the overall process of agenda-setting, all actors seek to influence the problem's definition through the construction and examination of alternatives as well as control how the issue is framed and assessed. The next is the control of the policy change inferred from an agenda-setting event's past and the anticipated trajectory prospect of changing government policy (Howlett, McConnell, & Perl 2015, 421). Agenda-setting is the first and considered the most critical stage of the policy cycle; it dictates the manner and form in which problems are recognised. If they are recognised at all, they are important determinants of whether and how they will ultimately be addressed by policymakers (Howlett, Ramesh, & Perl 2009, 93).

2.1.2. Policy Design and Formulation

Once a government has recognized the presence of a policy problem and acted to correct it, the policy enters the government agenda. The role at this stage is for policymakers to develop a course of action to address it (Howlett 2011, 29). Policy formulation refers to the process of generating options for what to do about policy problems. This stage includes the development of viable solutions, the analysis of the potential impact of these solutions, and the development and revision of the policy proposal (Howlett, Ramesh, & Perl 2009, 111) (Osimo et al., 2012, 10).

The formulation stage in the policy cycle is considered to have several sub-phases that encompass the entire formulation stage of policymaking. Academic literature varies on these phases almost as much as the discussion on the policy cycle itself (Althanus, Bridgman, & Davis, 2007, 57). The elements of each sub-phase comprising the first phase consist of data and evidence that are identified and considered, such as reports, expert testimonies, and public consultations. The next phase begins communication between policymakers, actors, and political decision-makers as they deliver their perspectives on the issue and potential solutions. The penultimate phase seeks the creation of policy options and the drafting of some form of a proposal that identifies the next stage, including draft legislation or regulations that solve the policy problem. Finally, policy actors are sought for their final input into the policy options developed in the previous stages, resulting in the approval or removal of policy proposals before the phase concludes and one or more or none are selected (Howlett, Ramesh, & Perl, 2009, 111).

2.1.3. Decision-Making

This is the apex of the policy cycle when citizens and governments select a policy option for adoption. This stage of the policy cycle can take a wide range of forms with several mechanisms available to dictate the scope of decision-making (Althanus, Bridgman, & Davis 2007, 145). This stage is not a self-contained stage of an option selection. It is a specific stage rooted firmly in the previous stage of the policy cycle. This stage is simply the act of choosing from among a relatively small number of policy options identified in the previous stage of policy formulation (Howlett, Ramesh, & Perl 2009, 139) (Osimo et al., 2012, 10). The decision-making process is far more intricate than the simple democratic procedure of parliamentary voting or electoral voting. Often, day-to-day policy decision-making is left to government-appointed authorities, whilst, the growth in greater citizen participation is gaining momentum (Lukensmeyer 2017, 765). The duty of government officials is often to create a final brief list of policy options or endorse the continuation of the current status quo (Howlett, Ramesh, & Perl 2009, 140). This stage, while often the shortest, is an integral part of the success or failure of policy development shifting the cycle from the theoretical discussion, research, and formulation of the practical elements of application and implementation into reality.

2.1.4. Policy Implementation

Successful policies must withstand the real-world application of the policy. If the policy goals of correcting the problems its designed to correct are to be realised, it must be effectively implemented. Policy implementation is often considered the most challenging as it needs to translate the policy objectives into concrete activities that deal with the complexity of the real world. It includes ensuring a broader understanding, the change of behaviour, and the active collaboration of all stakeholders (Osimo et al. 2012, 11). This stage sees that people are informed of the choice; policy instruments are created and put in place; the staff is instructed; the services are delivered; the money is spent, and everything is prepared for the parliament (Althanus, Bridgman, & Davis 2007, 161). All previous stages in the cycle have led to this, putting the government's decision into action. The success or failure of the implementation requires policy actors to give adequate attention, with the intention to be successful in the practicalities; the rigours of the real world are the ultimate tests of the policy's success. If policymakers fail to design a policy that can withstand the rigours of application or withstand shifts in practical application, this stage will result in policy failure (Howlett, Ramesh, & Perl 2009, 160) (Leong & Howlett 2017, 602). This stage begins with the culmination of the previous stage and ends with the preparation for the final stage of the policy cycle. The steps for policy learning and feedback loops are included in this stage to prepare for the future evaluation and monitoring stage of policy development.

2.1.5. Policy Evaluation and Monitoring

The final stage of the policy cycle serves three purposes. It examines whether the policy meets its objectives, holds policy-makers and decision-makers accountable for the policy's success or failure, and provides future direction for future policymaking (Althanus, Bridgman, & Davis 2007, 179). While each purpose is important to the continued success of the policy cycle. The primary purpose of evaluation and monitoring is the use of implementation data to assess whether the policy is being implemented as planned and is achieving the expected objective (Osimo et al. 2012, 11) (Heckman 2001, 678). The evaluation stages firstly generate data for improved policy analysis and suggestions for making the program more effective. This creates the policy learning and assists in adapting the policy to better meet the objectives (Althanus, Bridgman, & Davis 2007, 179) (Weiss 1999, 470). Following the improvement of the current policy, the evaluation stage of the policy cycle provides vital information towards future policies, creates the best design, and implements based on details of past failures or successes.

3. Technology evolution

Over the past 25 years, the world has seen the greatest changes in communication since the creation of the printing press. In the 14th century, 80 percent of English adults couldn't even spell their names, and only about 30 percent of European adults were literate (Smith 2017, 57). Low literacy rates in the populations severely limited their understanding of religious texts and thereby hindered their ability to challenge the religious authority of the powerful Catholic church and its clergy. The movable type printing press in 1440 by Johannes Gutenberg was a great innovation in early modern information technology (Dittmar 2011,1130). The printing press flooded Europe with printed material, and literacy rates began to rise. In the 50 years after the invention of the printing press, the price of books fell by two-thirds, transforming the ways that ideas were disseminated (Dittmar 2011,1130). Gutenberg's press enabled the distribution of thousands of copies of other religious texts, including the entire Bible, so that laypersons could access the documents of faith and consider the roots of that faith privately, without the direct intervention of the clergy (Smith 2017, 57). Also, it promoted opportunities for the less privileged to obtain education and raise their incomes. (Dittmar 2011, 1139). This also had a lasting effect on the citizens' pursuit of democratic reform in traditional absolute monarchies across Europe.

The past 40 years have seen similar leaps in technology creating disruptions to society and powerful institutions. The creation of ARPANET in 1969 gave rise to the subsequent assembly of the Internet in the 1980s, creating a new channel for transmitting information and communicating, this led to the development of the World Wide Web in 1990. Later iterations and program developments made the World Wide Web more accessible, starting with the Mosaic graphical web browser in 1993 and its successors, leading to the production of a hyperlinked system of documents through which visual and verbal information are presented, as well as the opportunity to connect users to a powerful range of information retrieval and analytic capabilities (Harrison & Barthel 2009, 156) (Roman 2013, 112). Over more recent time, this acceleration in technology development has increased with the rapid emergence and evolution of ICT platforms, including social networking services, social media or multimedia sharing, wikis, blogs, microblogs, and mash-ups these applications led to the term Web 2.0 (Bertot, Jaeger, and Grimes 2011, 82). Web 2.0 services and applications make more dynamic interactions between clients and servers, more engaging webpage

displays and applications, and ultimately, more direct, interactive, and participative user-to-user interactions than previously experienced on the web (Harrison & Barthel, 2009, 157) (Nam, 2011, 12).

The characteristics of these new Web 2.0 applications are their multi-faceted digital connections, which enable citizens to engage in collective decision-making and to collaborate on tasks through an online network. This has redefined the citizen-government relationship (Nam, 2011, 12). Previous communication technology has traditionally favoured those already in power, technology including the telegraph, television, mass printing, and early incarnations of the internet. This continued to confirm the power of political elites and assisted with the consolidation of power through the control of information to citizens with significant barriers to the development and distribution of information (Dutil, Howard, Langford, & Roy 2008, 78). Web 2.0 has been able to remove these barriers, enabling greater social interaction and information production by a wider range of citizen. (Anttiroiko, 2010, 112) (Yildiz, 2007, 653). The new generation of social interactions using Web 2.0 technology has become an everyday element of the communication of citizens in the digital age. Social networks engage with individual's desire to develop new relationships, continue to strengthen existing ones, as well as engage in social learning to develop communities (Nam, 2012, 15) (Burke, Marlow, & Lento, 2009, 946). This democratisation of information had a dramatic effect on the role of government and closing the gap between political elites and citizens, was greatly reduced through technological advancement and the ability of citizens to communicate with each other to develop social networks and communities online that could have a significant impact on policy and politics.

3.1. Content creation

The new disruptive technology of Web 2.0 has led to the proliferation of content creators for news media, social influencers, and user-generated content. This new generation of content creators can capture a single moment in time, act as an intermediary to influence social networks, or develop hyper-localised content otherwise ignored by traditional media or governments. This has developed a phenomenon facilitating the proliferation of citizen content creators and their ever-growing influence on political and social discord, with the ability to connect with rapidly growing numbers of citizens seeking to become more active in society (Wall, 2015, 798). The new wave of content creators began using social media platforms to produce microblogs characterised by speed and a subjective nature of the content. These qualities continue to characterise citizen journalism produced by using the social media tools during the development of Web 2.0 technology. Citizens once running their own blogs as independent editors often shifted to more social networking-based technology, which requires fewer skills and commitment than it takes to run a traditional blog (Wall 2015, 803). This shift has also seen a proliferation in the collaborative design of blogs, and wikis allow a process of bottom-up editing, where the expertise is in the hands of the many rather then the few. The ease with which new information can be introduced and examined by a community of users can lead to the creation of authoritative (Ramos and Piper 2006, 570).

The decrease in barriers to content creation and distant citizens using social network technology have seen a real-world impact. During the Arab Spring, researchers found that social media were the single most important trigger to anti-dictatorial protests. Social media can alter the dynamics of the relationship between a government and its citizens. It can also be a method of mass communication. Dictatorships, across the Arab States, are considered to have only been successful in controlling its citizens via their iron grip on the distribution of information through their control of mass media and its utilisation to manipulate public opinion. The proliferation of the social media and content creators broke this control and provided a voice to the citizenry (Smidi & Shahin 2017, 198) (Wolfsfeld, Segev, & Tamir Sheafer 2013, 118). Several dictatorships tumbled because of the inability to control information; other studies suggest that Iran was only able to prevent a revolution by shutting

down all social media websites before the mobilisation of the citizens against the government (Wolfsfeld, Segev, & Tamir Sheafer 2013, 117).

The beginning of the 21st century saw the rise of a generation of digital natives. These groups are primarily characterised as the generation without a working or academic memory devoid of the easily usable internet. This generation without any experience in a political or social environment, void of social media or other tools of connectivity. This group engage, learn, and develop more in a virtual space than in a physical place. For this group, the Internet is a channel for free expression, self-realisation, and an opportunity for creating communities. This generation of citizens will be the driving force in the future of collaborative content creation and will require that the governments adapt to their understanding of engagement and interaction between citizens and government (Herrero-Diz, Ramos-Serrano, No 2016, 1304).

3.2. New power and influencers

Political broadcasting has been in perpetual shifting in methods and characteristics of the government's or leader's information dissemination to the public. The period of time between the end of World War II and the introduction of the digital age and Web 2.0 was considered to be Broadcast Democracy. Blumler and Kavanagh outline the slow deterioration of party politics with a small number of political elites dominating the media landscape and the control of the media being utilised to reinforce political institutions and beliefs since the second world war. Monopolisation of newspaper and radio media enable the controlled political discourse and public policy direction, as well as the time issues, were discussed. The invention of limited channel network television in the early 1960s began the loosening of control of the political elites of the political narrative (1999, 212). The proliferation of television channels, which led to an increase in the level of dissemination of news and to informed choices for the citizens. Finally, the introduction of the 24-hour news networks changed the relationships among the politicians, journalists, and citizens, with the increased need for information and discussion; political elites lost the ability to control the political narrative (Blumler and Kavanagh 1999, 213). The end of broadcast democracy led to the digital age of technology post-broadcast democracy.

Post-Broadcast Democracy is the term used by academics to describe the period preceding the end of broadcast democracy. The concept of post-broadcast democracy is a way of understanding the impact of this unravelling on mediated western democracies (Wilson 2011, 446). Australia's changing media environment and the emerging characteristics of its mediated political life can be viewed as a post-broadcast democracy (Prior, 2006). New disruptive digital technology has led to the proliferation of media technologies, media channels, and viewing contexts along with time-shifting and mobile media devices, which have led to a high degree of unpredictability among media audiences. The audience in post-broadcast democracies is characterised as a fragmentation of shared media consumption, which has led to sharp differences in levels of engagement with political content (Prior, 2006) (Wilson 2011, 447). In place of the normative national culture of broadcasting, in Australia as elsewhere, we now see a fragmenting heterogeneity in terms of both programming and audiences. As the range of delivery platforms has increased, so too has the range of

information. This has been accompanied by a lowering of the barriers to entry in content production (Wilson 2011, 448).

The core outcome of post-broadcast democracy is the complete erosion of any control of the political discussion by the old elites had with the proliferation of individuals utilising innovative technology to create and influence political discussion. This has changed the political landscape forever, turning policymaking into a political discussion, increasingly controlled by citizens, using their social networks to influence each other's political beliefs or alternatively, by individuals, seeking political discord or information to match their own already established political views. The post-broadcast democracy also increased the opportunity for a citizen-centric process that required active and informed participation by the citizens themselves. In the government, the importance of the citizens' involvement is deeper still: authority and legitimacy come for the citizenry. Disengaged citizens are a symptom of an unhealthy democracy. Post-broadcast democracy engages the perspective, preferences, and experiences of citizens at its core of information dissemination.

4. The convergence of government and technology innovation

The convergence of technology revolution producing Web 2.0 applications and government activities has changed the relationship between citizens and government. Governments around the world are embracing the development of Web 2.0 applications to daily administration and reconstructing archaic bureaucratic procedures (Lim, Tan, & Pan 2007, 5). The application of Web 2.0 technology to government activities has led to the development of Government 2.0 or E-Government, where technology is used as a tool to modernise structures, processes, regulations, and many other aspects of public administration (Pankowska 2014, 265). E-Government covers a broad array of dimensions and can refer to government's use of all forms of ICT to facilitate the government's daily administration (Wigand 2011, 23). The goal of E-Government can be divided into two main application areas: first, internal work and communication processes; and, second, external governance and citizen relations. Internally refers to the application of technology to the internal organisation and work processes of public sector organisations. External refers to the applications of technology to develop all government and public-sector communication with citizens, businesses, and other special interest groups, including service management and governance relations (Anttiroiko 2010, 117) (Yildiz 2007, 652). Both application areas are focused on increasing public value with technology to enhance the development, implementation, and evaluation of policies and regulations, the management of public finances, social inclusion, the management of environmental sustainability, and sustainable development of communities. Making public value external for citizens is done through assisting governments in better understanding and addressing citizens' needs and understanding the degree to which they should be empowered (Pankowska, 2014, 265). The following section will discuss the application of technology innovation to both internal and external government endeavours.

4.1. Internal

The first phase of integrating technology into government operations was enhancing the managerial effectiveness of the public service, with a focus on developing a system that would enable the movement of communication, document filing, and procedure tracking onto a digital database or computer mainframe (Yildiz, 2007, 647). The promise of E-Government in the early days was to revolutionise democracy. However, it still lacked the technological capability to engage with citizens in the democratic processes effectively. Instead, the principles of E-Government were first introduced to government institutions during the height of Reagan's America and Thatcher's Britain and the political philosophy of "government is the problem". In this environment, E-Government's innovative technology was directed toward internal operations to reduce the number of public servants and reduce red tape (Roman, 2013, 117). It was in this environment of technological advancement that E-Government was introduced, leading to its use as an internal political, philosophical tool in public administration. The goal of this movement was to increase government productivity in the backroom, managerial, and administration sectors of public administration through greater automation (Yildiz 2007, 647) (Zuboff, 1988) (Aldrich et al. 2002, 349). The tradition of the intra-authority focus of E-Government processes continues to be a key element of E-Government development as technology advances into the Web 2.0 era. Shifting technology has allowed greater cross-authority cooperation, including the creation of department-wide social networks, greater documentation sharing or editing as well as the removal of the barrier between frontline staff and managerial staff (Muller and Grimm, 2007, 57). The rapid advancement of communication technology and widespread use of the personal computer only then allowed the expansion of E-Government to engage with citizens using Web 2.0 ICTs (Yildiz, 2007, 652). This shift toward an external sphere of E-Government, moving from the backroom to the front-end user, focuses on the distribution of information and the canvassing of opinion. The next section will discuss Web 2.0's creation of an external sphere of E-Government.

4.2.External

In 1993, a group of students from the University of Illinois who developed the Web's first graphical browser. The development made the network more accessible to a wider technology-illiterate citizenry. This interface motivated extraordinary and unprecedented growth (Roman 2013, 117). The increase in usability provided access to new customers and markets for business, academics, and governments. Suddenly, previously constrained brick-and-mortar institutions, such as government and education, became highly mobile and accessible. The sharp decrease in the price of computers minimised the accessibility barriers and made the internet's communication tools, which were available to the wider public, reach a critical mass-making practice of E-Government or Government 2.0 (Roman 2013, 117).

4.2.1. E-Government

The external sphere of Government 2.0 or E-Government can be further separated into two elements, based on the method or type of public communication administration. First is the delivery of a non-hierarchical, non-linear, and two-way communication structure to enhance and streamline government services, information delivery, responsiveness to citizens and business, and partnerships and social developments (Hia & Wen 2012, 485) (West, 2004). The application of Web 2.0 technology to government departments and public administration relationships with citizens has focused on delivering an e-service website, e-administration, e-citizen, e-collaboration, e-commerce, developing e-democracy, and e-governance (Ergazakis, Metaxiotis, & Tsitsanis, 2013, 9). The focus of these elements is to deliver information to citizens, which has led to the creation of a government-based website and a one-stop government. These websites allow for information distribution and collection for an agency or government, for example, the creation of the mygov portal by the Australian government deals with everything under the umbrella the majority of social services delivered by the Australian Government from Australian job searches, welfare applications, Medicare claims, health records, and taxation department superannuation discovery (Muller & Grimm, 2007, 56) (Sagheb-Tehrani, 2014, 375).

The E-Government academic literature has followed this line of thinking, focusing on the impact of government-driven communication with citizens and more stakeholder

engagement. However, governments continue to drive communications only utilising communication technology to increase citizens access to government information and to transform citizens into clients (Hia & Wen 2012) (Lim, Tan, & Pan 2009) (Jaeger & Bertot 2010) (Cordoba-Pachon 2010) (Roman 2013) (Mullner & Grimm 2007). The development of ICT has increasingly impacted the challenges of online delivery of government information and services through the Internet and other digital media. It provides "Everything: Anytime, Anywhere, Anyway" (Hia and Wen, 2012, 485). Increasing use of digital service delivery is believed to have increased public values through greater participation in government systems. The concept of removing the need for a physical presence increasing the level of citizen participation and provide citizens with more access to information to assist them in achieving their desired outcome of interaction with government services (Ergazakis, Metaxiotis, & Tsitsanis, 2013, 9), is the success of E-Government. While utilizing the technology of Web 2.0 based applications, governments have become more citizen-centric than previous bricks-and-mortar democratic institutions. The most common uptake of this form of Web 2.0 technology integration into external endeavours seems to be an extension of traditional forms of government-citizen interactions. The following will discuss the use of innovative technology to enhance previously restricted government-citizen interactions through their involvement in government decisions and policymaking.

4.3. Policymaking 2.0

The second element of the external sphere of Government 2.0 or E-Government, is the application of Web 2.0 social interaction capabilities and content collaboration to government decision-making, which has allowed citizens to inject themselves into policymaking processes. The promise of Web 2.0 technology applications to government and the political sphere has been leading the current wave of Policymaking 2.0. This wave of thinking has slowly developed into the future intersection of policymaking and Web 2.0 technology. Whilst mostly ignored or under researched in academic literature. Research and discussion of this field are largely left to government and think tanks to forge the research. The most prominent research has been undertaken by the Crossover Project “designing to bridging communities for next-generation policymaking". The project is supported by the European Commission, not academic institutions. The goal was for the establishment of a scientific platform to develop a roadmap, a long-lasting interest and commitment to next-generation policymaking (Osimo, Mureddu, Onori, Armenia, & Misuraca 2013) (Misuraca, Koussouris, Lampathaki, Kokkinakos, Charalabidis, & Askounis 2013). The research by the Crossover Project research examining a multitude of applications for Policymaking 2.0 has formed the foundation for academic literature (Koussouris, Lampathaki, Kokkinakos, Askounis, & Misuraca 2015) (Misuraca, Broster, Centeno 2012) (Lampathaki, Charalabidis, Osimo, Koussouris, Armenia, & Askounis 2011) (Markaki, Kokkinakos, Koussouris, Psarras, Lee, Lohe, & Glikman 2014).

The focus of the Policymaking 2.0 literature is on using technology advancements in the Web 2.0 era to help facilitate the modelling of complex processes, collaborating among the various involved actors, and simplifying the decision-making process even under the most complicated and demanding conditions (Koussouris et al. 2015, 142). The great promise of Web 2.0 is the application of ICT, which is expected to constitute a catalyst for the greatest change in policymaking in the past decade and provide the greatest opportunity and areas for citizen engagement in the policymaking process (Koussouris et al. 2015, 142). In the decades preceding the end of the Second World War, Western democracies had improved citizen engagement, voter turnout, and democratic institutions, and public administration entered an era of local, state, and national levels of democracy strengthening, with few constituencies failing to increase openness and responsiveness to their citizenry (OECD, 2005, 20) (Ferro,

Loukis, Charalabidis, & Osella 2013, 365). Public trust in governments also saw a marked rise, which can be attributed to the greater availability of information and a reduction in the distance between government officials and citizens. However, the past two decades have seen falling voter turnouts and political party memberships in Western democracies, together with a weakening of other pillars of representative democracy. Polling has also indicated that citizens show a declining level of trust in public institutions (OECD, 2005, 20). Amidst the growing apathy and disengagement in traditional political processes, Policymaking 2.0 has proven to strengthen representative democracies by developing appropriate tools and evaluating their performance in engaging citizens in the policymaking process. Traditionally, the policy cycle is designed as a set of activities belonging to the government. Policymaking 2.0 has recognized the importance of collaboration and engagement of citizens public governance, who are increasingly involved in all stages of the policy cycle (Koussouris at al. 2015, 142).

4.3.1. Citizen Coproduction

Citizen involvement in policymaking has long been considered by political elites as short-termism or populism. Traditionally, policymaking was characterised as carried out by elites, in the sense that politicians were supported by policy-maker experts and influenced by powerful stakeholders, who provided advice and whose advice was viewed as authoritative. This view of citizen coproduction as mere tokenism has hindered the creation of effective Policymaking 2.0 practises (Osimo et al. 2013, 24) (Dutil, Howard, Langford, & Roy 2008, 78). Citizen sourcing has used Web 2.0 technology to help the government to be more responsive and effective. While government officials are still primarily responsible for policy, the injection of citizens influences the direction and outcomes (Linders 2012, 447) (Nam 2012, 12). This idea has created a shift in the relationship between governments and citizens, from traditional customers into partners, which expands citizens roles to effectively becoming active problem solvers in government activities (Linders 2012, 448). The opportunity for citizen involvement in government has resulted in changes in technologies, political motivations, and cultural shifts, and each demonstrates a transformation in the focus of power, away from bureaucracy and toward the citizens (Janssen & Helbig 2015, 5) (Nam 2012, 17) (Linders 2012, 448). New tools are providing access and processes for collecting expertise from various sources, thus opening the process (Janssen & Helbig, 2015, 5).

4.4. Challenges to Policymaking in the Digital Age

4.4.1. Digital divide

The origin of the term ‘digital divide’ referred to gaps in access to computers. The proliferation and usability of the Internet broadened the term to encompass computers and Internet access (Deursen & van Dijk 2010, 894). As technology has evolved so has the use of the term to incorporate an of multitude meanings. This new digital divide in unequal Internet usage or online participation is the key to understanding the future of citizen participation in digital policymaking (Brandtzæga, Heima, & Karahasanovic 2011, 135).

Theories of Internet adoption have recognized this limitation, and an increasing number of researchers have argued since the 2000’s that more attention should be paid to social, psychological, and cultural backgrounds. Several conceptualizations of how to approach digital divide research generally identify five areas of importance, including attitudes and awareness, access, skills, types of usage, and general lack of interest. Usage access is the focus of this study and encompasses the purpose of the whole process of technology appropriation (DiMaggio and Hargittai 2001) (Warschauer 2003) (Cohen-Mansfield & Biddison 2007) (Cisco 2010) (Loges and Jung 2001). These conceptualizations and the supporting acedemic literature has revealed that while gaps in physical access are being addressed, while other gaps appear to be widening. One important factor is the difference possession of digital skills. Changes in society demand new skills, especially those related to the Internet, which is one of the most important means of communication in contemporary society (van Deursen & van Dijk 2010, 894); and, has proven to be a major hinderance to the advancement of policymaking in the digital age. If greater citizen input into policymaking is to be utilised for greater policy outcomes, government and academia must understand that current levels of digital divide will skew the findings. The lack of universal digital skills and access has the possibility of making Policymaking 2.0 a form of engagement for young, affluence, and computer literate section of society, but ignores a large unrepresented majority, possibility leading to poor policy outcomes.

5. Agenda-setting

5.1. Process of agenda-setting

Agenda-setting is the first and, perhaps, the most critical stage of the policy cycle. This process determines what issues vying for the government's attention are taken up by decision-makers. What happens at this early stage of the policy process has a decisive impact on the entire policy cycle and its outcomes. This process is the lift-off stage for any policy problem. Regardless of the statistical evidence or a policy analysis of the problem, without community or decision-makers' support, no problem is sufficiently addressed. The manner and form in which problems are recognised, if they are recognised at all, are important determinants of whether and how they will ultimately be addressed by policymaking (Howlett, Ramesh, & Perl 2009, 92) (Princen 2007, 21). The policy agenda is "a list of problems to which government officials, and those associated with the government, are paying serious attention" (Eissler, Russell, & Jones 2014, 77). Agenda-setting is the straightforward process of selection which of the myriad of policy problems facing governments are addressed by policymakers.

Traditionally, during the broadcast era of political communication, the agenda-setting process was performed by assessing the relationship among policy elites, decision-makers, and decision-makers' attention, with a tight control of the political agenda and media. This agenda-setting process from the more common organisational perspective outlined by Nelson and Lindenfield has four analytically distinct stages starting with issue recognition followed by issue adoption, issue prioritisation, and issue maintenance (1978, 20). Agenda-setting has long been considered to involve the policies of selecting issues for active consideration (Cobb and Ross 1976, 126) (Dery 2000, 37). For this reason, policymakers, government officials, and citizens all attempt to influence this stage of policy development. All government administrations have policy problems that require policymakers and government officials to develop policies to correct them. Agenda-setting is the process by which all problems come to public attention at a given time and place for discussion and analysis of the political agenda (Dery 2000, 38).

Cobb and Ross (1976, 128) elaborate on the individual stages of the agenda-setting process. Each stage plays an integral part in the process for issues to reach the population's mindset and land on the policymakers' political agendas. Issue recognition, the first step, is when an issue is noticed and determined to be a potential topic for action. The next step is issue adoption, which focuses on the decision to respond to an issue. Decision-makers must share a perception of the legitimacy of government responsibility for action on the issue, and they must believe that an appropriate response could be found if the issue is adopted. The third step, issue prioritising, is when an issue is placed in the existing agenda, which is reordered to include the new issue. Depending on the issue, urgency or immediacy will impact the periodisation and timeframe for the issue to be addressed. And, issue maintenance occurs when an issue remains on the agenda after consideration and perhaps response. Without this long-term maintenance, an issue failure is not necessarily regrettable because it could have been unnecessarily placed on the agenda or only captured attention based on short-term incidents, yet did not indicate a serious policy problem. Government agendas are often incredibly crowded when there is no mechanism for removing issues from public consideration among the myriad issues that no longer evoke general interest (Nelson & Lindenfield 1978, 21).

5.2. Role in the policy cycle

The role of the agenda-setting process is the selection of the policy problems that enter the public and decision-makers' consciousness. Academics consider policy selection vital in the policy cycle since they determine which issues are taken up for decision-making (Dery 2000) (Eissler, Russell, & Jones 2014) (Princen 2007) (Jones & Baumgartner 2004). In the agenda-setting process, the range of legitimate concerns and alternatives in a political system is therefore determined. Agenda-setting is highly political, with policy elites and activists seeking actively to bring issues to the agenda if they seek policy change or want to keep an issue off the agenda and defend the status quo (Princen 2007, 21). Historically, regarding the role of the agenda-setting phase, decision-makers contracted policymakers and experts to gather statistics to discern the underlying causes of the problems further. Surveys and consultations, including online, are now frequently used to assess stakeholders' priorities, and typically are analysed. Linear, general-equilibrium models are used to identify causal relationships among several factors (Osimo et al. 2013, 29). New Web 2.0 technology has forever changed the influencers on the agenda-setting cycle.

5.3. Agenda-setting 2.0

In the world of evolving digital communication and online communities, the dynamics of issue agendas are becoming more complex, increasing speed, and getting unpredictable. The emergence of Web 2.0 technology has generated renewed attention to the idea of agenda-setting and the transformation of citizens from customers into partners (Hochtl, Parycek, & Schollhammer 2016, 159). The growth in Web 2.0 technology has seen an increase in audience members who may initiate a new discussion or respond to an existing media. New realities of agenda-setting in policymaking visualisation and opinion mining can identify the problems early, possibly before the development of wide-spread citizen attention. New advanced modelling technology platforms are then utilised to untangle the relationships behind the problem, understanding the causal roots that need to be addressed by policy (Osimo et al. 2013, 150). The government plan to identify emergent topics and generate relevant agenda points early is the collect data from social networks with high degrees of participation and try to identify citizens' policy presence (Hochtl et al. 2016, 159).

Large-scale studies have shown that the public agenda as reflected in social media is not locked in a slavish or mechanical connection to the news media agenda, that has previously controlled the agenda-setting stage. Social media spend a lot more time discussing social issues, while they are less likely to address issues of economics and government functioning (Hochtl et al. 2016, 159). Web 2.0 technology has developed options in a post-broadcast democracy including visualisation and option mining to help identify problems at an early stage of development. Advanced modelling techniques are then used to untangle the casual relationships behind the problem, understanding the causal roots that need to be addressed by policy (Mureddu, Misuraca, Osimo, Onori, & Armenia 2014, 456).

5.4. Case Studies

5.4.1. Opinion mining and Sentiment Analysis

Opinion mining and sentiment analysis application utilisation in agenda-setting is aimed at providing policymakers with issue-specific, policy-focused, on-topic perspectives and sentiments about a policy problem that requires policy consideration. In this way, policymakers can better understand the positives and negatives as well as the expected benefits and consequences voiced by citizens regarding the problem, often before official problem discussion begin (Sobkowicz, Kaschesky & Bouchard 2012, 478) (Osimo et al. 2013 79) (Chen & Zimbra 2010, 74). Opinion mining can be defined as a sub-discipline of computational linguistics that focuses on extracting people's opinion from the web. With the explosive growth of social media content through Web 2.0 technology, the world has been transformed inidivual voice into collective social network creating a citizen mega-phone to enhance policymaking and decision-making of government (Porumbescu 2016) (Grubmuller, Gotsch, & Krieger 2013) (Lee & Kwak 2012) (Bertot, Jaeger, & Grimes 2010) (Bertot, Jaeger, & Grimes 2012) (Bertot, Jaeger, & Hansen 2012) (Linders 2012).

People can encourage users to contribute and express their views on almost anything in discussion forums and blogs, and at social network sites (Chen & Zimbra 2010, 74). Opinion mining and sentiment analysis platforms assist policymakers and decision-makers in understanding patterns in citizen opinions and the political feeling amongst the noise of social media. In June 2017, two billion users logged-in Facebook the largest social application, above YouTube's 1.5 billion, WeChat's 889 million, Twitter's 328 million, and Snapchat's estimated 255 million. Moreover, a Pew Survey reported that half of all adult Facebook users have more than 200 friends in their network enabling unprecedented access to localised information and grass roots political movements efforts that ideally help to shape policymaking (Osimo et al. 2013, 69) (Constine 2017).

This development has created unprecedented opportunities for citizens to voice their opinions publicly but has created a serious bottleneck when it comes to making sense of these opinions. At the same time, the urgency to gain a real-time understanding of citizens concerns has grown and is unpredictably influential (Mureddu et al. 2014, 449). New social media

platforms provide a huge amount of valuable information that policymakers want to analyse. Now a piece of text using opinion mining analyses can discover which is the opinion being expressing, who wrote the opinion, and what is being commented on (Osimo et al. 2013, 79). Sentiment analysis, on the other hand, is about determining the subjectivity, polarity, and polarity strength of a piece of text; the opinion of the writer to identify sentiment, affect, subjectivity, and other emotional states in online text. In the past few years, this field has attracted a great deal of attention from both academia and industry due to many challenging research problems and a range of applications. (Osimo 2013, 79) (Chen & Zimbra 2010, 74). The emergence in the popularity of social networks with high degrees of participation has allowed the collection of data and attempts to identify citizens' policy preferences, which can then be considered by the government for setting the agenda (Hochtl et al. 2016, 159). This technology has aided the government and decision-makers with beginning the process of identifying emerging topics and to generate relevant agenda points.

5.4.1.1. Opinion Space

The Opinion Space platform exploits new connection technology to incorporate ideas from deliberative polling, dimensionality reduction, and collaborative filtering. The platform explores individual opinions of a set of ideas as scalar values on a continuous scale and applies dimensionality reduction technology to "depolarize" discussions by including all participants on a field and encouraging communication between people who may not agree. The data is placed onto a two-dimensional plane for visualization and navigation, effectively placing all participants onto one level playing field (Faridani, Bitton, Ryokai, & Goldberg 2010, 1175) (Misuraca et al. 2014, 67).

"*Opinion Space will harness the power of connection technologies to provide a unique forum for international dialogue. This is an example of what we call 21st century statecraft and an opportunity to extend our engagement beyond the halls of government directly to the people of the world. I can't wait to be a part of this exciting new conversation*" Hilary Clinton (Newmark 2010).

The platform defines a metric relationship between users based on similarity of opinion. It is computed using statistical dimensionality reduction techniques. Using principal component analysis from advanced mathematics, multiple opinions can be projected onto two dimensions while still approximating original distance relationships, which lends itself well to forming a geometrically meaningful visualization of users in a two-dimensional plane. An underlying network structure emerges in this space as users interact by rating each other's comments (Faridani et al., 2010, 1176) (Misuraca et al., 2014, 67). The goal of Opinion Space is to help policymakers understand the diversity of their communities, solicit feedback and creative suggestions on specific topics, rapidly identify the most insightful ideas and suggestions, and increase satisfaction and engagement with their communities (Faridani et al., 2010, 1176).

The Opinion Space 1.0 was made public in March 2009. Over the next few months, the platform received 21,563 unique visits. As many as 4,721 registered with their email address to maintain connections and save settings, and each registered user rated on average 14.2

comments (Faridani et al., 2010, 1176). A US State Department study using Opinion Space 3.0, garnered more than 2,000 different ideas relating to foreign policies and priorities. Over 5,000 additional individual responses were collected and documented. Due to the subject of foreign policy, the innovative and final report was not publicly released. This has made any determination regarding the impact of the use of the Opinion Space application on policy decisions impossible (Misuraca et al., 2014, 70).

Another study by an auto-manufacturer into the future of the brand garnered 1,000 ideas with 100,000 ratings evaluating these ideas, including green vehicle designs. The Opinion Space platform has a significantly higher conversion rate than other applications, with 50 percent of users participating in policy discussions compared with 10 percent on most other comparable opinion mining platforms (Misuraca et al. 2014, 70). Also, 92 percent of participants reported that they preferred Opinion Space to other opinion-mining and sentiment analysis platforms (Faridani et al. 2010, 1181). Since 2009, Opinion Space has been utilised by decision-makers and policymakers as the leading opinion mining platform whilst the direct impact on agenda-setting is unclear due to the unpublished final reports delivered to policymakers and the often sensitive or classified nature of the policies. What can be ascertained is that more and more policymakers are turning to opinion-mining and sentiment analysis technology to determine the pattern of citizens' opinions on policy and agenda issues to determine the direction of major policy portfolios and the growing respect policymakers have for social media or opinion mining platforms to drive government agendas.

5.4.1.2. Social Media BP Deepwater Horizon

The Deepwater Horizon oil spill in April 2010 was one of the greatest oil spills in history and continued spilling oil for weeks. Policymakers were reviewing the regulatory regime for oil exploration, the existing liability, and the compensation framework in search of a policy response or outcome to the disaster. During this time, social media exploded with accusations against BP and the government for inaction thereby asserting heavy pressure on policymakers to act swiftly. Data collection retrieved online content related to the spill. The field's boundaries were set to include all participants who exerted some effect on opinion formation in the field. Topic detection that may identify topics on the oil spill, such as 'Clean Energy Legislation', 'Nightmare Well', or 'oil spill'. Opinion detection can then analyse the content according to whether the topics are associated with primarily positive or negative opinions focusing on a specific region or the public used to illustrate opinion detection and sentiment analysis (Sobkowicz, Kaschesky & Bouchard 2012, 478).

The #OilSpill tweets revealed that social media public engaged immediately in disaster response and connecting resources with individuals or areas in need. The Twittersphere had been optimistic about the potential for social media to play a productive role in getting timely information to affected people and thereby improving their decision-making. Along these same lines, digital volunteerism has been characterized as having the potential for improving response outcomes by facilitating connections between people and resources (Bostrom, Joslyn, Pavia, Walker, Starbird, & Leschine 2015, 608). During the height of the disaster, Unified Command's @Oil Spill 2010 account was the central account in the #OilSpill conversation network. That account was retweeted 1390 times, received 268 "mentions", and 60 "replies" (Bostrom et al. 2015, 625). The week of June 14-20, 2010 Twitter's most linked-to news stories tended to be more about BP executives, while blogs linked more often to news about the spill itself. In the conversation that ensued, bloggers displayed a significant level of distrust towards both BP and federal officials. The spill accounted for 44 percent of the news stories from June 14-20, its highest level of coverage (Pews 2010) (Starbird, Dailey, Walker, Leschine, Pavia & Bostrom 2015, 612).

Deepwater Horizon disaster as a case study of public opinion and social media platforms has long-lasting and wide spread policy implication for governments and politicians. This is particularly significant for environmental disasters. A demonstration of the lingering impact of is 38% of an American survey can still recognise the “Three Mile Island” disasters over twenty years since the incident suggesting that major pollution events have the potential to influence public opinion for extended periods of time (Bishop 2013, 18). Public opinion outcome from the Deepwater Horizon through social media expanded beyond the area of impact or areas reliant on oil drilling industry for economic prosperity (Bishop 2013, 17) but in a large cross-section of the wider community seeking policy change. While major pollution events affect social media and public opinion, and they can linger in the minds of ordinary citizens long after the event. a result which suggests that (Bishop 2013, 18).

The impact of Deepwater Horizon policy agenda began during the disasters with 10% of tweets containing sentiments considering the underlying policy areas of commercial and environmental policy, including policy failure to prevent the disasters and calls for political actions to correct this policy problem (Starbird et al. 2015, 621). As the Government official collaborates on oil-spill legislation, some stakeholders expressed in the question of liability, responsibly, prevention and response are all key elements. All key point of social media discussion during and in the aftermath of the Deepwater Horizon disaster (Aldy 2011, 1813). Policymakers also work to develop measures to mitigate the economic risks posed by the oil spill and to assess policy measures that could reduce the risks of future oil spills (Aldy 2011, 1813). The impact of social media in demonstrating the public will to achieving effective policy outcomes to prevent any future disaster and remove policy problems association with oil-spill of response and liability. It was a key element in setting the political agenda through the utilisation of social media by the public, and the attention policymakers pay to social media trends.

6. Policy Design and Formulation

6.1. Process of policy formulation

Directly following the acknowledgement of a policy problem by policymakers through the agenda-setting process and the decision to act, policy formulation is the process of selecting the course of action in addressing the policy problem (Howlett 2011, 29). During this stage, policymakers or government officials consider options that might help resolve the problem. Those options are identified, refined, appraised, and formalised (Howlett 2011, 30). The prevailing concept of policy design has four phases including appraisal, dialogue, formulation, or assessment, and consideration (Howlett 2011, 30).

Each phase of policy design process has elements critical to the success of the policy's development, to assist policymakers in preparation and awareness of all elements of the underlying policy drivers, and the wide-ranging implications of all policy options before the decision-making process of the policy cycle. The first phase of activities is an appraisal, where policymakers and governments both generate and receive input about the policy problem and solution options through data and evidence. This may take the form of research reports, expert testimony, stakeholder input, or public consultation on the policy problem identified. The next phase commences policy engagement in the dialogic activities phase that seeks to facilitate communication between policy actors with a unique perspective on the issue and potential solutions. Government officicals engage groups and individuals through open public meetings where citizens affected by the policy problem can discuss and debate proposed policy options. In more structured options, experts and societal representatives from business and labour organisations engage government officials and policymakers in a higher-level discussion and more structured meetings (Howlett 2011, 32).

After the apex of the policy design process, government officials become involved in a more meaningful way in the formulation or assessment activity phase. Government officials begin to weigh evidence on various policy options and draft some form of a proposal that identifies which of these options best represents community sentiment and will achieve the desired outcome. This can lead to feedback in the form of draft legislation or regulations, or it could identify the framework for subsequent public and private policy actors to negotiate a more

specific plan (Howlett, Ramesh, and Perl 2009, 111). The final phase of policy design before leading into the decision-making stage of the policy cycle. This stage is consolidation activity when policy actors can provide formal feedback on the recommended options. (Howlett 2011, 32). Sub-stages and activities involved in policy formulation outlined above suggest different actors are involved in different aspects of policy design.

6.2. Role in the policy cycle

The role of policy design and formulation in the policy cycle is creating and demoncsarting policy that are feasible or acceptable within any given limited set of policy options with the involvement of experts, stakeholders, and government officials leading the decision making stage. For each option, econometric and theorectical simulations are carried out to anticipate possible impacts. These simulations are typically carried out with linear general-equilibrium models. Based on the simulated impact, the best options are submitted for adoption (Misuraca et al. 2013, 3). The role of the formation phase, policy documents can be scrutinized, and governments can adopt or shape actual policies according to public demand. Especially in democracies, the credibility and legitimacy of new policies are important, so a useful undertaking is to use means of data collection to investigate the acceptance of specific polices among different groups of society (Hochtl et al. 2016, 160).

6.3. Policy Design 2.0

The elements of engagement in the digital age can be expanded beyond the political act of voting by political representatives to also refer to the general discussion and community involvement within the population, leading to a more collaborative form of policy design. The formal inclusion of citizen input in the policymaking process has so far been little explored in the context of the digital age; however, as case studies continue to build (Mureddu et al. 2014, 451). The continued development of Web 2.0 technologies has led to a radical increase in bottom-up collaboration, driving lower costs of self-organisation, and enhancing the concept of collaborative governance (Hochtl et al. 2016, 109). Collaborative policy design is proving to be useful for identifying the widest range of options by leveraging collective intelligence. To facilitate the choice of the most effective option, immersive simulations support decision-makers by considering unexpected impacts and relationships. Collaborative governance enables them to develop further and fine tune the most effective option (Mureddu et al. 2014, 456).

The integration of Web 2.0 technology and recent academic development of old and new policy design has fortuitously coincided. Traditional policy design considers individual tools, whilst ‘new’ policy design strategies focus more on ‘toolkits’ or multiple tools and tool mixtures used to address many problems, and it has especially tried to come to terms with how these mixes evolve over time (Howlett, Mukherjee, and Woo 2014, 197). The new design orientation has engaged more directly in the discussion and evaluation of integrative policy mixes, where multiple instruments and objectives are arranged together in complex portfolios of policy goals (Howlett 2014, 190). Web 2.0 technology can be used to contribute to this evidence-based policymaking and sovling these complex portfolios by utilising advanced predictive analytics methodologies and scenario techniques leading to vital case studies of the policy design process that are the foundation for assessing the future feasibility of Policymaking 2.0. Opportunities for a more effective large-scale collaboration in public action and the formal inclusion of citizens input into the policymaking process, has increased the legitimacy and accountability framework, but these issues have so far been little explored (Hochtl et al. 2016, 109).

6.4. Case Studies

6.4.1. Visualisation and gaming

The innovations of Web 2.0 technology have increased the computing and software capacity that has assisted the next generation of visual imagery and gaming software, as a tool for education, engagement, and understanding. This has elevated the minor idea of gamification applications to public services and formed a niche group of web-based applications that extend into various aspects of everyday life, including health, education, and business (Asquer, 2013, 146). Games like SimCity, Urban Empire, and Cities: Skylines are leading titles in the urban-planning gaming genre that has realised increasing commercial success with technology development. These games are about city planning, wherein gamers become actual elected officials, create their cities, and manage their growth and plans within a simulated metropolis (Janssen & Helbig, 2015, 5) (Asquer, 2013, 146). With their success, the use of visualization techniques in all types of games that assist ordinary citizens can become involved through the utilisation of their problem-solving abilities and creative thinking to better facilitate the policymaking process (Bachen, Raphael, Lynn, Baldwin-Philippi, & McKee 2010, 204). These techniques lower the threshold of ordinary citizens' participation. In this way, visualization and gaming provide a way for citizens to become a part of the policymaking process through simulations and games to poll citizens' opinions and receive feedback. These technologies can support the legitimacy of the decisions made by enabling citizens to understand the processes through participation greater participation (Janssen & Helbig, 2015, 5) (Bachen et al. 2010 204).

6.4.2. Urgent Evoke

In 2010, the World Bank Institute ran the first of four iterations in a ten-week online alternative reality game called Urgent Evoke, otherwise known as Evoke, produced by Jane McGonigal, then the Director of Gaming at the Institute for the Future. Every Wednesday over the ten-week game at midnight players went online to access a new "urgent evoke", or a description of problem players worked to solve. Users were encouraged to read the story, investigate the story, complete the mission outlined as learning, act, and imagine (Avi Brooks, Meneses, and Keyser 2015, 1) (Waddington 2013, 47). Evoke was a multi-player online educational experience, which uses storytelling, game mechanics, and social networks, to prepare young people to become social innovators capable of creating solutions that address global 'grand challenges', including problems related to food security, sustainable power, water shortages, the future of money, empowering women, urban resilience, indigenous knowledge, crisis networking, and the future of the virtual world of Evoke (Avi Brooks et al. 2015, 9) (Waddington 2013, 47). Evoke brought widespread media acclaim and praise by gaming critics as a model for "serious gaming," being awarded the Direct Impact award at the Games for Change conference in 2011 (Waddington 2013, 43).

The project was designed to develop the understanding of these complex challenges, acquire twenty-first century skills, such as creativity, collaboration, critical reflection, and socio-emotional skills, such as curiosity, empathy, generosity assisting them to gain the confidence to experiment and create innovative solutions. Evoke has been played in three languages by student groups in over 100 countries over the past seven years (World Bank 2017). The targeted and primary users of Evoke the first iteration was young people in sub-Saharan Africa, with a focus on South Africa's youths. The idea is that a massively multiplayer format crowdsources as a relatively inexpensive path to siphon innovative ideas with Africa as the ultimate challenge and experimental litmus test for the game (Avi Brooks et al. 2015, 5) (Waddington 2013, 43). Evoke made substantial use of Web 2.0 tools utilising blogs, personal profiles, social networks, and leader boards as major components of the game (Waddington 2013, 43).

Evoke's participation and engagement levels in 2010 was highly successful across the world. Evoke web-traffic received 286,219 visits by 171,958 different individuals during the ten-week duration, 11.3 percent of those unique visitors registered with Evoke, tallying a total of 19,386 players; then, 34 percent or 6,618 completed at least one urgent evoke over the entire ten weeks, and with urgent evokes 142 or 0.73 percent completed all of them. The ultimate involvement was 73 players submitted Evokations (Hawkins 2010, 5). A substantial proportion of the visitors were under the age of 24, with approximately 100,000 of this age group engaged with development challenges and social-innovation-based solutions. The traditional understanding of this age group and policy activism is that many in this age group would not otherwise have encountered these challenges or considered solutions to them (Hawkins 2010, 59).

The success of Evoke did not directly impact a specific policy design or formulation but showed the role serious gaming can have in developing research, facilitating discussion, and assisting assessment policy cycle. The platform introduced citizens to additional information, new ideas, and new thinking, and participants were or became receptive to new evidence and concepts (Hawkins 2010, 63). While not seeking a direct answer to policy problems or input into designing the solutions to the specific problems in the fictional game world, Evoke allowed an otherwise under the engaged segment of the global community and demographically unrepresented age-group in the democratic process a platform to conceptualise policy design and formulation processes. Undertaking research, discussion, and voting on solutions that transcend the game platform into real world skills and policy problems facing the global community. Evoke has proven to be a critical application of Web 2.0 technology to engage the next generation of digital natives. Their participation demonstrated the eagerness of digital natives to engage in problem solving and policy design in the digital space to develop solutions to policy problem their generation will encounter. This should give hope to policymaking to build problem solving and simulation platforms in the future with the hope of extensive engagement of this section of society.

6.4.3. Vibat London

The visioning and back casting for transport policy (VIBAT) in London was a project established to examines the potential impacts of a range of both technological innovation and behavioural change policy measures with the goal to deliver pathways towards a 60 percent reduction in transport CO2 emissions by 2025, and an 80 percent reduction by 2050, on 1990 levels (Hickman, Ashiru, & Banister 2009a, 2) (Environmental Audit Committee 2006, 4). In a broad sense, the study was to design a transport system that facilitates a higher quality of life within London, whilst reducing CO2 emissions in line with goals and European emission targets. In VIBAT, London was used as a case study and a scenario-building approach to examine and test potential future scenarios for various levels of application of different policy packages (Hickman, Ashiru, & Banister 2010, 13) (Misuraca et al. 2013, 151) (Environmental Audit Committee 2006, 173).

The study managers identified 120 different policy measures that were put together into mutually supporting policy packages of measures, totalling 12 policy packages, including low emission vehicles, alternative fuels, pricing regimes, public transport, walking and cycling, strategic and local urban planning, information and communication technologies (ICT), soft measures ‘smarter choices’, ecological driving and slower speeds, long distance travel substitution, freight transport, and international air travel (Hickman, Ashiru, & Banister 2009b, 6). VIBAT utilises the concept of “serious gaming” for developing behavioural change allowing users to understand better the impact of individual choices in which each policy lever is used requires awareness raising, acceptability, and involvement must accompany all actions to gain support from all affected stakeholders. The importance of these complementary measures has been well illustrated with respect to congestion charging in London: any measure impacting travel time or vehicle access with need a prominent level of public acceptance and policy design coproduction. The core of VIBAT’s information collection method was the use of transport and carbon simulator (TC-Sim) in the genre of a serious game designed for behavioural change and visualisation tools for Web 2.0 technological applications. The modelling behind TC-Sim has been developed to allow quantification of the potential impacts of a range of policy interventions in multiple combinations. Underlining the information presented in the game interfaces originate from a variety of data sources, which include relevant London Travel Survey modelling, a

spreadsheet of transport CO2 emissions developed by Transport for London, a vehicle fuel penetration spreadsheet, and several other databases (Hickman, Ashiru, & Banister 2009a, 15).

The outcome of the VIBAT and TC-SIM projects is a significant advancement in the serious game and immersive simulation, with two meaningful results. The first is community engagement and involvement, which is vital for policymakers, businesses, and the public at all levels of decision making to engage in the policy development process. It is needed for stakeholders to 'buy into' the ideas of pushing technological change and in changing behaviour so that real progress can be made. The TC-SIM innovation has been successful in raising awareness about the nature and scale of change required amongst decision-makers and participants. The public needs to radically change their purchasing patterns and behaviour to be more carbon efficient. Tools such as TC-SIM, applied to different contexts, could play a significant role in testing different options with a range of different users (Hickman, Ashiru, & Banister 2009a, 28). The VIBAT London study, using TC-SIM, illustrated that a range of entrenched policy positions is not likely to be successful in achieving the current CO2 reduction targets for London. The current trends mean that the transport sector continues to perform poorly in contributing to cross-sectoral CO2 reduction targets. The clear message is to work across the broader range of policy packages and at a higher intensity in the application. (Hickman, Ashiru, & Banister 2009b, 6).

The VIBAT study constructs an ambitious and well-thought out target, specifically for reducing carbon emissions from transport (House of Commons 2006, 4). The report concluded that this target is achievable, and devised a series of individual policy proposals that would acumulate into a significant reduction in emissions while stressing that reaching the overall target would require a combination of both technological improvements and behavioural changes. The VIBAT study devlivered policymakers invaluable assistance in constructing a challenging but deliverable target for carbon reductions from transport (Britain. House of Commons: Environmental Audit Committee 2006, 28). These constructive outcomes include urging that "It is in travel behaviour that the real change must take place". Under the "Smart Social" is a broad range of measures that is not a menu, but a total list of all possible and proven policies that require urgent implementation now. That bus distance

would increase 15 percent, rail 50 percent, walking trips would double, and cycle use increase five-fold. There would also have to be major improvements in vehicle fuels and technology, with car makers planning for these now (Britain. House of Commons: Environmental Audit Committee 2006, 173). The conclusion reached during the VIBAT project was also discussed during a public hearing into the proposed Automated and Electric Vehicles Bill before the House of Commons. The study found a public appettite and significant advantages for reducing city speed limits significantly cleaner and more fuel efficient at lower speeds. The reasons why a lower speed limit would reduce carbon are petrol, and diesel engines are most efficient at about 50 mph, and wasteful and polluting congestion would be reduced. A lower speed limit would also trigger a power-shift from those vehicles designed for up to twice the 70 mph limit and which pollute more at 20 mph than 30 mph, to lighter and more efficient vehicles that would be cleaner at lower urban speeds (Britain. House of Commons Public Bill Committee 2017).

7. Conclusion

The aim of this thesis was to examine the impact of technological advancement in the digital space on government endeavours to develop effective policies. In conclusion, this thesis has demonstrated that the rapidly evolving technological advancement in the digital age is having an extensive impact on policymaking. This development has transformed both the engagement expectation for citizens with government decision-makers and the ability for decision-makers to engage in more extensive information gathering processes to develop improved policies with greater community harmony through greater consolation. While this academic field is relatively new, governments continue to develop exciting case studies outcomes and government ventures into the development of an application to assist agenda-setting and policy design stages of the policy cycle. The history of governments and politics has always been impacted by the technological advancement shifting how governments relate to it citizens and connect with them. This thesis has shown the rapid development of Web 2.0 technology and the expectation of a generation of future digital natives has made meaningful change to the government-citizen relationships rarely seen in history.

This thesis also found several effective case studies of this evolving field that have effectively applied Web 2.0 applications to develop a platform to enhance citizen engagement in initial stages of the policymaking processes. The key findings of this thesis are that this developing field is showing promise, but no case study or platform is complete. Policymakers now have access to extensive, and innovative technology to assist them to develop better policy through enhanced citizen participation. Policymakers must be vigilant to both effectively engage citizens in the co-production of policy while understanding these platforms are yet to constitute a complete effective application. This is due to the limited levels of users. Case studies discussed have exceeded the developer goals, but it has yet to have a critical mass of users or effective cross section of citizens outside the opinion mining of social media. This case was most effectively capture of a broad spectrum of citizen opinion and sentiment, only through the utilisation of a platform with an already extensive userbase. The conclusion of this thesis is that this field is merely the beginning of policymaking 2.0 and political engagement in the digital space.

The challenge to future of policymaking 2.0 toward full implementation is the continued existence of the digital divide. This may prove to be an ongoing hinderance to the roadmap to policymaking 2.0. As this field progresses into maturity and digital literacy increases to a majority of politically active citizens the digital divide will still exist in some capacity. As the future of policymaking 2.0 is currently unclear. Decision-makers and policy professional cannot overlook the skewing of results of case studies. If the digital divide is taken into full account, future policy processes will effectively utilise digital engagement as part of effective engagement mix, rather than a complete method to citizen engagement in policy development. Rather, traditional citizen engagement in policymaking processes will need to continue. The current policymaking processes aren't without fault citizens that engage in Web 2.0 policy engagement are have grown disengaged and politically apathetic with current political processes. If governments continue to develop platforms that require citizens to be motivated to engage under their own motivation, policymaking 2.0 will begin to resemble the outcome and engagement of traditional policy development controlled by policy elites dominating the flow of information and policy outcomes. Policymakers must consider accessing citizens either on social network platform with a critical mass of users with a cross section of citizens or develop a usable platform with the broadest usability and access that would reach a critical mass of users to be most effective.

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