Summer 6-15-2016

EXPLAINING 'IRRATIONALITIES' OF IT-ENABLED CHANGE IN A DEVELOPING COUNTRY BUREAUCRACY: CASE OF GHANA'S TRADENET

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Research

Abstract

Through a case study of Ghana's TradeNet, a business-to-government (B2G) Electronic Data Interchange (EDI) implemented to automate and integrate customs clearance, this article investigates 'irrationalities' of IT-enabled change in the context of a developing country bureaucracy. Our data revealed that despite TradeNet's potential for full automation and integration, bureaucrats sometimes preferred manual, face-to-face, paper-based practices. We explain such outcome—often depicted in the literature as a kind of 'irrationality'—by drawing upon the theoretical notion of institutional logics to trace underlying logics of TradeNet-enabled change. We investigate two specific TradeNet-enabled practices—Import Declaration Form (IDF) processing and risk controls—and show that where 'irrationality' was present (IDF processing), the managerial logic of TradeNet contradicted existing bureaucratic logics. We therefore interpret 'irrationality' as 'good enough' or satisficing when new logics of IT and old bureaucratic logics contradicted. Our findings move beyond success or failure interpretations typical in Information Systems in developing countries (ISDC) and ICT for development (ICT4D) research. We also enhance knowledge of IT-enabled change in developing country bureaucracies by moving beyond the organizational milieu to emphasize broader institutional forces in developing countries such as neopatrimonialism. Such theorization advances ISDC/ICT4D research where reconciling micro with macro accounts remains daunting.

Keywords: institutional logics; neopatrimonialism; rent seeking; managerialism; bureaucratic reform; IS in developing countries; trade facilitation; TradeNet; ICT4D

1 Introduction

1.1 Background

Information technology has long been deployed in developing countries as a means of modernizing bureaucracies by rationalizing their practices—that is, by making them more efficient and effective. Developing countries, however, have been notably problematic environments for information technologies (Heeks, 2002b; Danish, 2006; Walsham and Sahay, 2006; Avgerou, 2008). For example, Heeks (2003) reported that most IT implementations in the public sector in Developing Countries fail, with 35% being total failures (IT not implemented or implemented but abandoned), and 50% partial failures (core objectives were not achieved or the outcomes undesirable).

On the problems of IT in developing countries, a common narrative in ISDC and ICT4D research is that IT users in developing countries tend to have peculiar practices or behaviors that go against IT's rationality assumptions (Avgerou, 2000). Avgerou (2000, p. 2) poignantly observes about developing countries that "the techno-economic rationality of western modernity is instrumental in defining a series of problems and determining their solutions [but] is blatantly unsuccessful in streamlining people's behavior to the achievement of such solutions." Such peculiar behaviors and practices of IT users in developing countries that IT is 'unsuccessful in streamlining' have been poorly understood and thus, presented as 'irrationalities', from the perspective of rationalization goals of IT (Avgerou, 2000).

To explain such 'irrationalities', scholars have focused on technology or social aspects of use. Design of IT, for example, has been suggested to contradict 'actuality' of developing countries thereby creating a 'design-actuality gap' (Heeks, 2002a, 2005). Avgerou and Land (1992, p. 38), similarly questioned the "appropriateness" of IT in developing countries where "rigid norms and structures" of "traditional societies" contradict fundamental tenets of IT's socio-technical design such as 'user participation'. Social accounts have pointed to micro (individual) level factors such as user resistance (Cavalheiro and Joia, 2013), incongruent alternative rationalities (Avgerou, 2000, 2002), conflicting multiple rationalities (Chilundo and Aanestad, 2004), lack of skills and competencies (Corea, 2007; Zaied, Khairalla and Al-Rashed, 2007), micro politics and vested interests (Peterson, 1998); or macro (group) level factors such as culture (Hill *et al.*, 1998; Zhao and Khan, 2013) and institutions (McGrath and Maiye, 2010).

1.2 Research Problem

Notwithstanding insights provided by extant approaches, some theoretical challenges exist. One is how to reconcile accounts of 'irrationalities' at the individual level with institutional factors at the social level while escaping the determinism trap (see e.g., Leonardi and Barley, 2008). For example, purely structural accounts of IT related phenomena might be accused of downplaying agency, that is, cognitive capacity of actors for planned or situated action (see e.g., Volkoff, Strong and Elmes, 2007); whereas, purely agent-based accounts might be accused of ignoring macro structural fields within which actors are embedded, and which they draw upon for action (Berger and Luckmann, 1967; Giddens, 1984). A second challenge is to elaborate how IT itself is implicated in observed 'irrationalities' of bureaucratic rationalization in developing countries, in light of admonition by scholars of institutions that "[existing] institutionalized practices are rarely ever completely extinguished but continue albeit weaker in scope (extent of diffusion) or potency" (Dacin and Dacin, 2008, p. 327).

1.3 Objectives

In this article, we pursue a different line of explanation that tries to overcome the noted theoretical concerns. We argue that 'irrationalities' of IT-enabled bureaucratic rationalization in developing countries may be traced to underlying contradicting institutional logics. Furthermore, such 'irrationalities' during IT rationalization—rather than being interpreted in straightforward terms of failure—might be better understood as a 'good enough' or 'satisficing' outcome (Simon, 1947, 1955) of contradicting old bureaucratic institutional logics and new managerial rationalism of IT. Unlike micro approaches that emphasize agency and cognition to the neglect of broader social structures, or macro approaches that do the obverse, institutional logics integrates agency and cognition with broader socially constructed institutional patterns and rule structures (Thornton and Ocasio, 2008, p. 101). Furthermore, by tracing contradictions between institutional logics of bureaucracy and that of IT, our approach emphasizes interaction between the social and technical and tries to overcome social or technological determinism.

Our theorizing is instantiated with a case study of Ghana's TradeNet-enabled rationalization, principally involving Ghana Customs Division (GCD) and other public and private organizations such as TradeNet's management company, Ghana Community Network (GCNET), destination inspection companies (DICs) and Government of Ghana (GoG) regulatory agencies. Primary data for this article was collected over several months as part of doctoral fieldwork in Ghana. The main research site was GCD's field office at Ghana's largest port, Tema Harbour, a hub for key trade actors. The rest of the article proceeds as follows. The next section outlines theoretical framework of the research: institutional logics, managerial rationalism of IT and neopatrimonial rent seeking logics of African bureaucracies. We then describe the research methodology followed by the case. We discuss findings and conclude with implications.

2 Theoretical framework

2.1 Institutional logics

Friedland and Alford (1991) in their examination of the relation between society, organizations and individuals, considered institutions as patterns of activity beyond the organizational level that are rooted in symbolism and material practices. Such symbols and practices provide resources for individuals, groups, or organizations to draw upon, elaborate or manipulate. Organizations and individuals draw upon such symbolic and material resources to shape their actions and give their experiences meaning; and in the process, reproduce such institutions. Institutional logics are thus the organizing principles that underpin individual practices, consistent with a given institution (Friedland and Alford 1991). Aside providing organizing principles, institutional logics also give motive and sense of self to social actors who in turn reproduce it through their action (Friedland and Alford, 1991, pp. 232,248–252).

Friedland and Alford (1991, pp. 248–249) defined institutional logics as "a set of material practices and symbolic constructions which constitutes its organizing principles and which is available to organizations and individuals to elaborate." Thornton and Ocasio (1999, p. 804) similarly defined institutional logics as "the socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality." In this way, institutional logics are consistent with the structurational view of new institutional theory with regard to the recursive interaction between structure and human action. For example, Powell and DiMaggio (1991, p. 23) suggested that a structurational account such as that of Giddens (1984) "provides a cognitive theory of commitment to scripted behaviors" that help explain how institutions reify through action.

By connecting individual agency and cognition with broader socially constructed institutional patterns and rule structures (Thornton and Ocasio, 2008, p. 101), institutional logics contrast with both rational choice theories that are narrowly individualistic and cognitivist and structural accounts that overlook situated agency. The institutional logic construct therefore, advances upon, and is distinguishable from new institutionalist accounts where institutions—historically developed patterns of social actions and relations, which have acquired a taken-for-granted meaning, value, and significance—are not subject to individual cognitive considerations (Powell and DiMaggio, 1991). Jepperson's (1991, p. 143) definition of institution as "an organized, established, procedure" further stresses the structural, historical and taken-for-grantedness of institutions (Powell and DiMaggio, 1991, p. 23). As such, in contrast to the general institutional view that actors are passively subject to institutional scripts, institutional logic suggests that actors act based on their own cognition but that cognition is consistent with goals and taken-for-granted assumptions that are situated within a particular institutional context—a notion described as "embedded agency" (Thornton and Ocasio, 2008, pp. 103–104).

Through the notion of embedded agency, institutional logics stresses that humans are not nonrational recipients and performers of taken-for-granted institutional scripts but act upon rationality embedded in an institutional context. Humans therefore navigate institutional structures in accordance with particular logics. Institutional logics influence mindful, rational behavior of individual actors in an organization who in turn shape institutional logics (Thornton, 2004). By providing a link between broader institutions and individual action, the institutional logics approach bridges macro, structural perspectives of institutional theorists like DiMaggio and Powell (1983) and micro, processual approaches of others like Zucker (1977). Situated action is further tied to beliefs and practices from wider institutional environments thereby overcoming critiques of diffusion and isomorphism studies such as Hasselbladh and Kallinikos' (2000).

Four aspects of institutional logics and their interplay are especially salient to this study. First, institutional logics provide organizing principles for action based on values and objectives of the institution (Friedland and Alford, 1991; Thornton and Ocasio, 2008) . Second, they contain assumptions about "means-ends relationships" (Thornton and Ocasio, 2008, p. 112). Third, institutional logics enable identity formation for individuals and organizations (Friedland and Alford, 1991; Thornton and Ocasio, 2008). Finally, institutional logics are domain specific and multiple institutional logics might exist within an organization (Friedland and Alford, 1991; Powell and DiMaggio, 1991; Thornton and Ocasio, 2008).

2.2 Managerial rationalism

Managerial rationalism, among other things, stresses efficiency, effectiveness, control and accountability—attributes typically associated with business. In developing countries, external coercive pressures toward organizational isomorphism have increasingly bore on states to become more managerial than bureaucratic. Since the 1980s, when the public administration paradigm of New Public Management (NPM) began to take hold in many developed countries, mimetic, coercive and normative influences (Powell and DiMaggio, 1991) from international development donors have mounted on developing countries to similarly emphasize managerial rationales such as efficiency, market mechanisms and transparent practices (Hood, 1995; McCourt, 2001; Minogue, 2001, p. 6; Sulle, 2010).

Along such lines of donor-driven managerial rationalism, Minogue (2001, p.6) draws attention to the regime of 'good governance' being promoted by international development organizations, sometimes incorporating elements of public managerial reform (DFID, 1997; The WorldBank Group, 1994; UNDP, 1998). This approach of packaging good governance initiatives and conditionalities with requirements for public managerial reform is suggested as a recipe for more responsive public services and ultimately for development (see e.g., The World Bank Group, 1997).

The uptake of such managerial rationalism in developing countries varies according to the particular element being considered. Some of the more common elements have been privatization and downsizing of bureaucracies as a core part of structural adjustment programs championed by the World Bank and International Monetary Fund (IMF) (Polidano, 2001, p. 46). In addition, many developing countries have experimented with other aspects of managerial rationalism such as corporatization (converting civil service departments into free-standing agencies within or outside the civil service) (Polidano, 2001, p. 47). Ghana and several other African countries, for example, have merged their customs and income tax departments into corporate-like national revenue authorities to promote effectiveness of internal revenue mobilization (Polidano, 2001, p. 47). Various other examples of managerial rationalism have been promoted by international development donors in Ghana and other African countries' bureaucracies (se ee.g. de Merode and Thomas, 1994; Dodoo, 1997; Christiansen, 1998; McCourt, 1998; Polidano, 1999).

In the context of Ghana's TradeNet implementation, managerial rationalism was pursued through training of bureaucrats in new ways of performance and management as well as TradeNet-enabled rationalization of customs clearance practices by automation and integration. For example, as part of managerial rationalism championed by the World Bank and IMF in Ghana, the GCD became an ISO 9000 certified organization (World Bank Group, 2010).[1] Unsurprisingly, we found during our research interviews that several customs officers and government bureaucrats generally spoke in jargons consistent with logic of managerial rationalism such as "revenue targets", "performance review", "turnaround time". "KPI (key performance indicator)" etc. As an artefact meant to enable rationalization of customs clearance processes, TradeNet was inscribed (Akrich, 1992; Heeks, 2005) with such managerial rationalism to accomplish rationalization objectives.

2.3 Bureaucratic logic of neopatrimonial rent seeking

Neopatrimonialism, an established concept in political science and political economy, has been widely applied to shed light on the nature of institutions in developing countries, particularly those in Africa (Bratton and Van de Walle, 1994; Chabal and Daloz, 1999; Van de Walle, 2001a). Clapham (1985, p. 48) defines it as "a form of organization in which relationships of a broadly patrimonial type pervade an administrative system which is formally constructed on rational-legal lines. Officials hold positions in bureaucratic organizations with powers which are formally defined, but exercise those powers [...] as a form [...] of private property". Neopatrimonialism is therefore understood as a hybrid institutional arrangement that combines an apparent formal, modern, rational-legal administrative apparatus (the "neo"), with a patrimonial system wherein elites control public offices for private gain (Bratton and Van de Walle, 1997). It is a co-existence of Weber's 1922 (1978) two ideal types of patrimonial and rational-legal domination (Eisenstadt, 1973; Clapham, 1985, p. 48; Bratton and Van de Walle, 1997, p. 62). Social and political structures, as a result, differ fundamentally from the formalized modalities of official conduct in a rational-legal system (Erdmann and Engel, 2006).

Van de Walle (2001b) has suggested that states vary in degree of neopatrimonialism from ideal types of completely patrimonial to completely rational-legal. Scholars like Bratton and van de Walle (1997), Chabal and Daloz (1999), show how in classic neopatrimonial states, institutional decision-making can be personalized by actors and their personal networks within and without the state structure. Such actors act upon a logic of personal, rather than national interest, and may exist at all levels from the top right down to the street-level bureaucracy. Cammack (2007, p. 600) notes that "policy decisions about development and governance are subordinated to that single, overriding [personal] goal." In the African context, separation between the private and public realms—the basis of modern conceptions of the state and public administration—is said to be thin or non-existent (von Soest, 2006).

Proponents have contended that neopatrimonialism distinguishes African institutions from others (Medard, 1982; Bratton and Van de Walle, 1997; Chabal and Daloz, 1999; Englebert, 2000). Bratton and van de Walle (1997, p. 277) for example, argue that "the distinctive institutional hallmark of African regimes is neopatrimonialism". Opponents have however cautioned against such tendency of

[1] ISO 9000 is a management standard that prescribes quality guidelines to increase business efficiency and customer satisfaction. It aims to embed a managerial quality system within an organization, increase productivity, reduce costs, and ensure output quality.

"overgeneralization about Africa" (Degrassi, 2008, p. 110). Sensitized by such positions, this study does not seek to ascribe neopatrimonialism to African states or developing countries as an intrinsic feature. Rather, it is posited that as in the case of Ghana, several characteristics of the bureaucracy are consistent with neopatrimonialism and rent seeking models—and that these define an institutional logic that helps explain 'irrationalities' in TradeNet rationalization. Such characteristics of neopatrimonial states include systematic concentration of power, personalization of official resources, corruption and rent seeking (Mbaku, 1996, 1998; Bratton and Van de Walle, 1997, pp. 63–65; Kelsall, 2011, 2012).

Rent seeking, a related concept developed within neoclassical economic theory (e.g., Krueger, 1974), elaborates another important aspects of the political economy of Africa's underdevelopment (e.g., Mbaku, 1998; Herbst, 2000; Mkandawire, 2013). Rents are defined as a "premium above opportunity costs for a given set of resources" (Lewis, 1994, p. 440) and occur when non-market forces such as politics or corruption, distort mechanisms of a free market. Rent seeking behaviors often arise from "politically mediated opportunities for obtaining wealth through non-productive economic activity" (Boone, 1990, p. 427). Lewis (1994, p. 438) has similarly noted a "mutually reinforcing pattern of neopatrimonial governance and a rentier economy." Both neopatrimonialism and rent seeking are therefore underpinned by informal structures where strong formal ones might exist. Boone (1994) in her study of state-business relations during trade liberalization reforms in two West African coastal countries similar to Ghana, found that "liberalization failed to suppress commercial rent seeking" and that "trade-centered renteerism is rooted in structural features of the West African economies. Kellsall (2011, p. 3) also observed that, "when it comes to state-business relations, there are significant disincentives to [...] making regulation transparent [...] because markets in most African countries are poorly developed political power is often the easiest route to wealth."

Regarding the link between rent seeking and bureaucratic corruption, Mbaku (1998, p. 209) argues that developing countries are "characterized by weak, inefficient and nonviable constitutional rules and economies" and hence, "civil servants [...] are able to extort bribes from entrepreneurs seeking favors." Bureaucratic corruption, in this view, is "primarily rent-seeking behavior and is directly related to government intervention in private exchange." For example, corruption remained a topical issue in Ghana and most Ghanaians perceived their government and bureaucrats as corrupt (Afrobarometer, 2014). The issue of corruption at customs was indirectly explored in our research through interview accounts of customs declarants and informal discussions with bureaucrats. Corruption was found to involve both formal, state-sanctioned practices and informal personal practices such as bribery, extortion or pilfering by some bureaucrats.

In the formal sense, a consequence of several GoG agencies mandated in customs clearance by law was that such agencies charged rents like 'inspection fees' or 'levies' autonomously and without coordination. The Ghana Museums and Monuments Board (GMMB) for example, were to charge handicraft exporters 50 Ghana pesewas per item,[2] to issue supporting documents to an IDF.[3] Such practices caused tensions between traders who felt extorted from, and bureaucrats who failed to acknowledge that their various 'small fees' created additional hidden costs (we witnessed feuding between traders and bureaucrats at a TradeNet workshop). GoG-sanctioned rent-seeking did not only have historical

[2] 50 pesewas, or about 13 US cents as of October 2015. E.g., a cargo container with 1000 woodcarvings would cost an exporter 1000*0.13, or $130 for 'inspection fees' to one of several agencies in charge of regulating woodcarvings. These payments were not 'official', meaning while legal, they were not part of the payments collected by GCD into national treasury.

[3] In the example of GMMB, the document was to confirm that inspected export-bound items were not antiques of national significance. Handicraft exporters interviewed complained they did not need such inspection because they dealt in new decorative artefacts with no antique value.

roots,[4] but were also attributable to perennial budget deficits and generally poor public finance which meant that under-funded GoG agencies were pressured to generate external funds.

The theoretical constructs presented in sections 2.1- 2.3 are briefly summarized in Table 1 below.

	Institutional logic	*Instantiations/ example of institutional logics*	
		Managerial rationalism	**Neopatrimonial rent seeking logic**
Operational definition	The socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality (Thornton and Ocasio, 1999, p. 804)	Administrative logic based on business-like or 'managerial' principles such as efficiency, effectiveness, accountability etc.	Administrative logic based on private misuse or abuse of public office for personal benefit e.g. through rents that arise from "politically mediated opportunities for obtaining wealth through non-productive economic activity" (Boone, 1990, p. 427)
Applicable domain	Most organizations have multiple and/or dominant logics	'New' IT interventions and administrative reform paradigms such as NPM meant to reform 'old' public administration (bureaucracy)	Public administrations (bureaucracies), especially in developing countries like those in Africa with weak formal state institutions and strong informal arrangements.
Significance	Stresses that humans are not nonrational recipients and performers of taken-for-granted institutional scripts but act with rationality embedded in an institutional context. Institutional logics influence mindful, rational behavior of individual actors in an organization who in turn shape institutional logics (Thornton, 2004)	Since the 1980s, when NPM began to take hold in many developed countries, mimetic, coercive and normative pressures from international development agencies and others have mounted on developing countries to similarly emphasize managerial rationales leading to a kind of global institutional isomorphism (Powell and DiMaggio, 1991)	Articulates how dysfunctional administration practices like rent seeking and corruption—typical in developing countries, though not exclusive to them—emanate from or are related to the 'hybrid' formal (bureaucratic)/informal (traditional/patrimonial) institutional arrangements.
Key actors/ champions/ associated mostly with		"Saints" –powerful elites who champion reforms (Peterson, 1998, pp. 44–47) e.g. International organizations such as World Bank, state agents such as 'reformist' government officials; "Wizards" –technical experts who advocate for technology (Peterson, 1998, pp. 50–52) e.g. IT staff	"Demons" –people who undermine an information system reform (Peterson, 1998, pp. 47–50) e.g. Public officials (bureaucrats) often resistant to change and adept at 'traditional' practices even if riddled with dysfunctionalities.

Table 1. Overview of theoretical constructs

3 Methodology

To understand *how* and *why* of 'irrationalities' occurred in IT-enabled rationalization in a developing country bureaucracy, case study approach was deemed appropriate (Yin, 2009). The study was interpretive and sensitized by theoretical concerns from extant literature (Walsham, 2006, 2010). The case of Ghana's TradeNet-enabled customs clearance rationalization was chosen because it is neither a straightforward success nor failure. Although TradeNet had a noticeable impact on certain performance indicators and has been widely cited as successful IT rationalization (De Wulf, 2005; World

[4] African states, through their customs administrations historically collect between 20 to 60 per cent of national revenues in the form of trade-related duties, levies and taxes (Cantens, 2012, p. 1). Ghana's 2011 figure was nearly 40 per cent, roughly the same as all direct domestic tax receipts to the state (Bank of Ghana, 2012, p. 3). Aside that, the customs administration in Ghana has been a primary instrument of state revenue collection since colonial times (see e.g., Chalfin, 2010).

Bank Group, 2010; Asuliwonno, 2011; Adaba and Rusu, 2014), it has not achieved its design and implementation goal as a 'single window' platform.

The research relied on several data sources with constant interplay between data and sensitizing theoretical constructs. Primary data was collected over an intensive three-month period spent mainly within GCD's field office at Ghana's main port, Tema Harbor. It consisted chiefly of open-ended formal and informal interviews with 65 informants in total, comprising street-level bureaucrats, senior officers, customs declarants (freight forwarders, importers, exporters) and others involved in customs clearance and Ghana's trade sector generally. Additional data analysed were field notes and memos from participant observations of the trading operations of exporters, importers, freight forwarders and clearing agents; transcriptions from TradeNet workshops; systems demonstrations and observations of TradeNet use, trade processing and port operations at Tema Harbor; archival data in the form of reports, filed documents, website contents, project documents and artifacts; newspaper clippings and other records from credible public sources.

The interviews aimed at understanding the nature and justifications for informants' customs clearance practices and everyday use of TradeNet. Attention was paid to capturing a host of "voices" pertinent to the phenomenon (Myers and Newman, 2007) while probing tensions, inconsistencies and 'irrationalities' that emerged (Avgerou, 2000). Interviews were concluded when it became apparent that theoretical saturation had been reached and no additional insights were being identified (Eisenhardt, 1989). Informants were chosen through combination of purposive and snow-balling techniques (Bryman, 2001). For example, at the onset of data collection, while interviewing a key informant at the Ghana Export Promotion Authority (GEPA) for background on Ghana's exports and TradeNet, the informant invited me, impromptu, to attend an ongoing workshop to brief exporters on TradeNet. The workshop quickly devolved into a protracted feud between the exporters—mostly small business owners struggling within the country's ailing economy—and organizers, over what the exporters perceived as "extortionate fees" pushed on them through TradeNet. It was at this chance workshop that the institutional contradictions of Ghana's TradeNet first came to my attention. It was also at this workshop that I met (and later interviewed) several key informants who referred me to other well-placed informants.

Most interviews were audio recorded, transcribed and analyzed—during and after the data collection phase—for themes, patterns and processes (Yin, 2013), with aid of qualitative analysis software (Atlas.ti). Despite assurances, few respondents were reluctant to be recorded; and in such cases, I took detailed notes. The duration of interviews varied from thirty minutes to three hours. Following the methodological suggestions of Robey and Boudreau (1999), analysis focused on discrepancies evident in data both during and after collection; in our specific case such discrepancies related to perceived 'anomalies' or 'irrationalities'. Interview data was analysed with three broad objectives in mind (Oates, 2005): to provide directly relevant insight into the phenomenon of study; to build a rich description of the research phenomenon and its organizational and historical context; and to explore alternative understandings, issues and questions beyond what is directly elicited through the sensitizing theoretical framework.

4 Case study

4.1 Background

In the 1990's the government of Ghana (GoG) undertook trade policy reforms as part of neoliberal economic policies that the World Bank (WB) and International Monetary Fund's (IMF) championed during structural adjustments in many developing countries (see e.g., Kraus, 1991). Because of Ghana's strategic geography and seaport access, GoG and its donors were guided by a vision to 'open up' Ghana to the rest of the world by supporting export and enterprise development to boost private sector competitiveness and attract foreign direct investment (FDI). But a decade after structural adjustments, intended outcomes had failed to reach desirable levels. Hence, after policy reviews, Ghana's donors, chiefly WB, recommended a series of additional measures intended to eliminate constraints to trade and investments (De Wulf, 2005). Core to these measures were reforms of GoG 'front line' agencies involved in trade and investment such as the Customs Excise and Preventive Services (CEPS).[5]

To that end, GoG and WB, implemented the Ghana Trade and Investment Gateway (GHATIG) project, a reform program that ran from 1999-2005 then extended until 2009. GHATIG's goal was to make Ghana a 'Gateway to West Africa' and to "attract a critical mass of Export oriented FDI into Ghana to accelerate export-led Growth of the National Economy" (The World Bank Group, 2010, p. 50). GHATIG, it was hoped, would not only improve competitiveness of local private enterprises but also make Ghana the most competitive investment destination among its peers in the West African sub-region. These objectives were in line with GoG's neoliberal developmental agenda to become a middle-income country by 2020 through its Poverty Reduction Strategy (GPRS) that called for the country to develop "competitive advantages", cater to export markets and to make the private sector an 'engine of growth' (World Bank Group, 2010, pp. 9–10).

Trade facilitation was central to GHATIG, and automating and integrating customs clearance became an important agenda. After a GoG delegation had visited countries with good trade facilitation programs, e.g. New Zealand, Singapore, Mauritius, and Malaysia, the Singapore and Mauritius models were deemed most desirable. These two models indicated that aside benefits of speeding up trade flows; there was great potential for government revenue mobilization. For example, Mauritius had become a leading textile and garment exporter partly because of technology deployed to facilitate trade, whereas Singapore's TradeNet, developed at a cost of about USD 11 million in 1987, eventually saved around USD 1 billion per year in productivity (Yasui and Engman, 2005, p. 16). Consequently, GoG selected Crimsonlogic, a Singaporean company that developed Singapore's TradeNet and transferred the technology to Mauritius, to provide a similar system for Ghana. By 2003, TradeNet began fully operating at Ghana's main seaport, Tema Harbor, and subsequently at all ports in the country.

4.2 TradeNet postimplementation

TradeNet was designed to enable processing of customs clearance documents, duties, taxes and data on Ghana's imports and exports. It also allowed centralization of steps in the import and exports clearance process and served a dual purpose of facilitating trade and supporting GOG's revenue mobilization. As a business-to-government (B2G) platform, it was meant to integrate several public and private actors in the trading community such as the Ministry of Finance and Economic Planning (MOFEP), Ministry of Trade and Industry (MOTI), banks, over twenty GoG regulatory agencies, shippers, freight forwarders, etc.

Prior to TradeNet, customs clearance and data flow between members of the trading community was convoluted and involved duplications and inefficiencies. Such processes were mostly paper based, labor intensive, time consuming, costly and error-prone, requiring multiple transcription and data entries. For consignments to be cleared, between 13-30 steps had to be completed over several weeks, depending on the nature of goods.[6] Trade data were also manually compiled from paper records, thereby causing delays, inaccuracies and costs. These inefficiencies created opportunities for bureaucrats to command 'facilitation fees' (bribes) to 'speed up' for anxious declarants, e.g. by allowing

[5] CEPS was later renamed Ghana Customs Division (GCD) after organizational reforms in 2004 that combined it with three other major revenue agencies to form the Ghana Revenue Authority (GRA). The renaming was in part to signal a shift from CEPS' original core enforcement functions to a more service oriented modern organization.

[6] GCNET, the public-private administering company of TradeNet reports that after TradeNet implementation, 75% of clearance at Tema port now takes 1-5 days with only 11% taking more than 5 days

queue jumping or manipulating the process altogether. GoG annually suffered revenue losses because the system's inefficiencies enabled private profiteering by creating an informal, intransparent facilitation economy (demand and supply for efficient service). Thus, customs, for several years, had been counted among the most corrupt bureaucracies in Ghana (see e.g, SOAS, 2001).

TradeNet integration and automation which was carried out under an 'organizing vision' (Swanson and Ramiller, 1997) referred to as a 'single window' and was meant to reduce transaction costs for declarants, make GoG's regulatory operations effective and efficient and to enhance revenues. For example, declarants were to electronically submit one online document, the IDF, to fulfil all regulatory, taxation, exemptions, permit and other requirements. In reality however, ten years after implementation, the 'single window' vision was not fully realized. The next two sections present two TradeNet-enabled practices meant to illustrate mixed outcomes of IT toward the two broad objectives of Ghana's customs clearance reforms, trade facilitation and revenue mobilization.[7] The first practice, IDF processing, illustrates 'irrational' outcome and the second, risk controls, an outcome consistent with rationalization goals of IT.

4.3 TradeNet implication in trade facilitation: IDF processing

The customs clearance process involved the following simplified steps:[8] (1) A declarant completed the IDF online via the TradeNet interface (2) GCD through its outsourced private agents, the destination inspection companies (DICs) classified and valued the goods, assessed applicable duties and taxes and issued a final valuation and classification report (FCVR) electronically (3) Declarant paid applicable duties and taxes at bank and physically submitted payment receipts, along with paper copies of IDF and supporting documents to customs (4) Customs bureaucrats undertook compliance steps that included paper document verification (5) If documents were approved, notification was relayed electronically to declarant via TradeNet and the declarant was sent for a physical inspection of the goods to fulfil security, compliance and regulatory requirements before final clearance (5b) Declarant undergoes physical checks by port guards and other GoG agents before exiting the port. As described, important steps remained paper-based, requiring declarants to print out the electronic IDF and present to bureaucrats face-to-face. This was despite TradeNet's affordance to fully automate and integrate IDF processing into a single electronic step for declarants.

The resulting mode of IDF processing at GCD may be viewed as a compromise between the 'single window' organizing vision of TradeNet and pre-TradeNet manual clearance procedures that took place in the 'long room'. Prior to IT automation at GCD, the 'long room' was where customs clearance was mostly carried out. 'Long room' is an elongated hallway where bureaucrats sat behind a row of adjoining glass-front partitions (multi-windows) to interact with and assist declarants to process declarations. The overall process was tightly coupled, with each step highly dependent on the next and hence highly susceptible to the discretion of bureaucrats, and easily prone to errors and inefficiencies. Furthermore, at the various stages of face-to-face interaction, the IDF was prone to tampering and falsification to evade taxes and duties.

Despite such known limitations of manual, paper-based steps, several bureaucrats preferred paper-based to full electronic IDF processing with TradeNet. This 'irrationality' was puzzling to senior customs officials who routinely encouraged officers to use TradeNet's electronic IDF capabilities fully. As one administrator lamented:

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[7] Given constraints of this article, only two customs clearance practices from the case study are illustrated. In reality, customs clearance process is highly complex and involves several specific 'customs regimes' with varying practices

[8] The steps represent a standard case where no special steps apply and the IDF is approved

> *[Customs] officers have so much confidence in paper that even at times the receipt that has been issued [...] it is connected [to TradeNet] so once you click on the declaration, you will see that payment has been done. So you don't really need the physical receipt for anything. But [...] they still want to see it though it doesn't add anything.*

To be clear, some steps such as payment of duties and taxes were constrained by lack of supporting infrastructure like reliable third-party online payment options while steps like physical inspection of goods by customs bureaucrats or their proxies were mandated by law. But customs bureaucrats' preference for paper documentation—when a simple IDF number sufficed to electronically access and process clearance documents—was puzzling and had less clear justifications.

4.4 TradeNet implication in 'revenue mobilization': Risk controls

One practice that was effectively rationalized through TradeNet was risk control. This refers to measures taken by customs to minimize "revenue risks" to GoG. "Revenue risks" was a term officials used to describe losses through such means as non-payment of duties and taxes or evasion via under-reporting, falsification, misclassification or undervaluation of goods, money laundering etc. Through aggregation of large and accurate data, as well as back-end tools for data analytics, monitoring, evaluation and reporting, bureaucrats were able to create dynamic risk profiles for declarants, spot unusual consigments, flag high-risk consignments and coordinate their responses for curtailing such risks.

Furthermore, via integration with receiving banks, TradeNet enabled real-time and periodic monitoring, reporting and reconciliation of revenues. This allowed officials to track performance relative to annual targets set by the GoG and daily targets set by senior management; and hence, to pre-empt and rectify potential shortfalls.[9] Finally, TradeNet allowed tracking of outstanding duties and taxes in the case of declarants with goods in bonded warehouses,[10] or for established declarants whom, in the interest of facilitating trade, had been granted waivers for future payment. A hold could be automatically placed so that they were unable to clear additional consignments until they had settled outstanding debts. The relevance of TradeNet for controlling revenue risks was described by a customs officer:

> *Now we are able to capture a lot of data for post clearance [...] Formerly, these bulky sheets [points to stack of papers], you can't go through and check [...] we have another regime we call the permit regime, where if your documents are not ready, you can apply, take the goods out and when the documents are in, you come back to perfect the permit. When the system was not in place declarants could come and beg, "oh please I have some goods to clear" and the customs officer will tell you the amount to pay, and we [customs] also need the revenue so we say "ok, let me do this for you [release a consignment without full payment]. Go and pay later." When the declarant went they did not return. Now [with TradeNet], if you don't pay, the system flags it and then you cannot send any more declarations [...] there is no human intervention.*

Another senior official further discussed the value of TradeNet in risk controls as follows:

> *Any information we want we get. And during facilitation, we must have a system to check whether we overlooked something in the pursuit of speed [...] another aspect is*

[9] Meeting GoG revenue targets was the sole performance criteria for GCD and repeated failure to meet targets could have serious professional and organizational consequences.

[10] A bonded warehouse is a customs-secured warehouse for withholding imports until owed duty and taxes were paid.

> *communication. So if you are a boss in your office and you chance on a document that has high risk, you can immediately put in a remark and whoever is working on it will be cautioned [...] And then we also have the bank reconciliation. Before this, we did manual reconciliation [...] because banks were not connected, declarants took money to the banks and got receipts [...] they came and customs also gave them receipts. So at the end of the period, we had to reconcile the payment at the bank to our receipts*

As illustrated, TradeNet not only reformed risk control practices, but afforded customs bureaucrats novel capabilities, as in the case of the permit regime, to negotiate conflicting goals of trade facilitation (with its need for speed) and revenue mobilization (with its need for accurate data and control).

5 Discussion and conclusion

Rather than seeing the IDF processing and risk controls examples of TradeNet outcomes as purely driven by individual cognition such as resistance or appropriation, or purely the result of structures like institutions and culture, we suggest that for 'irrational' outcomes as in IDF processing, the managerial logic of TradeNet contradicted the bureaucratic logic of neopatrimonial rent seeking. Hence, electronic IDF processing, rather than rationalizing manual paper-based human interventions, co-existed with it. On the other hand, for risk controls where TradeNet effectively enabled rationalization there were no observed contradictions between managerial rationalism and neopatrimonial rent seeking logic. Consequently, we interpret 'irrationality'—the existence of manual practices despite IT affordance for full automation and integration—as a 'good enough' or satisficing outcome when managerial and neopatrimonial rent seeking logics contradicted.

Guided by the four aspects of institutional logics highlighted earlier—organizing principles, causal means-ends assumptions, identity formation, and domain specificity—we elaborate four implications of contradicting institutional logics in 'irrationalities' of IT rationalization, as summarized in *Table 1*. In terms of guiding principles, the managerial principles of efficiency, effectiveness, control and accountability of formal processes appeared to sometimes contradict the principles of neopatrimonial rent seeking where formal (bureaucratic) and informal (personal) authority co-existed while their interests and values conflated. As a 'resolution' of such contradicting principles, bureaucrats tended to generally adhere to both, leading to instances of 'irrationalities'. As a senior TradeNet specialist admitted "officers are used to face to face contact, such that even if you send the thing [IDF] online and there is no paper, they will still be in the long room [expecting to see hardcopies]."

Relatedly, the managerial causal means-ends assumption of TradeNet—that automation and integration leads to better outcomes for declarants—contradicted the assumptions of neopatrimonial rent seeking logic of customs bureaucrats that the clearance process was solely to generate customs revenues, and that IT's usefulness or otherwise could be judged against this primary goal. This contradiction led to perceived tensions between the two design objectives of TradeNet—trade facilitation and revenue collections. This sentiment was captured by a senior customs officer who suggested that automation sometimes came at the expense of effective revenue collections: "during facilitation," he explained, "we must have a system of falling back, to check whether we overlooked something in the pursuit of speed".

In addition, contradictions in neopatrimonial rent seeking logic and managerial rationalism manifested as inconsistency in the 'internal' and 'external' identities of bureaucrats i.e. how they saw themselves versus how declarants/others perceived them. For example, hierarchic orientation of bureaucrats contrasted with the market orientation of TradeNet managerialism; enforcement orientation and customs officers' primary identity as revenue collectors was contrasted with the service orientation they assumed for TradeNet facilitation; revenue 'target driven' mindset of customs bureaucrats was also inconsistent with the client (declarant) focus of TradeNet managerialism; finally, the high sense of discretionary power that came with traditional bureaucratic logic was seen as undermined by the disintermediating effects of TradeNet in IDF processing. Because of such changing identities and attendant tensions, customs roles and practices appeared to be in flux. “For a long time we have just been working; going and coming [...]” a senior bureaucrat remarked in relation to her new role, “we had an idea [...] but it wasn’t structured. We are now coming up with a job evaluation to get an organogram.”

Finally, as institutional logics are domain specific and multiple institutional logics might exist within a given organization, technology’s effectiveness in rationalizing depended on the compatibility of logics. We illustrated this point with the two TradeNet related practices presented, IDF processing and risk controls. Even though bureaucrats drew upon both managerial rationalism and neopatrimonial rent seeking logics in their performance of both practices, TradeNet encountered ‘irrationality’ and was generally less effective in IDF processing than in risk controls because the two logics contradicted more for IDF processing than for risk controls. Despite being unable to clearly explain differences in effective use of TradeNet, senior officials were admitting of the discrepancy, “overall, TradeNet appears to have been more effective with revenue mobilization [risk controls] [...] we have some way to go with facilitation [IDF processing]” (A senior TradeNet specialist, quoted from interview transcript).

Despite the potential of our theorizing to shed some new light on ‘irrationalities’ of IT-enabled bureaucratic rationalization in developing countries, our approach has limitations. For example, while the institutional logics lens provides a useful way to theorize multiple logics and contradictions sometimes underpinning IT enabled bureaucratic rationalization, the conditions under which such contradictions lead to ‘irrationalities’ or less-than-intended outcomes remains to be explored. Furthermore, the question of why neopatrimonial rent seeking logic in developing country bureaucracies like in Ghana ‘resists’ reform into a ‘pure’ logic of managerial rationalism might similarly be probed.

Ultimately, the tensions and contradictions that manifest as ‘irrationalities’ during IT enabled rationalization of developing country bureaucracies are not solely idiosyncrasies of individual users but might implicate broader social structures. Furthermore, bureaucrats are not limited to a single logic in the course of their IT-enabled practices. They draw upon different, sometimes contradicting logics that co-exist and reproduce in practice. In this view, ‘innovative’ institutional logics such as managerial rationalism of IT may not necessarily reform ‘old’ logics such as neopatrimonial rent seeking, although the latter might be weakened as actors seek ‘good enough’ ways to satisfice both logics. This finding is consistent with Dacin and Dacin’s (2008, p. 327) observation that “[existing] institutionalized practices are rarely ever completely extinguished but continue albeit weaker in scope (extent of diffusion) or potency”. Our findings however differ from ‘amplification theories’ of IT and development which suggest that rather than enabling transformation, technology simply “magnifies” or “amplifies” existing human and institutional forces (Toyama, 2011a, 2011b).

We suggest that by embodying an institutional logic of managerial rationalism, technology might make a difference for developing countries, although not independently of other powerful logics such as neopatrimonialism or rent seeking. ICT4D professionals and scholars will do well to identify and appreciate ‘old’ existing local institutional logics and how they counteract (or sometimes enable) ‘new’ logics introduced by IT. Such recognition of multiple institutional logics within the organization and the nature of their interaction might inform better design and implementation of ICT4D projects, motivate complementary non-ICT-related organizational interventions, as well as aid sensemaking of idiosyncratic ICT4D outcomes when even the best plans and implementations do not completely go as expected.

Aspect of Institutional Logic	Managerial **Rationalism of TradeNet**	Neopatrimonial **Rent Seeking Logic of Bureaucracy**	Implication of Contradiction
Guiding Principle	Efficiency, effectiveness, control and accountability of formal processes	Informal (personal) and formal (bureaucratic) authority co-exist with interests and values conflating	Co-existence of new TradeNet and old bureaucratic principles
Representative quotation	*"CEPS is now ISO 9000 certified [...] with a new mission and vision [...] The system [TradeNet] has enabled flow of information [...] clearance of goods has improved tremendously"* (World Bank Group, 2010, p. 29)	*"When you go to the port now somebody [bureaucrat] will tell you "give me 500 cedis, give me 200 cedis." I have a copy of receipts here I can show you [...] all these charges are 'unofficial'. It doesn't make sense! And now that they realize we are making noise about it they [GMMB] are trying to put it in the TradeNet and try to charge 50p per item. So if they are able to implement it is going to be a cost that will remain there that every year they will increase. So at the end of it they are [...] going to put a lot of burden on us."* (Handicraft exporter, interview transcript)	"*Some officers are used to face to face contact, such that even if you send the thing online and there is no paper, they will still be in the long room"* *(Senior TradeNet specialist, interview transcript)*
Causal Means-Ends Assumption	IT automation and integration lead to better customs clearance outcomes for declarants	Customs clearance exists to mainly generate customs revenues. Therefore IT's usefulness or otherwise judged against this goal	Perceived tension between trade facilitation and revenue collections
Representative quotation	*"[TradeNet] improved clearance dramatically, I must say. And if we all are interested and use it to the maximum, I think we will reap a lot of benefit"* (Senior customs IT officer, interview transcript)	*"Our performance is measured by our ability to meet government revenue targets"* (customs officer, policy and programs, interview transcript)	*"And during facilitation, we must have a system of falling back, to check whether we overlooked something in the pursuit of speed" (senior customs officer, interview transcript)*
Bureaucrats' Identity	- Market orientation of bureaucrats - Service orientation of bureaucrats - Client/declarant focus - Low sense of power because of elimination of personal discretion	- Hierarchic orientation of bureaucrats - Enforcement orientation e.g. as revenue collectors and rule enforcers - 'Target driven' mindset e.g. for revenues - High sense of power through personal discretion	Inconsistent identities of bureaucrats between 'internal' (how they see their role) and 'external' (how declarants/others perceive their role)
Representative quotation	"*Initially because it [TradeNet] was a new thing, officers didn't know where they would be found wanting so people were kind of complying, but with time, I mean the smart ones study it and know where the loop holes are and do their own thing*" (Senior customs officer, interview transcript)	*"[Thanks to TradeNet] Right now I can tell you how much revenue we have collected since morning up to this time. So when we come to the office, early in the morning, like 7 o'clock, you have to produce your first report, everyday. Revenue for the previous day, you submit them to the commander, and probably the commissioner will call you and then they will relay it to the ministry [...] we cant miss our target even for a single day"* (Senior customs officer, collections, interview transcript)	*"For a long time we have just been working; going and coming [...] We had an idea [...] but it wasn't structured. We are now coming up with a job evaluation to get an organogram" (senior officer explaining her new role and ongoing streamlining of roles, interview transcript)*
Relevant practice domain	IDF processing	Risk controls e.g. post clearance	Technology's effectiveness in enabling change depended on the compatibility of logics irrespective of practice domains
Representative quotation	*"We have rationalized—cut down the number of steps that people had to go through [...] but we could still automate more, go paperless" (senior officer, interview transcript)*	*"TradeNet has enhanced our revenue mobilization capability by allowing us to do things that were not possible before [...] audits, controls, analytics and so on"* (customs officer, interview transcript)	*"Overall, TradeNet appears to have been more effective with revenue mobilization [...] we have some way to go with facilitation" (Senior TradeNet specialist, interview transcript)*

Table 2. Contradicting institutional logics and their implications in Ghana's TradeNet-enabled customs rationalization

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