Evaluating the Public Value of E-Government Services: An Actor-Network Theory Approach

Gabriel Kamau

Murang'a University of Technology, P. O. BOX 75-10200, Murang'a
Contact: Tel +254722915219: Email: *gkamau[at]mut.ac.ke*

Abstract: *Government all over the world are working on a broad array of e-government-services including re-designing services such as diverse as tax filing, applying and registering for social security, obtaining birth and marriage certificates, procurement for business, government transactions and customs declaration. Studies have shown that different stakeholders benefits from these e-government services. However, it is through objectively evaluating e-government services, that the benefits between citizens and governments can be successfully understood and improving areas correctly identified. Recently, researchers have shown interest in information systems evaluation and the public value perspective segment taking the lead. This is in support of the view that the prime objective of e-government is to produce public value through effective use of information and communication technology. Also, research in the field of IS evaluation has begun to recognize the need for grounding evaluation approaches and studies in the ontology and epistemology of relevant paradigms. Therefore, the main aim of this article is to develop an understanding of evaluation of the public value of e-government services using Actor-Network Theory perspective. This research review mainly focus on two aspects: studying the concept of public value and how it is relevant in evaluating e-government services and using Actor-Network Theory, to conceptualise the evaluation and as an ontological foundation to analyse the relations among actors in evaluating the public value of e-government services.*

Keywords: Public Value, E-government Services, Evaluation, Actor-Network Theory

1. Introduction

During 1970s, the world experienced a wave of reforms in public administration, which led to the end of fruitful age of "welfare state' to a new mode and form of management in public administration referred to as New Public Management (NPM) (Meynhardt, 2012) . The cause was due to the global depletion of public resources and reduced quality of public services combined with deep social dissatisfaction (Cordella & Bonina, 2012) . Articulated as policy framework, the reforms under NPM agenda were seeking to solve the problem of public administration that was too big, inefficient and expensive, therefore unable to serve public services as supposed to (Cordella & Bonina, 2012) . NPM had a clear and dominant focus on results and public managers in this paradigm had goals built around achievement of performance targets (O'Flynn, 2007).

Ever since NPM was first recognized internationally, adoption of information and communication technology (ICT) was conceived to be a powerful tool to help in achieving NPM reform agenda. Indeed, NPM information systems investments were directed towards enhancing efficiency (Cordella and Bonina, 2012). However, for many scholars, NPM was problematic (Alford and Hughes, 2008) . NPM has been criticized for it likening of public sector to the private sector by reducing the scope of its agenda to business-like and extensive treatment of citizens as customers (Buhai, 2021) .

Heek (2006) articulated that government operations are not business operations, and the views and models from business and e-business can not be implemented without taking the differences into account. O'Flynn (2007) argues that due to the problems and challenges experienced with NPM, especially during the 1990s, there has been increasing interest in what can be termed a public value (PV) approach in public management. It's an emerging form of management and governance in the public sector which emphasized more collaborative networked or joined up arrangements (Alfold and Hughes, 2008). Cordella and Bonina (2012) suggest that analysis of the effects of ICT on public sector should not solely focus on their impact on the direct economic exchange relationship and individual choices, but rather on the collective preferences as indicated by the public value paradigm.

The main aim of this article is to develop a understanding of evaluation of the public value of e-government services using Actor network theory) ANT perspective. The review mainly focus on two aspects: studying the concept of public value and how it is relevant in evaluating e-government services and using ANT, to conceptualise the evaluation of public value of e-government services, that is, using ANT as an ontological foundation to anaylse the relations among actors in evaluating the public value of e-government services.

2. Concept of Public Value

In theory and practice, the concept of public value has been attracting growing interest among public policy makers in both developed and developing countries (Benington, 2011) . The original notion of public value was rooted by Mark Moore, in his seminal book 'Creating Public Value: Strategic Management' (1995). Several authors have sought to define, categorise and distinguish the salient characteristics of public value (Benington, 2011) . Public value refers to the value which citizens and their representatives seek in relation to strategic outcomes and experiences of public services (Bojang, 2020) . After extensive review of public value literature Meynhardt and Bartholomes (2011) defines public value as the "values characterising the relationship between an individual and

society", whilst Talbot (2011) define public value as a combined view of public of what they view as valuable. Heek (2006) delineate public values as the value created by government through services, laws, regulation and other actions. Meynhardt (2012) views value for the public is a result of evaluations about how basic needs of individuals, groups and the society as a whole are influenced in relationships involving the public. Therefore, public value then is also value from the public, i. e. 'drawn' from the experience of the public and any impact on shared experience about the quality of the relationship between the individual and society can be described as public value creation.

Moore (2005) suggests that to create public value, executives must address three key areas; services, outcomes and trust. This viewpoint has gained acceptance in both public sector (Kelly, Mulgan, & Muers, 2002) and academics (Bozeman, 2002; Kearns, 2004). Services may be identified as meeting a relatively enduring need and are similar to the private sector (Moore, 1995). Under Public Value theory, successful service delivery supports all elements of public value creation outcomes, services and trust (Try and Radnor, 2007). For example, provisions of education, health care, policing, jointly or severally, services contribute to the achievement of outcomes (Kelly et al., 2002). Consequently, public organizations fails to create public value when they do not focus on the service capability to satisfy user's needs, outcomes produced by those services and on when trust in government declines (Spano, 2009).

From the literature it is clear that the notion of public value suggests a radical change in public sector management practices. Public value brings to the centred of the actions of the government and public administration activities for search of a solution which guarantees the best possible cohesion between expectations of the citizens and the actual deliverables of the actions of the public administration. O'Fylnn (2005) avers that public value should function as a lens for looking at public sector challenges and that management should focus on relationships. Bennington (2011) agrees when stating the public value emphasizes how public professionals need to work towards the co-creation of public services, by collaboration with producers, users and other stakeholders. In this research, public value is understood as a management paradigm for thinking government activities, policy making and service delivery within public sector (Benington, 2011; O'Flynn, 2007). A public sector oriented to the creation of public value may prioritize management practices designed on the basis on NPM spirit of performance objectives centred on efficiency and economy.

3. Overview of E-government services

Information and Communication Technology (ICT) has become a powerful tool for many private and public sectors. Private companies in particular are increasingly taking advantages of opportunities offered by the new technology (Palvia and Sharma, 2007). It is worth noting that globalization, demographic changes, and growing influence of technology are reshaping our lives at breakthrough speed.

A world economy based on digitally-empowered enterprises give rise to a new set of critical success factors for survival in global marketplace. Along with rise of e-commerce and –business in private organizations around the world, the world has seen the emergence of related phenomenon in government organization known as "electronic government services", or e-government services (Carter and Bélanger, 2005).

According to the Carter and Bélanger (2005) e-government services refer to the delivery of information and services online via the internet. Further, Basu, (2004) allude that to e-government services might involve delivery services via internet, telephone, community centre, wireless devices or other communication systems. . E-government services can be broadly categorised into informational and transactional services (Venkatesh, Thong, and Xu, 2012) . Notwithstanding numerous definitions and categories of the term e-government services, two things are apparent. First e-government services change the way in which government delivers its services (Hafeez and Sher, 2006) . Second, e-government services employ the use of ICTs technologies (Halligan and Moore, 2004) . In sum, e-government services simply means a new way of delivering government services to citizens, businesses and other partners through the use of ICT technologies.

4. Evaluating the Public Value of E-Government Services

E-government evaluation refers to assessing and examining the e-government program activities to understand the process and the result of e-government programs (Alhyari, Alazab, and Venkatraman, 2013). E-Government represents an exclusively specific case of IS investment in the public sector and thus its evaluation is likely to be informed by understanding of public sector IS evaluation (Grimsley and Meehans, 2007). According to Tona and Calrsson (2013) IS evaluation is concerned with the evaluation of different aspects of real-life interventions to achieve anticipated goals. The evaluation of public services to citizens in e-government can help government officials understand the development situation of the people-oriented e-government (Zhao, 2010) . In additional, e-government evaluation would lead to monitoring changes in e-government environment and also to assess the efficiency of implementing e-government program in order to improve the procedure of service delivery (Alhyari, Alazab, Venkatraman, Alazab, & Alazab, 2013) . Despite these benefits little attention has focused on evaluation of e-government (Grimsley & Meehan, 2007; Karunasena, Deng, & Karunasena, 2011; Kelly et al., 2002; Persson & Goldkuhl, 2010) .

Some of the reasons cited for limited research in IS evaluation are problems of identifying and quantifying benefits and opportunity costs, unfamiliarity with evaluation techniques, difficulty in interpreting results, and lack of time, data, information or interest (Alshawi and Alalwany, 2009). Most of the research in the area of IS evaluation indicates that it is a complicated and difficult subject (Alshawi & Alalwany, 2009; Serafeimidis & Smithson, 2000) . The complexity is due to multiple perspectives

involved and the difficulty in quantifying benefits (Walsham, Symons, & Waema, 1988) . The debate between researchers is not only about the complexity of IS evaluation, but also about the most appropriate evaluation approach to be used for specific IS (Alshawi and Alalwany, 2009). Furthermore, evaluation by its nature, is a very subjective undertaking that cannot be separated from human intellect, history, culture and social organization (Özkan, Hackney, & Bilgen, 2007) .

Present literature shows that the most commonly used evaluation methods of e-government are the traditional ones (Alshawi & Alalwany, 2009; Irani, Love, Elliman, Jones, & Themistocleous, 2005) . They include return on investment, cost/benefit, payback period and the present value. The methods are largely oriented towards the private sectors and specifically towards for-profit firms which market and sell products or services (Cordella & Bonina, 2012; Frisk, Bannister, & Lindgren, 2014; Ogutu & Irungu, 2013) . Evidently, citizens expect efficiency in respect of public expenditure, so this is not to imply that economic evaluation is inappropriate, rather, the need for complementary measures that relate to citizens' desires and perceptions (Grimsley & Meehan, 2007) . Serafeimidis and Smithson (Grimsley & Meehan, 2007) criticized the traditional approaches to IS evaluation methods. They argued that they were based on narrow technical and accounting terms, ignoring human and organizational components of IS users (Mingers & Stowell, 1997) . In response to the setback of evaluation of traditional IS contexts there have been already been valuable efforts to bring public value ideas in field of ICT (Cordella & Willcocks, 2010) .

5. Actor Network Theory

Research in the field of IS evaluation has begun to recognize the need for grounding evaluation approaches and studies in the ontology and epistemology of relevant paradigms (Lagsten, 2011). This section will review the Actor-Network Theory (ANT) as the theoretical foundations underpinning this study.

The seminal works of Bruno Latour (Latour, 1987) (Latour, 2005) , John Law and Michael Callon (Callon, Law, & Rip, 1986) are recognized as foundations of Actor Network Theory. As its major proponents maintain, ANT is entirely appropriate for socio-technical research (Callon et al., 1986) (Callon et al., 1986) . The basic concept of ANT includes actors (or actants). Both human beings and non-human (e. g. technical) objects are considered as an actor (Latour, 1987) . One important aspect of ANT is the denial of a *priori* dichotomy between the social and the technical; they are considered to be interwined, in what Law (Callon et al., 1986) (Walsham & Sahay, 1999) refers to as heterogeneous networks. Actor-network is a heterogeneous network of aligned interests, including people, organizations and standards (Walsham, 1997) . ANT recognizes that technology and people are not distinct pre-existing actors' which influence each other through relationship. Instead, they are considered as the constitutive elements of this relationship, and at the same time, the output of this same relationship (Cordella, 2010) .

In ANT, both people and technologies can act and be acted upon (Holmström & Robey, 2005) . Walsham and Sahay (Walsham & Sahay, 1999) summed up and concluded by saying, "the actor-network theory examines the motivations and actions of actors (both human beings and non-humans such as technological artefacts) who form elements, linked by associations, of heterogeneous networks of aligned interests. " The view proves to be crucial to the aim of developing of a deeper understanding of the use of an IS evaluation process (Nijland & Willcocks, 2008) .

Using this theory as a frame of reference also makes it suitable as a method for analysis (Gao, 2005) . ANT has successfully been used in the information systems field to examine, for example, the development of information infrastructure (Hanseth, Monteiro, & Hatling, 1996) , the standardization process (Hanseth, Jacucci, Grisot, & Aanestad, 2006) or for analysing strategy formulation (Gao, 2005) . In conclusion ANT offers a language of analysis that sensitizes us to new ways of understanding. The difference in opinion between the social and the technical is solved by the perception that both are intertwined.

6. Actor Network Theory and Evaluating Public Value of E-government Services

Evaluating public value of e-government services is a complex and requires comprehensive understanding of the relationships of the social networks and each actor's relationship to technology and the artifacts' that define the socio-technical network. Actor Network Theory concepts of translation (Callon et al., 1986; Latour, 1987) , assemblage (Latour, 2005) , and inscription (Akrich, 1992) can be used as unifying concepts of understanding the public value of e-government services where both social, economic and technical value meet.

The translation process enhances the deeper understanding of the interplay among various ICT actors by providing the details of all the strategies through which an actor identifies other actors and arranges them in relation to each other. Through translation the focus is on "processes by which an actor creates lasting symmetries" (Callon et al., 1986) . Translation is concerned with the alignment of interests of different actors, which is necessary for stability in the network. From the outset, actors have a diverse set of interests and aligning these interests causes a network to become stable and durable (Gao, 2005) .

Clarke (Clarke, 2002) alludes translation bring together complex entities into a single object or idea that can be mobilised and circulated like a branded commodity or a taken-for-granted fact. According to Callon et al., (Callon et al., 1986) "by translating we understand all the negotiations, intrigues, calculations, acts of persuasion and violence, thanks to which an actor or forces takes, or causes to be conferred on itself, authority to speak or act on behalf of another or force".

Based on ANT, translation modifies an actor's "program of action" by employing different devices, indentified as the "four moment of translation" of problematization,

interessment, enrolment and mobilisation (Latour, 1994). *Ploblematization* involves the definition of the problem and the establishment of an 'obligatory passage point' by the focal actor "which renders them indispensable in the network (Callon 1986); *interessment* is a series of processes during which qualities and motivations (roles) are bestowed to other actors according to focal actor's programme; enrolment is a set of strategies aimed at persuading others to invent in or follow the programme; successful *enrolment* depends on the negotiation and consolidation among actors during *interssement* phase (Thapa, 2011) . Finally, *mobilisation* is a series of methods used to ensure that the representatively of spokesmen of collectivities remains uncontested by those collectiveness. All four moments of translation intend to overcome resistance and prevent other actors to follow their predisposition. During successful translation, the network strengthens internally, gains coherence and consistency.

Besides the four stages of translation, the process of inscription is critical to building and stabilising actor-networks, as most artefacts with social systems embody inscriptions of some interest. Inscription refers to the way the technical artefacts embody pattern of use (Monteiro, 2000). For example, technological artefacts can embody a world view that reflects the socio-economic context and rationality in which it was created (Heeks & Stanforth, 2007) . In other words, artefacts always embody the beliefs, social and economic relations, the previous pattern of use and assumptions as what the artefact is about (Akrich, 1992) . Inscription can also refer to the way technical artefacts embody pattern of use, including user program of action (Monteiro, 2000). In relation to translation, inscription to a large extent take place simultaneously and interrelatedly (Latour, 1991). Indeed, the dynamics of translation reflect different levels of actor's inscription and alignment rigidity achieved in the actor network (Cordella, 2010).

Assemblage is a moving target that cannot be studied in a complete or comprehensive sense (Latour, 2005). In contrast (DeLanda, 2006) considers that an assemblage is a realistic picture of an agent that can be captured in a given space and time, meaning that causalities could be established between actors. In this study, I rather consider assemblages under the definition given by Latour (2005). Establishing causalities, as De Landa, (2006) proposes becomes more complicated if we do not have a fixed 'thing' we are studying. But rather we see progression and process, which may or may not mean the presence of causality.

One of the most key motivations to use the concept of translation in this research is that the evaluation of public value of e-government services can be seen as something emergent. Irani et al. (2005), articulated the IS evaluation should be viewed as a process of experimental and subjective judgement, grounded in opinion and word views. Latour (2004) propose a combination of values in the translations of facts from what he referred new constitution.

Translation describes the process whereby knowledge and values are seen as emerging from concrete situations. Latour argues that values, much like facts become recognised objects only when are constructed and gradually become publicly known.

Public value of e-government services can be studies using a model comprising of four stages of translation. The choice of a specific translation is made following the spirit of ANT where every translation is unique (Latour, 2005). The process start from *problematisation* where actors with and around the public domain identify pertinent problems that they face in the communities, organizations and wider society. The next step is *association,* here actors voluntarily associate with spatial settings rather than necessarily accepted an imposed' *interressment*' as evident in expert-led processes (Callon, Lacoumes, and Barthe, 2009). Association often emerges at the crossroad of users, workers, experts, public and other interested individuals/groups. Once converges are found both tangible and intangible benefits/costs of e-government services are *enrolled*. Finally, is the stage of evaluation referring to the practice among the public to evaluate the outcomes and impacts of the values that were enrolled. Public value emerges from this process through the on-going processes of assemblage and re-assemblage, rather than fixed. In addition, the focus is not on the study of the effects that specific actors have on the black-boxing of inscriptions in a specific actor-network, but on the interplay analysis taking place in the actor-network that result to black-boxed relationship. Latour (1987) argues that science and technology need to be studied in action that focuses on the dynamics of their interaction, rather than on the stability of their relationships. In conclusion, ANT offers an analytical framework that provides a theoretical and methodology for the study of public value of e-government services in terms of these dynamic relationships. It permits public value to be conceived as a phenomenon in action that both emerges and affects the interplay of different actors participating in open network relationships.

7. Proposed Model of actor-network analysis and e-government

The relationships between the human and non-human actors exemplify the ongoing struggles in evaluating the public value of e-government services With time, the contextual elements will vary and the interests of both human and non-human actors, as well as their alignment, will alter, which may result in changes to the approaches of evaluation. Hence, evaluation is viewed as a process of several stages with varied foci. Researcher task is to define the contextual elements, determine their influence on the actors' interests, and trace the evaluation of the public value of egovernment services as a process of interest inscription and translation. Figure 1 provide a proposed Model of actor-network analysis for e-government services using public value perspective.
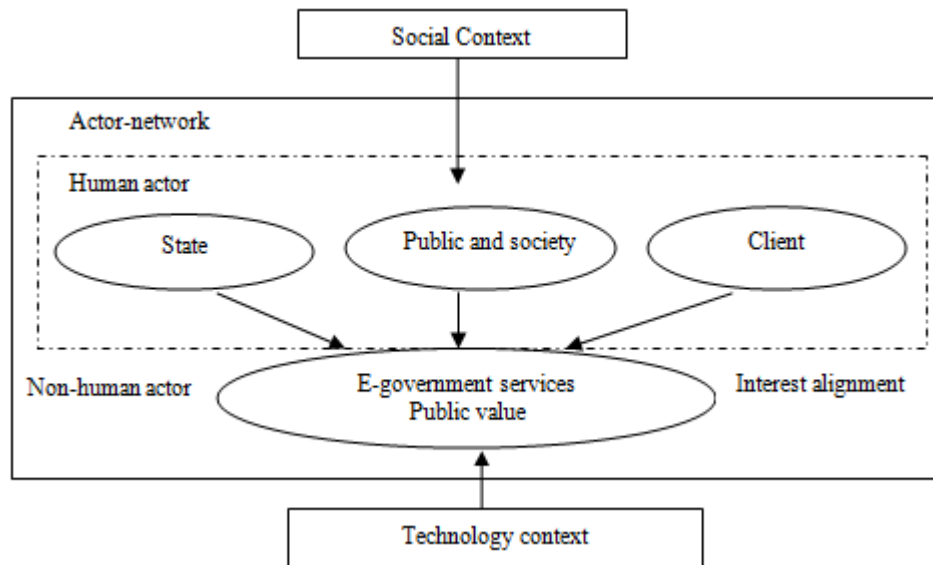
Figure 1: Proposed Model of actor-network analysis of e-government based on public value.

In the model, the public value and e-government services are defined as the non-human actor. In identifying the human actors, it is necessary to consider whose interests the candidates represent (Walsham, 2017) . This mode defines the public, clients, citizens and the operators as three groups of human actors that represent the social interests in the evaluating public value of e-government services. In the end, the state stands for the interests of the public and the operators owned by the state. For the sake of distinction, the interests of the state are here restricted to political and macro economic concerns.

8. Conclusion

The objective of this research was to promote the use of ANT in understanding the public value of e-government services. According to data presented from literature, ANT not only provides theoretical concepts as ways of viewing elements in the real world, it also suggests that it is exactly these elements which need to be traced in empirical work (Walsham, 2017) . ANT provides a study of social constructivism by attending to power strategies and networks of human and non-human actors. The glue that holds the actor network of IS together is the power to have strategic control of the IS processes by professionals and the way technological solutions inscribe organizational behaviour. The fundamental role is that ANT offers exposition of role of technology in social processes formation. This approach is not only of theoretical value, nevertheless can also be valuable for practitioners to predict scenarios of medium and long-term results from the use of ICT in government (Buhai, 2021) . However ANT has critics and carries certain danger, it fails to take into account power structures and their influences on how networks develops and what inscriptions are promoted (McBride, 2003) . In additional Actor-Networks risk degenerating into endless chains of association. Other research perspectives such as Emergency, Structuration and realistic evaluation may be held to be important alternatives to ANT approaches.

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