Assessing the (Ir) Reversibility of a Transformational Government Project in South Africa

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Abstract

Purpose - The paper traces the trajectory of the Gauteng Freeway Improvement Project, an electronic tolling programme based in South Africa, to argue for the importance of taking advantage of the public project opportunity to introduce the concept of Transformational Government (t-Government).

Design/methodology/approach - The research employs an interpretive perspective and utilises Actor Network Theory (ANT) to understand the roles and interests of the various stakeholders within the project and assess how each stakeholder has influenced the project's sustainability.

Findings - The findings suggest that the attachment of global actors appears to be waning; and events support the idea that there is a moderate degree of mobilization of local actors, which is reducing. This allowed us to make a claim that the project remains solid and indispensable, even though there are 'discordant' voices in the local actor groups as well as waning global actor network attachment. Part of this claim is hinged on the view that the e-toll has become a visible technical artefact, which has managed to embody its own patterns of use characterised by various viewpoints, values, opinions and rhetoric.

Practical implications - The paper elevates the opportunity of using the notion of t-Government as an extension of our understanding of factors influencing e-government such as public participation. We show that unless governments employ participatory approaches to similar programmes in future, they may jeopardize a critical requirement of t-Government namely the need for the service experience of stakeholders to continuously support participatory governance principles.

Originality/value - This paper contributes to the research on the emerging discourse on t-Government. The paper also highlights the utility of ANT as a tool for understanding dynamic public sector e-government programmes, their associated complexities and unintended consequences.

Keywords Transformational Government (t-Government), e-Government, Actor Network Theory (ANT), e-Participation, Electronic Tolling

1. Introduction

The introduction of the terminology of transformational government (t-Government) related to value addition of e-government initiatives to citizens and businesses, is a welcome conceptual addition to the metaphors used for understanding the impact of ICT in the public sector. Particularly, Irani et al (2007a, 2007b) see t-government as a process in the public sector that ensures exploitation of e-government for benefit realization. Thus t-Government encourages thinking towards 'beneficiation', that is e-government initiatives should provide value to stakeholders, not only from a policy design perspective, but also from a public participation view. In evaluating the impact of e-government projects, the issue of 'beneficiation' not only brings to the fore the maturity stage of an e-government project, but also forces project designers to think about how the roles and interests of various stakeholders influence the success of an e-government project.

Extant research on the implementation of Information Systems and in particular e-government highlights various challenges. Such projects are inherently risky, multi-faceted, non-linear and very technical in nature (Brown, 2005, Ebbers and Van Dijk, 2007). Citizen trust is also often cited as a barrier (Warkentin et al., 2002, Alsaghier et al., 2009). A lack of alignment of the social, technical and organisational aspects of implementation (Elbanna, 2007) is an oft seen limitation. Another aspect that is highlighted is the lack of partnerships and collaboration across public, private and non-profit sectors within e-government projects (Ndou, 2004). Additionally, the socio-technical nature of e-government projects requires an appreciation of social context of these complex implementations. Thus this calls for a consideration of how stakeholder participation (such as citizens) influences the nature of large scale transformational government projects.

Public participation has seen much research and has had increasing interest from academics, governments, NGO's and practitioners alike (Rowe and Frewer, 2004). Public participation may be defined as "the practice of consulting and involving members of the public in the agenda-setting, decision-making, and policy-forming activities of organizations or institutions responsible for policy development" (Rowe and Frewer, 2004: 512). The idea of citizen participation is not novel and has been considered for different domains such as public administration (Yang, 2005, Coursey et al., 2012), health services reform (Tritter and McCallum, 2006), planning for development (Cornwall, 2003, Saxena, 1998), environmental projects (Luyet et al., 2012) and city planning (Kotus, 2013).

Additionally it is becoming more accepted that “a non-consulted public is often an angry one” (Rowe and Frewer, 2004: 514) thus steps need to be taken to ensure citizens are involved and engaged to ensure the success of transformational government projects. Thus we seek to answer the question: how does the nature of citizen participation impact the sustainability of e-government projects in the context of a developing country? This paper seeks to assess how the roles and interests of various stakeholders influence the trajectory of an e-government project, which impacts on the sustainability of such projects.

We address the research question by focusing on a specific transformational government project: the South African Gauteng Freeway Improvement Project (GFIP) typically linked to an electronic road tolling initiative conceived in 2006 by the South African Government. The initiation of the GFIP was partly based on the need to evolve a funding mechanism that would ensure that road maintenance and improvement is sustainable. Ferrari (2005) argues that the construction and maintenance costs of a road network can be financed in part through public funding and in part by imposing tolls on some of its roads. Gauteng province, the hub of economic activity in South Africa provided the context to explore how the government of South Africa, through the GFIP, attempted to initiate an electronic tolling (e-toll) system as a basis for evolving a road maintenance and improvement policy for the rest of the country. Global road e-tolling reported from various countries have relied on various motivations as a basis for the initiation of these projects. Several of these projects are in North and Central America, Europe, South East Asia and Middle East. The GFIP E-Tolling project was the first of its kind in Africa and we explore its motivations as a basis for focusing on the t-government, as a new metaphor for explaining how the roles and interests of various stakeholders impact the sustainability of e-government projects. We link the South African e-toll implementation to the concept of e-government since the systems are dependent on ICT and seek to transform the efficiency of road revenue collection without the necessity to build tolling booths. It is reported that the e-tolling system, was initially proposed by economist William Vickery in 1959 (Beaulier et al., 2012) and revolves around the use of transponders (e-tag) as a form of electronic automated vehicle identification system. Gantries are built in selected parts of a road and are fitted with cameras for automatic number plate identification as well as charging through the e-tag system.

The starting point in this paper is to describe the theoretical rationale for road tolling levies as a foundation for unearthing motivations for the e-tolling or “open road tolling” project of South Africa. This is then followed by an identification of the research methodology and an identification of the stakeholders, their roles and interests in the project. We then provide evidence analysis of how the interests of the stakeholders are likely to affect the sustainability of the project through recourse to the notion of irreversibility from Actor-Network Theory (ANT). We make conclusions in the last part of the paper and also link these conclusions to implications for undertaking transformational government projects, relevant to developing countries of Africa.

2. Theoretical Foundations to Electronic Tolling System

The theoretical motivation for starting an e-tolling initiative is typically linked to two main reasons: the first is the problem of congestion on roads and the interest is to increase transportation costs on some roads or to 'force' a proportion of road users to shift to uncongested roads in order to dampen demand in some roads (Ferrari, 2005). The imposition of congestion tolls is linked to the works of Beckmann et al (1956), who argue that capacity constraints on some road network links are inevitable as a basis for defining road tolls in such a way that they give rise to an equilibrium traffic flow pattern in the road network. However, part of the motivation for the imposition of the road toll to ensure road decongestion is either the development of alternative routes or the existence of other options for the road users.

The second motivation for road tolling is related to the desire to recoup maintenance and improvement costs incurred in some road networks because it may not be possible to rely solely on public financing (Ferrari, 2005). The imposition of the road toll is rationalized on the basis that if construction of the road is by public funds, then the funds have to be obtained by levying taxes, which typically results in the loss of social welfare (Rosen, 1985). The increasing use of road tolls to finance transportation infrastructures has become increasingly popular as government realize that public financing is untenable, despite the negative effects on social welfare (European Commission, 1998).

Therefore, what emerges from the theoretical backdrop for e-tolling is linked to the fact that road tolling is a form of financial instrument for road construction and maintenance (Waersted, 2005, Leromonachou et al., 2006) as well as the use of road tolling as an efficient tool for transportation management (Albert and Mahalel, 2006). While many citizens and other stakeholders believe that governments should provide more road capacity to ease traffic congestion, financing the additional capacity is normally inadequate, thus governments resort to road tolling as one form of financing (Li and Hensher, 2012). Therefore, the use of e-tolling is based on using technology to ensure the efficient collection of toll charges for both congestion management as well as maintenance and improvement of roads. In assessing e-tolling as a tool for realizing automatic road user charging, the e-toll systems need to be designed to meet the technical objectives, the objectives of the designated geographical area and the optimization of the public and political acceptability to ensure the success of the project (Saleh and Farrell, 2005).

In our explorations in this paper, we mainly focus on the latter perspective, that is, how the optimization (or lack of) of the public and political acceptance is impacting the sustainability of the e-toll road system in the Gauteng Province of South Africa. Our proposition is that public and political acceptability for e-government related projects such as the GFIP in South Africa is intricately linked to the interests and roles that various stakeholders play, which impact on project milestones. ICT implementations in the public sector require an appreciation of the social and political aspects influencing the outcomes of the projects. Prior research on IS implementation shows that these

projects require “delicate management” (Elbanna 2007) to better understand their outcomes and the gap between the original objectives versus the resultant project form (Dery et al, 2013). Therefore, in the ensuing sections, after presenting the adopted research methodology, we explore how stakeholder roles and interests have impacted on the future sustainability of the GFIP E-Tolling project, as a transformational government initiative.

3. Research Methodology

We adopt an interpretive research paradigm to underpin the research, since understanding and interpretation is the overarching theme in this study. We employ actor-network theory (ANT), which has been argued to provide a careful tracing and recording of heterogeneous networks, well suited for the generation of detailed and contextual empirical knowledge (Doolin and Lowe, 2002). This study used secondary data. The study assessed documents, websites, media reports and other materials related to the project that were published since its commencement. The study further included official public sector documents from the affected national government departments and, proceedings of the parliament of South Africa. The review also covered position papers and reports from civil society organisations, non-governmental organisations and consulting companies. The benefits of secondary data are in areas such as accessibility of data, lower costs, as well as coverage of a wider geographical and temporal range. Secondary data also facilitates the ability to “eavesdrop thus providing unobtrusive access to sensitive situations and the past” (Cowton, 1998: 432). A cut-off point for data collection was applied in October 2014 to enable finalization of the paper. Given our research intention of tracing the interests and roles of stakeholders in the GFIP project, ANT provides a suitable lens to ‘follow’ the actors and the consequences of their actions on the trajectory of development of the e-toll system in South Africa.

We make use of the global-local network framework of Callon and Law (1992) to show how the chain of events and episodes surrounding the e-toll project have influenced the stability and hence the possible sustainability of the GFIP. The global part of the framework refers to a set of stakeholder interactions that enables the project to take place with the resources provided, including money, expertise and political support. The local network is the ‘inside’ of a project, representing interactions and associations of actors that implement and use the project. The intention with the ensuing discussions is to establish the stability of the emergent e-toll network, since stability assumes that the project effectively enrolled and mobilized various actors (stakeholders and other non-human actors).

Callon and Law (1992: 46) argue that the success or failure of a project, that is, an assessment of its sustainability, is linked to three interrelated factors:

- ‘the capacity of the project to build and maintain a global network that will for a time provide resources of various kinds in the expectation of an ultimate return’,

- ‘the ability of the project to build a local network using the resources provided by the global network to ultimately offer a material, economic, cultural or symbolic return to actors lodged in the global network’,

- ‘the capacity of the project to impose itself as an obligatory point of passage between the two networks’.

We employ four ANT discursive practices: the first is the concept of Problematization, which refers to the process through which the actual problem is highlighted (during the translation phase) and a solution or vision for the network is created (Alcouffe et al., 2008). Furthermore the solution is viewed through a certain focal actor as the ‘obligatory point of passage’. Secondly, Interessment is also part of the translation process and it is essentially about raising the interest of other actors in the vision or project. Actors find mechanisms of locking allies into the problematization (Rhodes, 2009). The concept of interessment is employed to show how stakeholders entice other stakeholders to fit their program of activities. Thirdly, Enrolment is when the various actors within the network begin showing their acceptance of the new vision or project. Also technical artefacts are produced and consolidated such that they secure the dominant interests of the main actors (Teles and Joia, 2011, Heeks and Seo-Zindy, 2013). Enrolment results in “black boxes” which are essentially things within the networks such as method, concept or even an institution that are entrenched and are not questioned (Teles and Joia, 2011). Enrolment is employed by focal actors to define and coordinate the roles of other actors. Lastly, Mobilisation involves the on-going analysis of the various interests to ensure that they remain generally constant and have stability (Alcouffe et al., 2008, Haque and Mantode, 2013). The network is mobilised when there is a solid representation of the masses within the network and actors in the network become spokespeople for the vision (Dery et al., 2013). The paper uses the concept of Mobilization as a way to attain visibility for representing stakeholder groups. The four discursive practices (Problematization, Interessment, Enrolment and Mobilization) are used as part of a qualitative theoretical thematic analysis procedure to analyze policy documents, speeches, project documents and other sources of information on the e-toll system in South Africa. In theoretical thematic analysis, the analysis is deductive in nature and the analysis is driven by the researchers’ theoretical (in our case ANT) or analytic interest (Braun and Clarke, 2006).

4. Analysis of Findings

The following section presents the analysis of the findings related to the assessment of stakeholder roles and interests, the consequences of the role-playing and how these are likely to influence the trajectory of e-toll development in South Africa.

4.1 Stakeholder roles in the GFIP e-Toll Project

The starting point in understanding the problematization and initiation of the GFIP E-Toll project is linked to the establishment of the South African National Roads Agency Limited (SANRAL) as a government parastatal through an act of parliament in April 1998. Operating under the Ministry (Department) of Transport as the sole shareholder, SANRAL's purpose is to be the custodian of and is expected to maintain and expand South Africa's national road network (SANRAL, 2012). Part of SANRAL's strategy for realizing its mandate is to evolve a financing mechanism that is not fully dependent on government budgetary allocations. Thus in July 2008, SANRAL launched a Domestic Medium Term Note (DMTN), a finance instrument that allows for flexibility in raising finance for toll-road construction. The DMTN program is supported by credit ratings issued by Moody's Investors Service in 2008; which allowed SANRAL to secure finance to begin construction on the Gauteng Freeway Improvement Project (GFIP). The GFIP was approved by the cabinet of the South African government in 2007. Therefore, when the notion of problematization is employed, what is apparent is how the government of South Africa, by creating SANRAL in 1998, transferred the management of transportation challenges related to the road network to SANRAL, as the 'obligatory point of passage' (OPP).

In assessing how focal stakeholders enticed (Interessment) other actors to the common goal of 'accepting' e-toll, we focus our attention on the phases of GFIP, and how the initial phase (phase I) was effectively used to prepare stakeholders to adopt electronic tolling as inevitable. Whether the approach was a success or not is another issue and we trace the 'toll' that has been exacted on the GFIP based on the strategy that was adopted. The GFIP was conceptualized to comprise of three phases, of which Phase I, which included substantial upgrading of approximately 185 km of freeway (N1, N3, N12, and R21 routes) after which an e-toll strategy was to be implemented to charge users of the roads. The sequencing of project activities therefore involved the physical improvements of the roads, which the consumers readily welcomed, which was then followed by the introduction of the e-tolling using an e-tag system. So, one of the oft used claims made by the government and its agencies to "entice" other stakeholders is to make the claim that e-tolling needs to be accepted because (Department of Transport, 2012):

> *"The improvements have been made and the benefits of these improvements are being enjoyed by road users. […]. Therefore, the funding of this project through the "user-pay" principle is required. This is an equitable way of funding the project, since the benefits will be enjoyed by those who pay for it."*

However, those who oppose the e-tolling system counter that commuters cannot be penalized for using the road network covered under the e-tag system, yet GFIP, far from adopting a "user – pays principle" will be another example of taxation of the Gauteng economic heartland to finance the rest of the country. Part of the argument being advanced is that Gauteng province, where the e-toll system is being implemented is currently responsible for 50% of all personal taxes with only 20% of the

population. Furthermore, the widespread culture of non-compliance is likely to lead to many motorists avoiding the e-toll routes, which is likely to increase the risk of damage to the few alternative routes that exist (Deloitte, 2011). In addition, if the rationale for road upgrades and improvements was partly hinged on traffic congestion, then SANRAL should have spent greater effort in developing alternative routes, which in their current state are likely to be depressed as motorists try to avoid e-toll charges, rather than having seemingly had a singular focus on penalizing users based on the "user – pays principle". So while SANRAL and other actors who have supported the design of the e-toll system advance the argument that the road improvements and upgrades that have been undertaken make it inevitable for the enactment of e-tolling charges, discordant voices inside the government itself are voicing different opinions. For instead, while it is normally assumed that under collective responsibility, the government coalition of the African National Congress (ANC), Confederation of South African Trade Unions (COSATU) and the South African Communist Party (SACP) would adopt a common position on the e-toll saga, evidence suggests the contrary.

For instance, the SACP claims that the new e-tolling system will cause the prices of commodities and public transport to rise, especially due to the fact that working class communities mostly make use of public transport (Graham, 2012). This state of affairs would further be exacerbated since SANRAL did not make any improvements to the alternative routes, for motorists who would want to avoid e-tolling charges. The SACP also further claims that there was a poor consultation process, yet according to SANRAL and the Department of Transport, consultation has been ongoing since the inception of the GFIP in 2007 (GCIS, 2013). COSATU, one of the government coalition partners, and Democratic Alliance (DA), the official opposition party, also question the credibility of the Swedish and Austrian companies involved in the supply of e-toll, as well as the secrecy surrounding the award of contracts (Cohen and Wild, 2012). We also see the use of DMTN as a possible tool being used by SANRAL, in conjunction with the Treasure Department (Ministry of Finance), to 'prove' that viability of road maintenance and financing is possible through public – private partnerships, yet SANRAL's and Treasury's actions of underwriting the DMTN instrument using 20 billion rand from the social welfare fund has been condemned as risky. Thus, while the DMTN is positioned by the government and SANRAL as a viable mode of financing for road e-tolling, its intended consequences of 'enticing' user enrolment is actually negative with various civil society organizations and other discordant voices within the government itself voicing concerns over the underwriting of DMTN using social welfare.

Therefore, the actions surrounding the implementation of the electronic tolling system must be seen from the perspective that SANRAL needed to 'act' in various ways to meet the national road network challenges; while its actions influenced and were also influenced by a number of actors captured in Table 1. In Table 1, and based on the preceding analysis, we identify some of the stakeholders as designers, in other words, those actors who were dominant in the policy design process and its implementation as well as their interests; while the users are generally clustered as individuals and businesses.

Table 1 e-Toll Stakeholders: Roles and Interests

Actor	Project Role	Potential Interests in the GFIP Project
Government Related Actors		
Department of Transport	Designer	Craft equitable transport policy
SANRAL	Designer	Ensure implementation of e-toll policy and system
Treasury	Designer	Provide government funding Ensure viability of the project
Presidency	Designer	Provide political support Ensure viability of the project
DMTN	Designer	Reduce financial impact on motorists Obtain additional funding Gain legitimacy from citizens
Gauteng Provincial Government	Designer	Economic growth of South Africa's economic powerhouse. Maintain political support for ANC led provincial government
International Institutions/ Service Providers/ Other External Parties		
Service providers	Designer	Gain contracts Profit maximisation
Moody's Investor Services	Designer	Elevate credibility of SANRAL actions
Investors	Designer	Return on investment
Legal System	Designer	Promote and protect social justice and human rights. Responsible and accountable justice for stakeholders involved.
Competition Commission	Designer	Reduce restrictive business practices that may jeopardise the equity and efficiency of the South African economy.
Media	Designer/ User	Disseminate claims about the project.
Review Panel	Designer	To undertake a comprehensive assessment of the socio-economic impact of the introduction of the Gauteng Freeway Improvement Project in general and the e-tolls in particular on the economy and the people of Gauteng. Provide recommendations to Gauteng Premier.
Users/ Other Stakeholders		
OUTA/ Civil Groups	Users	Efficiency in deliveries Avoid additional transport costs
Citizens/Motorists	Users	Avoid additional transport costs
Political Parties	Designer / Users	Align with popular sentiments Win credibility with citizens for political mileage
Labour Unions	Designer/ Users	Avoid costs to workers Align with dominant and popular stakeholders
Other Non-Human Actors		
e-Toll System	Designer	Inscribes the vision of implementers of GFIP
Technical and road infrastructure	Designer	Enabler of the vision of implementers of GFIP
Project related documents and research reports	Designer	Disseminate claims about the project Rationalise GFIP

Table 1 reveals that there is a group of actors largely considered as 'global' and comprise the cluster of stakeholders responsible for designing the e-tolling financing mechanisms. In the global actor group are the international consortium of e-toll suppliers whose interest is to obtain a return on their

investments; the Department of Transport, whose interest is to craft an effective transport policy for the country; the South African presidency, whose goal is to deliver on campaign promises and acts by 'shoring' support for those whose interests appear to support the campaign agenda; credit rating agencies whose interest is to rationalize SANRAL financing instruments. On the other hand, the 'local' actor groups is represented by the various media organizations, who have positioned themselves as a conduit for 'voicing' the validity claims from various stakeholder groups (both global and local); civil society organizations representing various interest groups and who have positioned themselves as champions of e-toll users; various political parties, who make the claim that they represent the wider population of clients of the e-toll system.

4.2 Consequences of Actions on the Toll on e-Toll

The analysis above identified the major stakeholder groups and their goals in the e-toll project. The formation of SANRAL in 1998 formed the basis from which to analyze how subsequent stakeholder actions and their consequences are likely to affect how the GFIP E-Toll project is likely to 'pan out'. Research utilising ANT should reflect the story of a particular project over a period of time (Heeks and Stanforth, 2014). A timeline of key episodes, the actors and the consequences of stakeholder actions on local and global actor enrolment and mobilization for e-toll support is captured in Table 2 and 3.

Table 2 GFIP Project Milestones

Year	Milestone Description
2004	• SANRAL granted jurisdictional mandate to address Gauteng Province road upgrades.
2008	• Cabinet approval of the 187km road upgrades to freeways.
2008 – 2011	• Construction of freeways • Objections to e-tolling raised by various business, civil society groups, labour unions and political parties.
2011	• GFIP steering committee setup in April to engage with various stakeholders and assess objections to e-tolling. • Committee announces in June that e-tolling would continue with reduced tariffs despite objections. • Two launch dates for e-tolling are postponed and both missed. • Public consultations and a drive for E-Tag registrations is undertaken.
2012	• OUTA- Opposition to Urban Tolling Alliance launched in February. • SANRAL announces a new launch date of April 2012. • OUTA makes an application in April to legally challenge the lawfulness of e-tolling – the interdict is obtained to halt e-tolls and conduct a judicial review. • DOT agrees to postpone launch by a further 2 months. • May 2012 CEO of SANRAL tenders resignation while a national government inter-ministerial committee led by the deputy president is setup to conduct yet another consultation process.

Year	Milestone Description
	• CEO withdraws resignation after being convinced to stay. • Government/SANRAL applies to constitutional court to overturn interdict obtained by OUTA. • Constitutional court agrees with SANRAL and overturns the interdict but indicates that a judicial review may proceed. • SANRAL argued in court applications that it was ready to start the e-tolling within two weeks but delayed the actual launch by over 12 months. • SANRAL obtains permission from high court in November to stop OUTA's request for a judicial review.
2013	• OUTA's appeal is heard in the high court. The punitive costs that were ordered against OUTA are overturned but the court finds that it cannot rule on arguments on the alleged unlawfulness of e-tolling. • OUTA decides to not pursue the legal route further since it cannot match SANRAL's strategy of litigation due to limited funding. • Competition Commission investigates and exposes collusive practices of the construction companies which impacted negatively on the price of GFIP • e-Tolls system is launched in December 2013 • SANRAL runs multi-million rand marketing campaign
2014	• It appears majority of Gauteng motorists have not registered for the e-Toll system (39% have registered for e-toll tags) signalling a rejection of the system. • SANRAL continues to run a multi-million rand marketing campaign. • Citizens report bullying tactics from SANRAL through sms, email and postal messages coupled with roadblocks. • SANRAL mentions in June it is looking at legal summons to be directed at motorists that are using the roads but refusing to pay. • New Gauteng Premier announces in state of the province address of June 2014 that the Provincial Government would set up a panel to assess the socio-economic impact of e-tolls in Gauteng. • GFIP e-toll review panel was setup in July and would run until November 2014 to find a "lasting solution".

Linked to the understanding of the chain of events (Table 2) on a project is an assessment of the impact of key decisions on the enrolment of actors. Table 3 below offers a view on the main decisions that influenced the project trajectory. The strengths of the two networks (local and global) may be traced as a project progress. This is done through a network analysis process.

Table 3 Project Decisions and Impact on Enrolment

Decision	Local Consequences	Global Consequences	Resultant Impact on Enrolment
A. Establishment of SANRAL; Adoption of road tolls Strategy	Local point of focus for Transport Debate	Support from International Partners	*Major (+) GA;* *Slight (+) LA*
B. Cabinet Approval for	Mobilization of Local	Increased GFIP	*Moderate (+) LA;*

GFIP; SANRAL Adverts and Intention to Toll	Support; Increasing visibility of SANRAL	Visibility; Legitimization of International partners	*Major (+)GA*
C Awarding of Contracts and the beginning of the installation of Gantries	Increasing media and public focus on SANRAL; Failure to consult remains a 'sticky' issue; rationalization of GFIP using studies; increasing public awareness	Increased legitimization and mobilization by international partners; Positive Credit Rating by Moody's	*Moderate (+) LAs* *Major (+)GA*
D. Dropping of SANRAL's Credit Rating; Intervention by the Treasury	Questioning of SANRAL Funding model ; Pressure for tariff reductions/E-Tag Registrations	Support from international partners wanes as credit rating drops	*Major (-) GAs;* *Major (+)LAs*
E. Court Interdict and legal action	Challenges to e-Toll	Show of power among different government entities	*Major (-) GAs;* *Major (-)LAs*
F. Establishment of Gauteng Province Review Panel	Increased defiance of e-toll by motorists. Complexity of e-toll becomes increasingly evident.	Future funding in question; increasing discordant voices within government and ruling party	*Major (-) GAs;* *Major (-)LAs*

The changing strength of the global (GA) and local networks (LA) over time is plotted on a two-dimensional graph, with the x axis indicates the degree of the local actors' mobilization, and the y axis outlines the degree to which global actors are attached (Callon and Law, 1992, Heeks and Stanforth, 2014). The intention in undertaking a network analysis is to establish the stability of the emergent e-toll network, since stability assumes that the project effectively enrolled and mobilized various actors (stakeholders and other nonhuman actors). A high placement on an axis indicates that a large portion of the actors have been translated and therefore support the project (globally) or that local actors are participating freely in the project with very few of them deviating from the project (Heeks and Stanforth, 2014).

Thus, the translation trajectory of GFIP E-Toll project is mapped in Figure 1

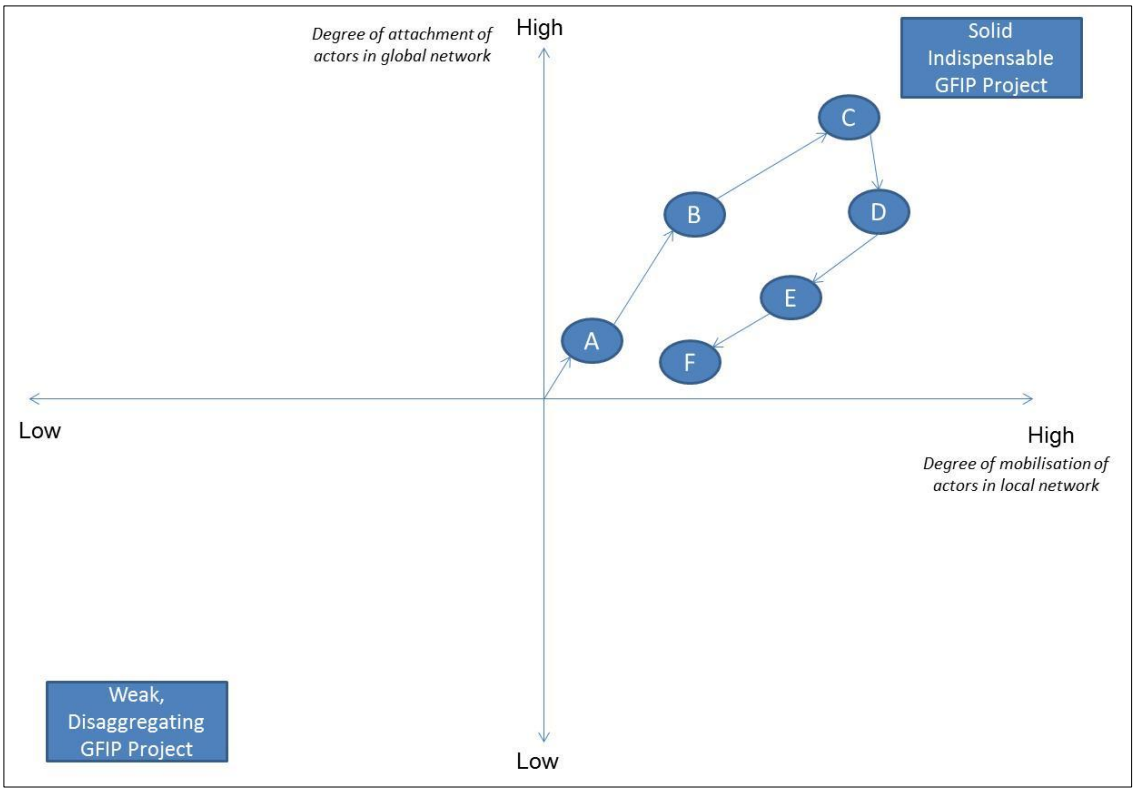

Figure 1 Network Diagram

The starting point is the center of the diagram and the arrow climbed moderately up the vertical axis as SANRAL was established by DOT in 1998 to be the focal actor for addressing road transport challenges in the country. Further, focused problematization specific to Gauteng province enabled SANRAL to enrol the Provincial Government of Gauteng, with the Department of Transport of the Gauteng launching public consultations in 1999 as well as the adoption of a road toll strategy in August 2000. These actions enabled a moderate recruitment of global and local actors. The increase was moderate since as early as 2002, Democratic Alliance (DA), an opposition party, was already threatening to oppose the toll plans. We use the consequences of the various milestones in table 3 to plot figure 1.

On its establishment, SANRAL, in consultation with various governments in the Gauteng province (Gauteng Provincial Government, Johannesburg Municipality and Ekurhuleni Municipality) developed the GFIP proposal which was approved by the Cabinet of the South African Government in 2007 (Motlanthe, 2012). This is considered as one of the key milestones, given that, while it was critical for SANRAL to start gaining support of the local stakeholders by “selling” the idea of GFIP and mobilize the provincial government of Gauteng, it remained key to gain “buy – in” into the national government. Therefore, the cabinet approval that was granted for the GFIP was not only key for recruiting the national government as an important global actor, but also related to future actions that would be critical for recruiting other global actors.

Thus the GFIP problematization began with the establishment of SANRAL (Network Analysis–A) which was to become the Department of Transport's main driver for the maintenance of South Africa's ailing road network that was failing to keep up with the country's growth. SANRAL's strategy for road maintenance included the acquisition of additional funding from external parties other than their allocated Treasury budget. Their strategy was further approved by Cabinet in 2008 (Network Analysis–B). Another part of the problematization phase was SANRAL's launch of a Domestic Medium Term Note (DMTN). The DMTN is a finance instrument that allows for flexibility in raising finance for toll-road construction. The DMTN program was supported by credit ratings issued by Moody's Investors Service in 2008; which allowed SANRAL to secure finance and begin construction. This bolstered SANRAL's vision for road upgrades in the eyes of various local and global stakeholders. The problematization phase also resulted in SANRAL (with the support of the Department of Transport) becoming the focal actor in the formation of the GFIP network. It is interesting to note that SANRAL is responsible for national roads however in 2004 it obtained jurisdictional mandate to upgrade some provincial road network in Gauteng (Clarke and Duvenage, 2014). This bolstered SANRAL's role as an Obligatory Passage Point (OPP) for the GFIP project. However, the government has also continued to realize that the approval that was granted in 2007 was possibly a mistake (PMG, 2012):

> *[…] I have said that if we could re-wind the clock back to 2007, we would not recommend embarking on this project at all. We have made that very clear (Pravin Gordhan, Finance Minister).*

And possibly the only reason that the government remains intransigent in its support of the e-toll is because (PMG, 2012):

> *However, alas! There is a R20 billion debt. It has been incurred on Phase A1, which is about 180 kilometres of what was projected to be, let's not forget, more than 500 kilometres of e-tolling (Pravin Gordhan, Finance Minister).*

Therefore, while the Cabinet's approval of 2007 was a 'watershed' in setting the ground for local and global actors' enrolment, retrospectively, the government changed tune, evident in the emerging conflicting voices within the government itself. We see the Cabinets action as having a moderate increase in support from local actors, while it resulted in a massive increase in support from global actors since it set the stage for SANRAL'S confidence in the issuance of the DMTN. The launch of DMTN in July of 2008 can be attributed to increasing confidence by global stakeholders in SANRAL's ability to handle PPP financing as well as a possible tactic by the national government to rationalize the 'offloading' of infrastructure financing to other institutions outside government. The launch of the DMTN may have had a major increase in the enrolment of global actors (such as obtaining financing for E-Tolls), but possibly just a minimal impact in the increase of local actors. Though, a subsequent media blitzkrieg since 2009 about SANRAL activities attracts the attention of media and parliament

could have brought some visibility to SANRAL resulting in local enrolment of local actors. The effect of media and parliament's visibility impacts positively on recruitment of local actors to be aware of e-toll.

We also see the installation of the 49 gantries in Gauteng's freeways as significant in entrenching the e-toll concept in the psyche of various stakeholders; however, the municipal elections of 2011 dampened the positive image that may have been building up in the minds of the user actors over time. This state of affairs was exacerbated by the Moody's negative credit rating of SANRAL in 2011 and 2012 that gave rise to the predominant thinking that the funding model adopted by GFIP was risky. Yet, the launch of e-tags in April of 2012 was successful with a record number of motorists registering. While the 'success' maybe viewed as an indication of 'lack of option' for motorists using the Gauteng' freeways, the registrations will provide fodder for entrenching e-tolls in South Africa. In other words, the GFIP E-Toll program can already be regarded as 'successful' despite a court interdict suspending the e-tolls project.

Additionally in efforts towards mobilisation the president of the country also has also come out in support of the project in various public speeches. In one report the president indicated that the e-tolls had been adopted legally and thus citizens should comply (Ephraim, 2013).

SANRAL further tried to entice stakeholders by using research outputs from third parties to bolster their argument and vision for an intelligent transport system funded through e-tolling. The organisation commissioned a report by Standish, Boting and Marsay in 2010. The report stressed that the current road network was compromising the economic growth potential of the province. Further to this it positioned e-tolling and the user-pay system as an equitable way of funding the upgrades (Hommes and Holmner, 2013).

The National Government has tried to garner public involvement by reducing the tariffs payable by motorists, extending the grace period for payments and increasing their investment in SANRAL (7am News Network, 2014, Clarke and Duvenage, 2014). Public transport taxis and buses were also exempted from paying e-tolls in the hope to appease the argument that the poor would be hardest hit with transport price increases due to e-tolls. COSATU, the largest labour movement federation also strongly opposed the e-tolling strategy. On the launch of the system the General Secretary of COSATU urged the public to stop the "economic apartheid" that would result from e-tolling. The legal battles between SANRAL and OUTA have also served to influence the enrolment of actors in a negative manner (Network Analysis- E). Although SANRAL eventually obtained a court order allowing them to continue with the implementation of e-tolling the process has highlighted SANRAL's failure to consult and increased challenges to the project in the minds of local actors. In further assessing the project we believe it has not managed to fully mobilise the different stakeholders. Indeed the assessment fails to show a solid representation of the masses within the network.

4.3 (Ir)Reversibility of e-Tolls from the 'Tolls'

We use the network analysis model of Callon and Law (1992) as a relevant framework to trace the trajectory of the GFIP E-Toll project from its inception to the current stage. The Network analysis model uses a mapping process, in which the various milestones (Table 3) are indicative of fluctuations of involvement from the global and local actors, which determine the degree of mobilization of local actors as well as the level of attachment of the global actors to the e-toll project. A project becomes reversible if both networks withdraw from engaging with the project; while a project becomes irreversible if there is continued active and mobilized involvement of both networks. We view involvement as stakeholders being aware of and engaging with the project in whichever form it exists. Involvement does not necessarily mean the actors are in support of the project or agree with its design indeed they may even be opposing the project. In the case of the GFIP the project is irreversible in the sense that the physical infrastructure prevails, the various global and local actors are aware of the form taken by the e-toll project. As a socio-technical phenomenon the e-toll project has from a technical stance gained stability. However from an organisational, social and political vantage it may be argued that various challenges remain.

The discussion now considers the involvement of citizens in public sector large scale projects. Involving the public has several benefits such as better trust in decisions made by government, increased acceptance of the decisions, improved project design, a better understanding of project issues, the integration of various interests and opinions and finally the optimisation of project plans (Luyet et al, 2012). However, we also acknowledge that the involvement of the public may yield various problems for projects. As Luyet et al (2012) indicate some disadvantages of public participation include increasing costs, time consuming processes, potential stakeholder frustration, new conflicts may arise, stakeholders may not be representative of the population and indeed more dominant stakeholders may be empowered whilst others are marginalised (Luyet et al, 2012). However, we argue that public participation is an important but not necessarily a sole contributor toward t-Government. Thus we elevate the notion of involvement of the public. The stakeholders may not be in agreement with the project but it is the participatory aspect that is essential to the trajectory of such projects. Thus if participation results in unsupportive sentiment and public outcry this is not necessarily negative. This may be necessary for reducing the design-reality gap (Heeks, 2002) that often plagues e-Government programmes. It is perhaps more important that stakeholders are involved than not even if it may be perceived as the project is failing due to their involvement. We argue that participatory governance is essential and thus a technically integrated system that is irreversible is not sufficient social integration is as important for sustainability of the projects (Elbanna, 2007).

5. Conclusions

Is the GFIP E-Toll project irreversible or reversible considering the many tolls? The analysis, summarized in Figure 1 suggests that the attachment of global actors appears to be waning; and events support the idea that there is moderate degree of mobilization of local actors, which is reducing. This allows us to make a claim: that the e-toll project remains solid and indispensable, even though there are 'discordant' voices in the local actor groups as well as waning global actor network attachment. Part of this claim is hinged on the view that e-toll has become a visible technical artefact, which has managed to embody its own patterns of use (Callon, 1986) characterized by various viewpoints, values, opinions and rhetoric, which has already been converted to 'visible' physical devices (toll stations, gantries, DMTN, e-tags, institutions, improved roads, reports, documents and scientific papers). In other words, it has already become a socio-technical information infrastructure, which can change its form, but has also gained some power, enough to influence its own future life – its extension and form.

In a preliminary sense, we may say that the e-toll project has become an "immutable mobile" (Latour, 1999) network; that even though it is being moved around in time and space (delayed schedules, concerns, criticisms, court interdicts, political juxtaposing), it remains relatively stable and unchanged, thus displaying properties of irreversibility. We employ the term "immutable mobile" as an entity that can travel from one point to the other without suffering from distortion, loss, or corruption (Latour, 1999). When we trace the trajectory of the e-toll project since 2008, there is evidence of its persistent existence, despite 'discordant' voices and resistance from various actors. As a socio-technical artefact, it has attained an 'installed' base that allows it to remain relatively unchanged in technical form, though social form and acceptance remains conflictual. But, we also recognize that the e-toll project may change, since once a network is formed, it does not remain fixed since it is likely to get deserted by some of its key supporters or changes in alliances may allow a re-consideration of its goals.

In summary, e-toll has developed an installed base over time that has provided it with the momentum to be stable and irreversible. The momentum it has built is increasingly developing self-reinforcing processes (Arthur, 1998) linked to its R20B debt; improving learning effects (increasing public consultations); adopting better coordination by learning to concede ground and adapting to new expectations. In line with Hughes (1987), we are of the opinion that: "Only a historic event of large proportions could deflect or break the momentum" (Hughes, 1987: 52). So, while the network model (Figure 1) described above is an oversimplification of the 'real world', it affords us some inferences with regard to the unfolding scenario of how stakeholders are participating in transformational government projects such as e-toll. We especially pick on t-government projects becoming irreversible as they build momentum through various "service experiences" over time.

Thus we deliberately elevate the notion of citizen participation and their service experience as an important component in realizing t-Government projects. The discordant opinions being witnessed in the implementation of the GFIP E-Toll may point to a critical lack of service experience. SANRAL as the focal stakeholder for the GFIP projects, has seemingly delivered goods in the form of high quality and maintained roads (technical integration and acceptance). However, there has been a lack of delivery on the crucial aspect of participatory governance and the service experience as seen with the outcry and resistance directed at the GFIP E-Toll component (social integration and project acceptance). This study has highlighted that although the GFIP E-Toll project is irreversible and the payment for the investment will most likely be sourced from citizens in some form of tax (e-toll or other taxes) there is still an opportunity to introduce t-government. This opportunity to engage with the fundamentals of t-government could positively impact the sustainability of future ICT driven government programmes. Government implementers may find that this particular experience with GFIP E-Toll has taken its toll on the citizenry so that future e-Government initiatives may be met with distrust and thus influence participation levels. It is acknowledged that such IS projects are influenced by a multitude of factors and challenges (see for example: Brown, 2005, Ebbers and Van Dijk, 2007, Warkentin et al., 2002, Alsaghier et al., 2009, Elbanna 2007, Dery et al 2013). However in this paper we illuminate the area of user participation for a paradigm shift towards t-government.

The implication of this paper is a call for a conceptual shift towards designing e-Government projects for sustainability. It is hoped that this paper highlighted the need for t-government programmes that elevate the role of various actors within these complex initiatives such that stakeholders are engaged earlier in the process of delivery. This may result in empowered stakeholders that are encouraged to participate in e-Government and thus potentially deliver benefits not only for the users but also value for the initiators of such programmes. This is rooted in the socio-technical nature of such initiatives requiring an understanding of technical, social and political factors influencing project delivery and outcomes. Another essential lesson and practical implication of this study for public sector practitioners and scholars is the critical need for attention to be given to the form of public participation pursued given some of the disadvantages cited for increased participation on e-government projects. Furthermore the contribution on a methodological level is that the paper also highlights that ANT may facilitate the of study public sector ICT projects and explicate how the projects do not consistently result in the expected outcomes as compared to the original design. It contributes to the existing examples of how ANT may be of value for case studies on IS implementations.

6. Limitations and Future Research

The paper used secondary data however an opportunity exists to extend the research through alternative data collection strategies such as interviews and focus groups with policy makers, civil

society organisations and citizens. This will facilitate the capturing of additional perspectives from actors within the e-toll network.

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