E-GOVERNANCE: A SOCIOLOGICAL CASE STUDY OF THE CENTRAL ADMISSION SYSTEM IN TANZANIA

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ABSTRACT
This paper draws upon “sociotechnical theory” as an effective approach to examine e-governance implementation challenges in higher education institutions where multiple stakeholders exist. The use of sociotechnical theoretical approach provides a valuable contribution to the research domain of sociological studies of e-governance in the public sectors, particularly in higher education quality assurance. A sociological interpretive analysis of the Central Admission System in Tanzania (as a case study) is presently under concern for this end. In African context, Tanzania in particular, ICT penetration is concentrated in urban areas hence the issue of “digital divide” is an on-going debate which calls upon the need to understand the implementation of e-governance projects and their challenges. The paper concentrates, through in-depth interviews with key users of the Central Admission System (applicants, admission officers and IT staff), on how the implementation of the system poses various socio-technical challenges in attempt to improving quality assurance in higher education admissions. Our research reveals that introduction of new technology in higher education admissions have created multiple challenges for users and implementers of the system. The paper shows that “digital divide” and low IT skills – are leading challenges in the implementation of e-governance in the country. Given the prevailing admission malpractices, Tanzania’s initiative to implement the Central Admission System will most likely eliminate such practices within higher education institutions. The paper highlights the milieus in which the implementation of the system takes place; specifically, the existing multiple stakeholders of the system and autonomous nature of the higher education institutions. This research advances the theoretical understanding of “sociotechnical systems” to a new “multilevel” ICT implementation and offers policy makers propositions for confronting such circumstances. This paper also appeals practical recommendations to assist e-governance adopters in the public sectors especially regulatory agencies in Tanzania as well as other developing countries.

Keywords: e-governance, sociotechnical theory, digital divide, Central Admission System, quality assurance, multilevel

1. INTRODUCTION
The ‘e-governance’, also known as ‘e–government’, ‘digital government’, ‘online government’ or ‘transformational government’ is a neologism used to refer to the use of information and communication technology (ICT) to provide and improve government services, transactions and interactions with citizens, businesses and other sectors of the government (Maumbe et al., 2008:760; see also Ndou, 2004). E-governance is the foundation for electronic service delivery (Eid et al., 2009:528) and it appears in various contemporary organizations, including many higher education institutions (HEIs).

Tanzania is among the countries in Sub-Saharan Africa adopting numerous e-governance initiatives aiming at advocating good governance. These initiatives are guided and demonstrated by the current new technology implementations and government plan document. Such initiatives are compelled by the promise of transparency and efficiency in
governance to leapfrog the sluggish process of development (Dé, 2006), and all are symbolised by Tanzania’s ICT policy, of 2003 the time when the e-government was announced as a foremost driving vigour to the improved and sustainable socioeconomic advancement towards enhancing poverty reduction efforts, nationally and globally (URT, 2003).

Implementation challenges of e-governance are not the same, they differ based on the type of e-governance being implemented, context in which it is implemented and the type of implementing institution(s). Therefore, this paper aims to address the challenges facing the implementation of the Central Admission System in Tanzania’s higher education regulatory context. Our study was guided by among others, the following research question: What are the sociotechnical implementation challenges of the Central Admission System in Tanzania? Based on our theory, this question intended to examine the social and technical encounters hindering the smooth implementation of the new admission system towards quality assurance in undergraduate admissions. However, STT concepts could not explain some other challenges in our context; hence we have expanded it to include institution subsystem concept so as to explain institutional challenges. The remaining part of our paper is presented as follows. Section 2 unpacks the literature reviews on new technology and its application in e-governance and brief description of the case study. Next is the Section 3 which sketches the theoretical background to the study. Section 4 highpoints the methodology used in our study and the last is section 5 that discusses the results, way forward and conclusion.

2. LITERATURE REVIEW

Implementation of new technologies in the name of e-governance in various institutions faces myriad of challenges – in parts generated by its success. Most of these challenges vary from country to country and from one type of e-governance to the next. However, few of them are universal with comparatively few variations. A case study by Islam et al. (2013:4-5) “E-Governance in Bangladesh: An Empirical Study on Problems and Challenges” shows that, implementation of e-governance face various common challenges including: poverty, technical illiteracy, dominance of English language, unawareness, inequality, inadequate ICT infrastructure, mare application of IT system, absence of the participations, deficiency of adequate training program, few ownership of IT system, insufficiency of sustainability of IT system government functionaries, less competent IT maintenance, and lack of incentive structure of government officials. These issues seem to be shared by most implementing institutions.

In mapping the prospects and challenges of e-governance implementation in India, almost similar challenges were also found by Beniwal et al. (2013:3-4). These include among others social and cultural problems, where rural population entails a large number of illiterate people; while the dominance of English on the internet services act as a bottleneck for non-English speaking population. The prevailing ‘digital divide’ between rich and poor areas in India is a serious challenge in the implementation of e-governance. According to Beniwal et al. (2013), Other challenges include infrastructural and technical constraints (e.g. telecommunications infrastructure is still unreachable to all parts of India, outdated equipment and most infrastructure being available in big cities); economic constraints (including the cost of subscription to the internet; and scarcely location of internet service providers making it hard for normal citizens to access the internet services). Additionally, Rashid and Islam (2011:74-76) explored the implementation of e-governance in Bangladesh and revealed that there were many social and technical challenges facing e-governance implementation such as high-cost of Internet services and access, infrastructural bottlenecks, users’ illiteracy, unconscious about new technology (lack of awareness), inequality (digital divide), and operating reluctance (whereby most public sectors traditionally think that they
are important repositories of government operations and information). Furthermore, lack of unified services, lack of key persons to manage these technological innovations have been a pivotal bottlenecks to e-governance service delivery\(^1\).

2.1 Global Higher Education Admission Systems

Worldwide, there are various admission systems aiming at controlling quality in undergraduate admissions and widening access to higher education. “Quality control” in higher education is a global cry fascinated by various challenges including forgery of certificates during application. The answer to this has been automation of the admission processes. Some of the notable admission systems include the following:

- In China: China University and College Admission System (CUCAS) [http://www.cucas.edu.cn/]
- In Hong Kong: Joint University Programmes Admissions System (JUPAS) [http://www.jupas.edu.hk/en]
- In United Kingdom: Universities and Colleges Admission Service (UCAS) [http://www.ucas.com/]
- In Nigeria: Joint Admissions and Matriculation Board (JAMB) [http://www.jamb.org.ng/]
- In Australia: Universities Admissions Centre (UAC) [http://www.uac.edu.au/]
- In the United States of America: The Common Application [https://www.commonapp.org/]
- In Tanzania: the Central Admission System (CAS) [http://cas.tcu.go.tz/2/index.php]

2.2 The Central Admission System in Tanzania: The Case Study

The Central Admission System (CAS) is electronic system whose functions are to register applicants, validate their applications; select them based on their choices and set criteria for admissions into higher education institutions (TCU, 2010:1). The system was established by the Tanzania Commission for Universities (TCU) in collaboration with the National Council for Technical Education (NACTE) and higher education institutions (HEIs) in 2010. The goal of CAS was to ensure ‘fair and transparent admission system’ for all applicants aspiring to join HEIs. Fair admission system is one that provides equal opportunity for all individuals, regardless of their background, to gain admission to a course suited to their ability and aspirations. However, applicants are chosen on merit (merit in the sense that they are selected based on their examination marks and the set criteria). The Central Admission System is linked with the National Examinations Council of Tanzania (NECTA) database to access applicants’ Ordinary and Advanced Secondary Education examinations results that are benchmark for selection process. The system also allows the processing of admissions for Form Six applicants (holding foreign certificates) and those holding other qualifications like Diplomas, Full Technician Certificate (FTC) and recognized prior learning qualifications. The system has one central database, which can generate various reports for various purposes and is able to prevent fraud and document forgery (TCU, 2010:2).

The introduction of the Central Admission System is part of the greater initiative in higher education quality assurance in Tanzania. The intention of this key initiative is to reform higher education governance system in order to strengthen quality control in undergraduate admissions. The mounting number of higher education institutions in Tanzania from one university (University of Dar es Salaam) in 1961 to more than 60 higher education institutions in 2013 (TCU, 2013); and the successive expansion of students enrolment

\(^1\) [http://www.it.iitb.ac.in/~prathabk/egovernance/challenges.html].
coupled with the complexity of selection for admission, generated a number of challenges during the previous years’ admissions which were manual. Reforming the old manual admission practices has become a target of improving higher education governance system in the country, particularly in admission matters. Studies show that most HEIs have switched to electronic services by introducing new technologies like online library services, distance education, electronic learning (e-learning), electronic applications, electronic registrations, electronic payments, (Gaible, 2009), e-infrastructure for research, e-science, and e-pedagogy.

Among others, the operationalization and implementation of the Central Admission System (TCU, 2010) aimed to:

- Eliminate multiple students’ admissions and the use of forged certificates during application.
- Allow only applicants who meet the minimum entry requirements to proceed with the admission process by eliminating the unqualified before the process goes further, hence saving time and resources needed in the process.
- Track selected applicants through registration in their institutions, their performance and progression in subsequent years until graduation.
- Abolish multiple loan applications and disbursements.
- Reduce higher admission costs burden to applicants who were obliged to physically visit institutions and pay for each individual institution in which admission is sought.
- Enable the timely commencement of academic years which were previously delayed due to admission irregularities.
- Accommodate many candidates for higher education so as to assist some higher education institutions to meet their admission capacity.

Since 2010, higher education admissions in Tanzania had undergone rapid technological transformation. There has been a significant change in the way undergraduate students are selected to join higher education institutions. Important indicator of this technological change is the operationalization and implementation of the Central Admission System as noted above. This technological innovation has triggered numerous positive commentaries about quality assurance in higher education admissions - some practitioners of quality assurance in higher education have appraised CAS as one of the best practices in African higher education quality assurance. The most recent of these glowing commentaries has come from the International Network for Quality Assurance Agencies in Higher Education and the African Quality Assurance Network (AfriQAN, 2012:5) that affirms:

“The Central Admission System is worth emulating by other institutions dealing with education everywhere because it saves both time and financial resources while maximizing efficiency and effectiveness. The CAS model could be adopted as the system to be used for admission into all levels of education (AfriQAN, 2012:5).

The implementation of the Central Admission System makes higher education institutions regulatory agencies feel a sense of achievement and success as it promises an efficient bureaucracy through “best practice” in higher education governance system. Thus, the Tanzania Government directed that from the 2010/2011 academic year onwards higher education institutions should admit students through the Central Admission System (TCU, 2010). This was optional for private higher education institutions and compulsory for public higher education institutions. Meanwhile, institutions that are not participating in CAS were directed to continue processing admissions direct through their institutions and upload the
selected applicants into the system for TCU and National Council for Technical Education (NACTE) approval. According to TCU (2012), CAS entails 66 participating higher education institutions for academic year 2012/2013.

3 THEORETICAL BACKGROUND

In this case study, we employed the socio-technical paradigm as a benchmark for aligning our discussion. The cornerstone of socio-technical theory is that “the fit is realized by design process aiming at the joint optimization of the subsystems (i.e. technical subsystem and social subsystem); and thus any technological system will maximize performance only if the interdependency of these subsystems is explicitly recognized” (Lawler et al., 2010:91). STT emphasizes that successful technological innovation requires the concurrent alignment of both technical and social aspects during the system design, adoption and implementation (Hvid et al., 2003:17). The socio-technical framework is instituted on two main principles. First, it views the interaction of social and technical aspects as pre-conditions for successful or unsuccessful e-governance implementation. These interactions encompass partially linear ‘cause and effect’ relationships that are usually designed relatively from non-linear, intricate and even unpredictable interactions, which are often unexpected. Walker et al. (2007:5) state that a foreseeable consequence of mixing ‘socio’ with ‘technical’ is that the ‘socio’ does not essentially behave like the technical because people are not machines, thus illogically with growing complexity and interdependence even the ‘technical’ can start to exhibit non-linear performance, though both types of interaction happen when a socio-technical system is put to work. Walker et al. (ibid) conclude that the consequence of this is the second principle which assumes that the optimization of either socio or technical tends to increase not only the magnitude of unpredictable and unintended non-linear relationships, but also those relationships might be injurious to the system’s performance. This marks the idea of “joint optimization” as the rule of sociotechnical theory.

Traunmüller (2003:92) argues that socio-technical framework seems to better conceptualize the role of ICTs in the e-governance environments. The socio-technical paradigm takes into consideration important factors such as the social and institutional context of the technologies and the people who use them. Researchers (Al-Shehry et al., 2006; Edington et al., 2006; Al-Adawi et al., 2005) show that e-governance is surrounded by political, economic, cultural, technological and institutional factors, which significantly influence the numerous stages of e-governance implementation. Since socio-technical theory is an interdisciplinary approach to science and sociological studies of technology; it is seen as a proper framework for e-governance analysis, given the complex characteristics of such technological innovations application. STT can be used to conceptually disentangle the complex interaction associated with the design, development, introduction, use and consequences of e-governance related creativities (Monteiro, 2000).

4 RESEARCH METHODOLOGY

Human and social systems are complex. Understanding phenomena related to such systems demands a holistic approach which can produce not only detailed descriptions of situations and events but also an in-depth understanding of the actors involved, their feelings and the interactions among them (Yin, 2012:1). Only qualitative methods can provide a comprehensive view of this type (Bensat et al., 1983; Eisenhardt 1989; Patton 1982 in Yin 2012:1). Qualitative researchers incorporate the ‘etic perspective’ (outsider researcher) and the emic perspective (insider participant) as lenses for synthesizing and interpreting study findings (Lapan et al., 2012). In the qualitative research, truth is context bound as well as time specific; as Merriam (2009:5) in Lapan et al. (2012) summarizes:
“Rather than determining cause and effect, predicting, or describing the distribution of some attribute among a population … [qualitative researchers] might be interested in uncovering the meaning of phenomenon for those involved … [by] understanding how people interpret their experiences, how they construct their worlds, and what meaning they attribute to their experiences”.

Case study is suitable for our study context since truth is relative, reality is realistic and an organizational relationship is contingent (Scholz et al., 2002:25). It is chosen due to the dearth of empirical work (Martin et al., 2006; Feagin et al., 1991; Bryman, 2012) related to complex e-governance projects in HEIs. Thus, it is a highly appropriate method for this study since CAS cannot be studied adequately outside the context in which it operates (Yin, 1989; Bryman, 2004). The setting of this study, necessitated involving the Tanzania Commission for Universities staff, applicants admitted through CAS, admission officers in HEIs; Vice Chancellors, Deputy Principals and Deputy Provosts in charge of academic affairs; the National Council for Technical Education representatives; Ministry of Education (Directorate of Higher Education) representatives; University Computing Centre representatives, Dar Technohama Business Incubators representatives; National Council for Technical Education representatives; Higher Education Students Loan Board representatives; and National Examination Council of Tanzania representatives. The participants were selected purposely as key actors and users in the operationalization and implementation of the system since its inception in the 2010/2011 academic year.

Our study used generic purposive sampling (Brymann 2012:422) that drew the maximum varied sample from the stakeholders of the Central Admission System. Since a case study is carried out by monitoring the phenomenon during a certain period or, alternatively, by collecting information afterwards with respect to the development of the phenomenon during a certain period, several data source were employed. In-depth interviews that used open-ended questions and documents analysis were conducted to collect data related to sociotechnical challenges in the implementation of the Central Admission Systems. Different reports related to CAS project from its inception to its implementation and observation of CAS portal and applicants’ emails and query forms were employed to supplement information from interviews. All data were sorted, coded and analysed using Nvivo. Before conducting this study, the ethical issues were taken into consideration.

5 DISCUSSION OF RESULTS: SUCCESSES AND CHALLENGES

Through documents analysis, our study revealed that, the CAS has been able to increase access to higher education by selecting 37,102 applicants in 2010/11 academic year (CAS Report, 2011). Currently, the admission trend has remained almost constant because in its first year, the system accommodated all who could not join higher education institutions during the manual admissions system. Because of this system, quality control in admission was proudly appreciated by various stakeholders, as one interviewee here states:

“This system has reduced forgeries, multiple admissions and has increased access to higher education”.

Further assessment of the CAS benefits in terms of cost and time saving by applicants, show that there is potential benefit to applicants who previously were applying for higher education in various institutions. In discussion with interviewees, this reality was endorsed:
“This system has helped applicants to reduce the cost of application as compared to the time when one applied for several institutions”.

It was further realized that, because of the new admission system there are no further delays of commencing new academic years, since all admissions are processed at once altogether. This is beneficial also to the HESLB who can now allocate the students’ loan in time as here one states:

“The CAS has helped other government agencies such as HESLB to accomplish their activities on time, no more delays of students’ loans allocation that caused a lot of inconveniences to selected applicants leading to many strikes in HEIs”.

It is the matter of fact that technological innovations when deployed in e-governance offers numerous benefits to most developing nations particularly in supporting the efficient delivery of public services through online (Parajuli 2007). Nevertheless, this study indicated that the implementation of the Central Admission System has never been smooth due to various challenges as one of our interviewees echoed.

“Lack of education and IT skills by most prospective higher education applicants has been a very challenging issue in implementing this system. During application, applicants fail to make registration on their own because they have no IT skills, instead they seek assistance from internet café attendants. They sometimes forget their passwords for CAS login, they cannot add seat for those who repeated exams causing the system to mark them as “unqualified for application” and many others”.

Additionally, another interviewee added:

“Our applicants didn’t know even how to change programme choices and because of that, some were selected in less preferred programmes”.

As noted by e-governance scholars (Rana, 2013; Backus 2001), literacy and information technology skills remain to be issues of interest in the implementation of e-governance projects, CAS in particular.

At institutional level analysis, resistance to change was reported as the on-going problem to CAS implementation. Resistance as the ‘enemy of progress’ (Bauer, 1997:2) is one of the issues often emerging in the operationalization and implementation of new technologies in the public sectors. The same faces the implementation of CAS in Tanzania as confirmed by one interviewee:

“We still have some institutions [about five of them] which are reluctant to join the system due to various reasons. However, we are still making effort to convince them so that they join the system”.

The problem of resistance to new technological innovation may have a different angle altogether. In discussing resistance to the Central Admission System by some higher education institutions, my own theoretical inclination is towards a framework that draws upon the idea of “autonomous systems” that view new technologies “analogically” as “acute pain” with reference to processes of self-monitoring. Recognizing the challenges of
CAS implementation in my research, I have come to regard higher education system as one which still holds a “long lived institutional culture” and “status quo” that shape the credibility of various technological innovations taking place in these institutions, including CAS. Our study found that, while higher education regulatory agencies in Tanzania’s have introduced new admission system aiming to control quality in undergraduate admissions, some higher education institutions are yet to join the system due to a number of variable excuses.

Furthermore, the infrastructural Issues such as human and technical aspects were reported to be bottlenecks to CAS implementation as one interviewee commented:

“Poor ICTs infrastructure, combined with absence of guiding policy for new admission system, poor penetration of ICTs in Tanzania’s advanced secondary schools and unimpressive human and institutional IT staff capacity are among inherent infrastructural challenges in implementing this system”.

Drawing on the scholars of e-governance such as Wimmer et al. (2010:426) it is argued that “the real benefits which e-governance promises can be reached when ‘system integration’ is implemented”. This statement has been supported by van den Berg et al. (2006:211) who admit that “for e-government to be effective and efficient, system integration is an important precondition”. During interview, some respondents questioned on the matter:

“You know this system and that of HESLB do serve the same clients, but they are not unified. One has to apply for loan and for admission separately. I think there is a need to integrate these systems and all others which cater for applicants and thereafter students in higher education institutions”.

ICTs play a key role in realizing and maintaining integrated services. Enhancing system integration in the implementation of the CAS was marked as essential especially for the main users of the system (applicants), but due to the “user fees” charged to applicants and which goes to specific institution, it was mentioned to be among the hindrances to that decision.

6 WAY FORWARD

During interviews, various recommendations were suggested on how to make the system more viable in undergraduate quality control and in dealing with the on-going implementation challenges:

- CAS should also be used to admit applicants who intend to join certificates and Diploma programmes for the purpose of reducing certificates forgeries in the country;
- CAS should be integrated with other systems that serve the same clients (e.g could be integrated with the Online Loan Application System (OLAS) of the HESLB; and HEIs’ systems.
- CAS implementers should set focal centres where assistance would be offered to applicants with less knowledge on IT at regional level especially during application season;
- CAS should focus its awareness in Advanced Secondary schools where almost 95% of prospective applicants reside and this could be done before the commencement of National Examinations;
CAS should allow applicants to transfer into other programmes if only they meet the stated minimum entry requirements and should not exceed the set capacity for specific programme.

7  CONCLUSION
Our study acknowledges the existence of digital divide as the leading and prominent challenge in the implementation of the CAS and generally it appears to be common in most African e-governance projects. Due to that, this study found that more awareness on the new admission system to prospective applicants of higher education is inevitable. Additionally, training for those working with CAS particularly admission officers is essential for proper running of the system.

Generally, there are many evaluation frameworks in the literature which can be used to assess the implementation of the e-government initiatives. For the purpose of this study, the sociotechnical system theory was found significant in examining the implementation challenges of the central admission system in complex multi-level settings. The framework concentrates on different actors available in various systems (social, technical and institutional). The current paper’s core objective was to examine the implementation sociotechnical challenges of the Central Admission System in the context of higher education quality assurance in Tanzania. Further study can be conducted from the current study to assess the influence of system developers in the use of microelectronic services in other regulatory agencies.

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