

Innovative financing (IF) of infrastructure projects in Ghana: conceptual and empirical observations

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Traditional methods of financing have failed to resolve Ghana's infrastructure deficit. Innovative financing (IF) solutions are being encouraged to alleviate this, but presently IF knowledge is limited. This study provides an overview and maps the evolution of IF solutions to conceptually model their characteristics and application to major infrastructure projects, especially in the context of LDCs. An inductive methodology draws extensively on extant literature and published data from Ghanaian ministries, departments and agencies who procure infrastructure works. The study highlights how the IF concept stems from a plethora of public finance issues including reform of government service delivery, new tax tools, public-private partnerships and alternative financing arrangements and further how IF has been focused at educational, road, water infrastructure, housing and district assemblies. Through illumination of the Ghanaian IF concept, the study will be of utility to policy makers and international development agencies considering investment in the country, while its broader ramifications will help the search for alternative ways to finance infrastructure projects *per se*. It is concluded that further research would be beneficial in examining strategic IF issues, especially regarding the extent to which available tools and techniques are utilized in each of the four key IF phases (preparation, implementation, monitoring, evaluation).

Keywords: Financing, Ghana, infrastructure, innovative project delivery.

Introduction

Modern and reliable infrastructure is essential to the development of any nation (Ngowi *et al.*, 2006). It stimulates national wealth and underpins public services. Additionally, physical public assets support non-economic goals and improve citizens' quality of life (Guerrero, 2001). However, some countries have struggled to achieve economic development and competitiveness, which suggests that their basic infrastructure delivery could be improved (UNECF, 2008). Globalization was expected to ease infrastructure financing but has not done so—demand in developing countries remains acute (Ngowi *et al.*, 2006). Funding gaps are immense, and current receipts, savings and central government transfers have proven insufficient to finance large-scale infrastructure projects (Kehew *et al.*, 2005; Martell and Guess, 2006; Ngowi *et al.*,

2006; Beck *et al.*, 2000; Platz, 2009). It is estimated that across the Pacific, East Asia and Sub-Saharan Africa regions, the total infrastructure financing gap will average US\$420 billion per annum during 2006–15 (Platz, 2009). Simultaneously, private sector infrastructure investment in developing countries has been volatile over the last decade: investment dipped to \$50 billion in 2003 after a peak at \$131 billion in 1997, before rising again to \$158 billion in 2007 (Kehew *et al.*, 2005; Martell and Guess, 2006; Beck *et al.*, 2007; UNECF, 2008; Platz, 2009).

Undeniably, infrastructure deficit hinders global industrial, social and political progress and is particularly acute in developing countries (UNECF, 2008). Faced with Ghana's paucity of resources, in 2001 the government prioritized medium-term objectives within the framework of the Ghana Poverty Reduction Strategy (GPRS) and most prominent was basic infrastructure

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improvement (GPRS, 2003). This has been fraught with difficulty, and growing concern for Ghana's infrastructure debt has stimulated interest in innovative financing (IF) options. For instance, via Act of Parliament, the Ghana Education Trust Fund was established in 2000 to help finance educational infrastructure. Subsequently, via a strategic development document (dubbed *Ghana-Vision 2020*), the government proffered a strategy for a stable macro-economic environment, transformation to strong economic growth and improvement of living standards (Onyina-Adjei, 2007). Public-private partnerships (PPPs) were proposed as an infrastructure delivery mechanism underpinning these objectives (Owusu-Manu *et al.*, 2008). Additionally, the government issued US\$750 million 10-year bonds in 2007 in attempt to raise funding (Stuart, 2008) and, in recognition of Ghana's finance constraints, the World Bank and other international organizations advocated domestic mobilization of infrastructure project funds to help reduce the debt burden (Dirie, 2005).

Ghana's District Assemblies Common Fund (DACF) Act 455 (Nyarko and Eghan, 1998) mandated Parliament to annually allocate not less than 5% of the total revenues of Ghana (i.e. all revenues accruing to central government other than foreign loans, grants, non-tax revenue and revenues already collected by, or for, District Assemblies under any enactment in force), to the District Assemblies for development (Nyarko and Eghan, 1998). Central government, however, has urged local authorities not to rely solely on the DACF but also to deploy innovative revenue mobilization to increase purchasing capabilities. In essence, infrastructure IF tools seek to enlarge fiscal space within government budgets by increasing the amount of financial resources available (Ploeg and Casey, 2006). Both Cohen (2002) and Ploeg and Casey (2006) suggested that IF of infrastructure is relative to geography and time, implying that conclusions drawn elsewhere cannot be implicated directly in another country (Cardone and Fonseca, 2006; Ploeg and Casey, 2006). The global financial crisis has renewed interest in mechanisms that might help limit exposure to unstable international financial flows (Platz and Schroeder, 2007; Platz, 2009) and has thereby improved developing countries' capacity to innovate financing instruments.

IF can mean different things to different people but is generally taken to embrace any mechanism that generates additional funds, enhances the efficiency of financial flows or makes finance more results oriented (World Bank, 2011). Within the literature, the concept is popular but attempts at formal IF definition are rare, inadequate and inconsistent (Ploeg and Casey, 2006). For this study, the definition developed by the Department of Transportation of the US

Federal Highway Administration is used: 'Innovative financing includes tools that supplement traditional sources and methods of financing to overcome cash flow shortages and attract new sources of capital'.

IF research is rare in the broader perspective of developing countries (Ngowi *et al.*, 2006), but particularly so in the context of Ghana. This situation underpins and justifies the aim of this study, which was to chart the evolution of IF to major Ghanaian infrastructure projects and conceptually model it. Objectives stemming from findings of the study include to: (1) stimulate Ghanaian policy makers to search for alternative ways to finance infrastructure; (2) add momentum for formal review of existing IF mechanisms; (3) help kindle investor confidence; (4) ensure effective financial management of public funds and (5) induce private sector participation by encouraging win-win public-private IF solutions.

Infrastructure definition and provision at the national level

The term infrastructure appeared in the 1920s and broadly refers to structural elements that allow goods and services to move between people and places in an industrial economy (Moteff *et al.*, 2003; Sheffrin, 2003; Teriman *et al.*, 2010). Since then, definitions and categorizations have evolved from various sources (cf. Moteff *et al.*, 2003; Sheffrin, 2003; Semler, 2005; Bigotte and Antunes, 2007; Cleveland, 2008; Hardwicke, 2008; Chism, 2009; Woochong, 2009; Teriman *et al.*, 2010). Hardwicke (2008) and Teriman *et al.*, (2010) categorized infrastructure into (i) *physical and economic*, such as roads, railways, water supply, energy and sewerage, and (ii) *social*, to include housing, health and education facilities (cf. Bigotte and Antunes, 2007). Woochong (2009) included power plants, roads, water supply and communications systems and asserted that in today's globalized economy, no country can succeed without a solid infrastructure base. Cleveland's (2008) definition added transportation and structures housing public institutions, which provide an interface between people and their environment for society to advance beyond an agrarian lifestyle. Similarly, Chism (2009) included physical structures that provide or permit transportation, energy generation and transmission, water distribution, sewage collection and the provision of social services such as health and education. SACOSS (2009) highlighted 'soft' infrastructural forms, taking account of social environment and services that support human capital (Williams and Pocock, 2010) as well as institutions maintaining health and cultural

standards (Timmeren *et al.*, 2004; Casey, 2005). Generic categories of infrastructure and respective examples are summarized in Table 1.

The social infrastructure concept has been expanded around economic perspectives. For example, in economics, the term ‘infrastructural capital’ at times includes skilled manpower (Cleveland, 2008). Hall and Jones (1999) explained social infrastructure as representing the institutions and government policies that determine the economic environment, within which individuals accumulate skills and firms accumulate capital/produce output (see also Chin and Chow, 2004, p. 141). Economists and politicians often refer to infrastructure as investment in human capital through the provision of physical elements to support human services (SACOSS, 2009). The provision of basic facilities, services and installations which underpin quality of life (as well as the ability of economies to function effectively) is central to the infrastructure debate. With no ‘standard’ definition, the concept in policy terms has been fluid but generally encapsulates both public and private systems, services, amenities, social facilities and industrial capacity (Moteff *et al.*, 2003; Cleveland, 2008). This broad scope of infrastructure and its inherent consequence to society underline the importance of IF of infrastructure assets.

That a nation’s economic development is dependent on adequate infrastructure is clear (cf. Dirie, 2005; Kumar *et al.*, 2006; Cleveland, 2008; Foster, 2008; Sagar, 2009; Slone, 2009). Estache (2004) further argued that infrastructure helps spread the benefits of growth. Others have stated that availability of physical and social infrastructure will to some extent: (1) define a nation’s living standards (Nicolosi, 2009; Platz, 2009) and (2) encourage foreign direct investment (Estache, 2004; Department of Transportation, 2006). Hence, it is argued that infrastructure investment should continue unabated during periods of fiscal adjustment because this—more than any other form of public investment—portends long-term economic development. Studies by the World Bank reveal that public investment in infrastructure not only increases productivity but also promotes private investment (Chang, 1999). Foster (2008) proffered that infrastructure must continue to play an integral role in Africa’s recent economic turnaround, whereas Estache (2004) argued that in addition to supporting economic growth, such investment also helps share its benefits. Thus, infrastructure development is required to support these benefits and, additionally, help achieve the millennium development goals in particular (Foster, 2008).

Infrastructure investment delivers high returns, averaging 30–40% for telecommunications and >200% for roads (Estache, 2004). They differ significantly from

manufacturing or modernization projects (Cohen, 2002; Mor and Sehwat, 2006; Cleveland, 2008; Nicolosi, 2009; Platz, 2009; Sagar, 2009; Slone, 2009), so their key characteristics are critical to determining applicability of IF (Mor and Sehwat, 2006; Ploeg and Casey, 2006). Infrastructure projects can be classified using key characteristics such as size, complexity, up-front costs, construction time, asset life, payback period, marketability, new or refurbishment, hard or soft asset, risk level, rates of return and location (Moteff *et al.*, 2003; Mor and Sehwat, 2006; Cleveland, 2008). Implications of these characteristics are key to selecting appropriate finance, taking account of, for example, user fees, bond markets, domestic taxes, equity, grants, private investment, loans, micro-finance, voluntary finance, environmental charges, dedicated or special purpose funds and debt swaps (Cardone and Fonseca, 2006).

Strategic objectives of infrastructure IF

Discussion abounds regarding the strategic objectives of infrastructure IF (Department of Transportation, 2002, 2004; Mor and Sehwat, 2006; Ploeg and Casey, 2006, 2008; Nichol, 2007; Moszoro, 2009; Slone, 2009). These sources describe such in terms of: increased revenue, improved cash flow, multiple policy objectives, economic sustainability, accountability and appropriate matching of financing tools.

In addressing ‘increased revenue’ as an objective, proponents position the concept as a tool that seeks to grow the pool of resources available using one of two mechanisms: first, by increasing the revenue yield of traditional and existing finance tools and second, by securing funds at lowest possible cost (Department of Transportation, 2004, 2006). This is achieved by changing tool use in order to overcome prevalent political challenges or barriers (Ploeg and Casey, 2006). These include lack of political or public acceptance of financing; public, political and media resistance to policies; wavering political commitment; restrictions imposed by pressure groups and cultural attributes e.g. to enforcement, which influence the effectiveness of instruments. The literature indicates that IF inextricably embraces efficient use of existing revenue sources by leveraging external revenue sources. Accordingly, it seeks out new funding avenues as supplements to existing sources (Department of Transportation, 2004; Mor and Sehwat, 2006; Moszoro, 2009; Slone, 2009). Thus, IF strives to increase fiscal space within the capital budget envelope by securing additional revenue, while maintaining overall fiscal disciplines (Nichol, 2007).

Table 1 Generic infrastructure typology

Category	Specific type	Typical examples	Literature sources
Physical and economic infrastructure ('hard' infrastructure)	Transportation	Roads, railways, airports, seaports, harbours	Cohen (2002), Moteff <i>et al.</i> (2003), Amos (2004), Casey (2005), Nichol (2007), Cleveland (2008), Platz (2009)
	Energy and public utilities	Energy generation, transmission and distribution of energy, water supply	Casey (2005), Cardone and Fonseca (2006), Platz and Schroeder (2007)
	Public and national services	Fire service, police service, defence and military service, prisons service, disaster management agencies, monetary and financial services, postal systems, legal and regulatory systems	Moteff <i>et al.</i> (2003), Cleveland (2008), Platz (2009), Moszoro (2009)
	Communications	Cable, television, fibre optics, mobile, satellite	Cronin <i>et al.</i> (1993)
	Agriculture Housing programmes	Irrigation, processing, warehousing Social housing, low-cost housing	Binswanger <i>et al.</i> (1993) Stover (1987)
Social infrastructure ('soft' infrastructure)	Public education systems	Primary, secondary and tertiary education, research institutions, specialized institutions	Hall and Jones (1999), Moteff <i>et al.</i> (2003), Chin and Chow (2004), Casey (2005), Andris (2008), Cleveland (2008)
	Healthcare delivery systems	Primary healthcare services, national health bill	Kagioglou and Tzortzopoulos (2010)
	Social welfare and human capital	Social welfare agencies, human resource policies	Munnell (1993)

Regarding '*improved cash flow*', finance tools place a premium on flexibility in attempt to: (1) provide better up-front funding; (2) overcome recurring short-term cash flow shortages and (3) improve long-term cash flow performance and management (Department of Transportation, 2004; Cardone and Fonseca, 2006). In this context, IF aims to improve overall cash flows, while not necessarily increasing total funding. Better cash flow management, for example, can accelerate infrastructure projects held back by short-term dearth of funds (Department of Transportation, 2004).

Under the theme '*multiple policy objectives*', an important aspect is how certain tools can serve other policy objectives in addition to providing additional funds (Ploeg and Casey, 2006). According to the US Department of Transportation (2004), IF of infrastructure can help promote environmental conservation, reduce urban sprawl and ensure better fairness and equity in the provision of services. A typical example in this situation is the Community-Led Infrastructure Finance Facility (CLIFF). CLIFF provides venture capital and other financial products directly to organizations of the urban poor, rather than to government, to support community-led slum-upgrading schemes conceived in

partnership with city authorities (Malcolm and Morris, 2005). It uses finance as a tool to bring poor communities (and the organizations which support them, such as non-governmental organizations (NGOs)) right into the heart of urban development, planning, housing infrastructure provision and slum upgrading.

Regarding '*economic sustainability*', IF is inextricably linked to economically sustainable infrastructure issues (Slone, 2009). For example, some tools are better geared towards managing the costs of capital assets across their whole life cycle, ensuring adequate funding over the long term (including preventative maintenance) (Atkinson, 2003; Department of Transportation, 2004; Cardone and Fonseca, 2006). In this sense, IF is a complement to long-term capital asset management strategy (Ploeg and Casey, 2006). Examples include tools that promote the self-funding of infrastructure through user-pay systems and comprehensive pricing/tariff structures as opposed to the traditional tax and spend option (Nichol, 2007). Relating to '*sustainability of investment*', there is a positive correlation between the degree with which a financial tool allocates the costs of infrastructure among its various users on the one hand and establishes a link between

its beneficiaries and financiers on the other (Ploeg and Casey, 2006). Key IF goals are good corporate governance (accountability and transparency) and ensuring future infrastructure performance (Moszoro, 2009; Slone, 2009). As part of this, many tools provide governments with feedback mechanisms that improve their ability to respond to changes in demand and determine how and when to provide infrastructure (Mor and Sehrawat, 2006).

Categorizing IF tools

There are numerous IF tools including PPPs, municipal bonds and direct access to international development agency funds—all of which are increasingly being considered (Dirie, 2005). Cohen (2002), Semler (2005), Nichol (2007) and Nicolosi (2009) broadly classify these tools under three thematic groupings: earmarking, syndication and redistribution (Table 2).

'*Earmarking*' occurs when an existing tool is used differently (Department of Transportation, 2002, 2004; Cardone and Fonseca, 2006; Ploeg and Casey, 2006; Sihombing, 2009). For example, where general taxation is used to service infrastructure finance debt, an innovative approach would be to earmark a portion of the general tax rate to pay for debt servicing. Earmarking allows taxpayers to better see their tax 'at work', making it politically easier to raise revenues for specific projects (Ploeg and Casey, 2006). *Syndication* occurs when an entirely new tool is employed to finance infrastructure (Department of Transportation, 2004). In a Ghanaian context, a syndicate loan that financed a mega-hostel project at the University of Ghana—in which the loan was secured with rental revenue as collateral—is an example.

Finally, '*redistribution*' employs familiar methods of financing, funding and delivery, but applies them to different types of infrastructure (Department of Transportation, 2002; Nichol, 2007). In many ways,

redistribution is the heart of infrastructure IF (Ploeg and Casey, 2006). For example, PPPs are innovative because the private sector is participating in the construction and operation of a public asset that has traditionally been the domain of the public sector.

Financing infrastructure: the need for innovation

Constant infrastructural upgrade is prerequisite to sustainable economic growth. Such assertion is reinforced by the Organization for Economic Cooperation and Development (OECD), which estimates that required global investment in road, rail, telecoms, electricity and water infrastructure will reach US\$71 trillion by the year 2030. This does not take account of seaports, airports and social infrastructure, but still represents approximately 3.5% of global gross domestic product (GDP) (Abadie, 2008). Growing global demand for infrastructure puts intense pressure on public budgets, especially in countries with fiscal deficits (Foster, 2008). Various World Bank reports have conceded that current receipts, savings and central government transfers have proven insufficient to fund this demand in most developing countries, including Ghana (Foster, 2008). It is argued that the infrastructure financing needs of developing countries could amount to trillions of dollars over the next few decades and that many of these countries will be unable to finance large-scale projects alone (cf. Sihombing, 2009).

Notwithstanding finance that donor countries and international financial institutions provide to aid developing countries' infrastructural progress, this remains below current needs and is unlikely to increase in the near future (Sihombing, 2009). Dwindling world financial systems coupled with the recent global financial meltdown has exacerbated the situation. The traditional institutional debt market (comprising bank and non-

Table 2 Categorization of IF tools

Categorization of innovation	Tool type	Innovation occurs when ...	Literature sources
Earmarking	Existing tool	... an existing tool is used in a different way	Cohen (2002), Cardone and Fonseca (2006), Ploeg and Casey (2006), Sihombing (2009)
Syndication	Entirely new tool	... an entirely new tool is employed to finance an infrastructure project	Department of Transportation (2002), Nichol (2007), Nicolosi (2009)
Redistribution	Familiar tool	... financing, funding and delivery method is applied to an infrastructure asset to which it has generally not been applied in the past	Semler (2005), Ploeg and Casey (2006), Nichol (2007)

Source: Based on Dirie (2005), Cohen (2002), Semler (2005), Nichol (2007) and Nicolosi (2009).

bank financial institutions in developing countries) is reported to be insufficient and inefficient as a primary source of long-term finance for infrastructural development (Dirie, 2005; Abadie, 2008). Dirie (2005) asserted that financial resources are likely to remain difficult for the immediate future and that scope for closing the gap is uncertain, while longer term viability of the infrastructure finance market is also unclear. To help pay for necessary infrastructure investment, developing countries cannot simply rely on donor support nor depend on traditional financing sources. This is a challenge for all developing countries, not just Ghana (Sihombing, 2009), and one invariably requiring innovative solutions.

Embracing IF into infrastructure provision

Prioritization of infrastructure funding by central governments remains weak throughout the Poverty Reduction Strategy Process in most countries and, where major projects have been earmarked, budget allocations have been insufficient (Ngowi *et al.*, 2006). A paucity of coherent policy planning hinders traditional finance sources (Owusu-Manu and Badu, 2009). Government budgeting allocations are frequently based on political decisions, rather than on empirical evaluation of need or demonstration of satisfactory performance (Platz, 2009). This situation presents significant opportunities for change that many developing countries have already embraced. Effective use of IF needs to recognize what kinds of projects benefit most from which kinds of tools because it is important to achieve synergy in combining tools and projects (cf. Cohen, 2002; Department of Transportation, 2002). This is demonstrated in Figure 1.

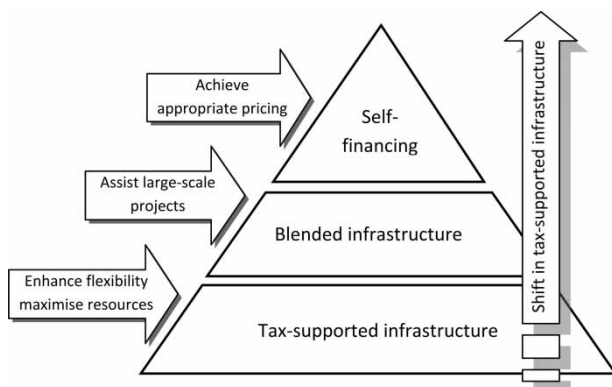


Figure 1 IF and infrastructure categories

Source: Adapted from the US Federal Highway Administration.

The base of the pyramid in Figure 1 represents the majority of tax-supported projects. These do not generate revenues, but can benefit from IF tools that enhance flexibility and maximize resources. Various fund management techniques—such as advance construction (Miller, 1974; O’Neill, 1998), tapered match (Hines and Thaler, 1995) and grant-supported debt service (O’Neill, 1998)—can help move these projects to construction more quickly (Department of Transportation, 2002). Ploeg and Casey (2006) argued that aside from fund management techniques these are prime candidates for debt instruments, in which future apportionments are used to service debt and related costs. The mid-section of the pyramid represents projects that can at least be partially financed with project-related revenues, but may also require some form of public credit assistance to become viable. US Department of Transportation (2004) and Ploeg and Casey (2006) suggested that the best strategy for this category of projects is use of low-interest loans, loan guarantees and other credit enhancements. Such credit programmes are designed to assist large-scale projects of regional or national significance, which might otherwise be delayed or not constructed at all because of risk, complexity or cost (Ploeg and Casey, 2006). The peak of the pyramid reflects a very small number of projects that may be able to secure private capital financing without any governmental assistance (self-financing infrastructure). The key strategy here is to achieve appropriate pricing (Department of Transportation, 2004). Overall, the most innovative options are those designed to intentionally push tax-supported infrastructure into the blended or self-financing categories (Ploeg and Casey, 2006). That accordingly converts the former into user-pay models, avoiding an increase in taxes or the issuing of debt to meet funding shortfalls (Cohen, 2002).

Figure 2 demonstrates key characteristics in determining the applicability of IF. Consistent with Mor and Sehrawat (2006), this suggests that before deciding how best to finance an asset, its basic characteristics should be identified and specific circumstances/goals of the project be carefully considered. IF thrives where the aim is to provide the right amount of infrastructure at the right cost, employing the most efficient means possible—in contrast to a primary goal of redistributing income to ensure universal access at all costs (Ploeg and Casey, 2006). Consequently, IF provides tools and institutional arrangements as alternatives or augmentations to traditional funding strategies, designed to enhance the effectiveness of fund management and to bridge investment gaps between available resources and needs (Ploeg and Casey, 2006). Debt issuance or other forms of credit enhancement can help facilitate access to a wider range of capital or leverage for future revenue streams (Ploeg

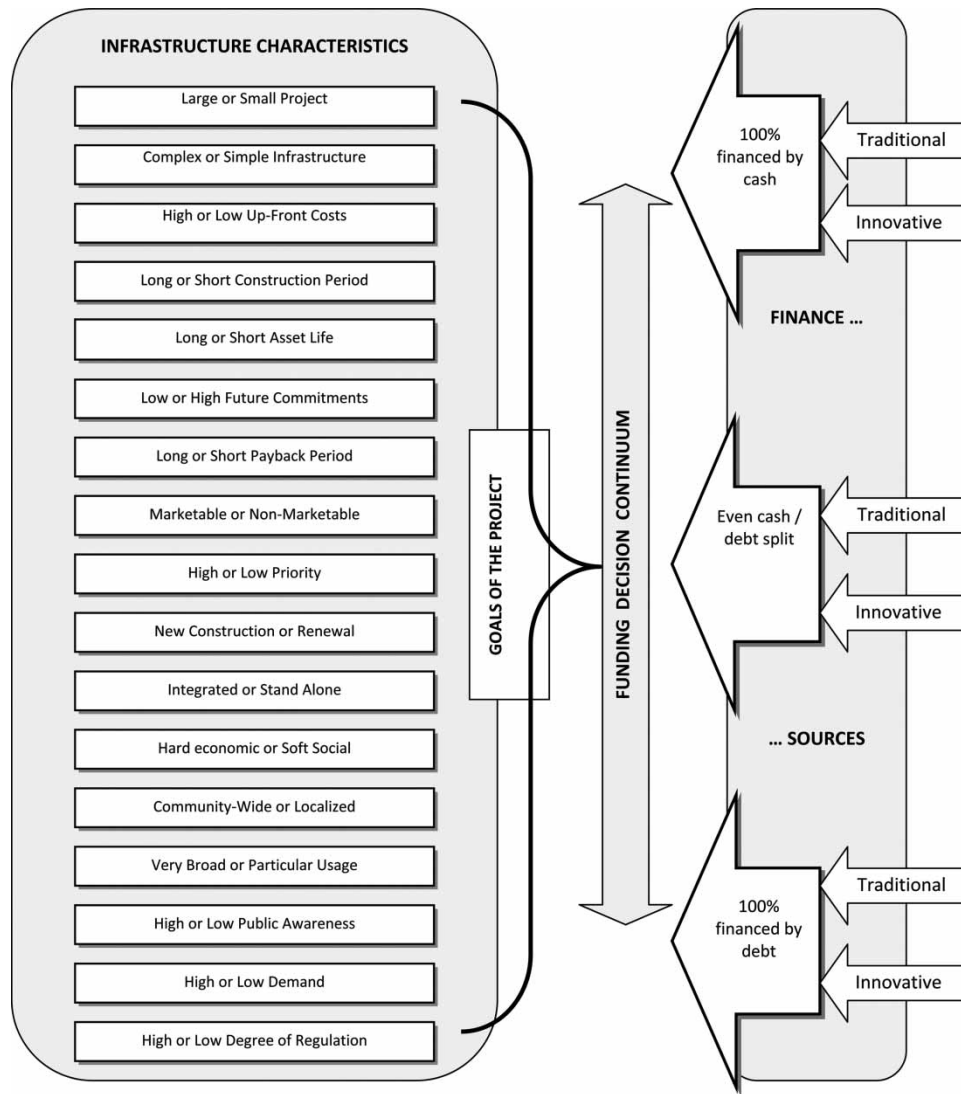


Figure 2 Interface of key infrastructure/financing characteristics

Source: Adapted from Ploeg and Casey (2006).

and Casey, 2006). According to Ploeg and Casey (2006), the case for employing IF rests upon the arguments that: (1) current approaches are insufficient to secure the capital required to meet infrastructure demand and (2) long-term solutions must address issues that help create problems in the first place. Dealing with the second argument involves the use of demand management strategies. These strategies are intended to manage rapidly growing infrastructure requirements without expanding supply (i.e. keeping demand for infrastructure in check) (Ploeg and Casey, 2006).

Clearly, the emergent IF concept considers alternatives, both in terms of expanding the notion of who provides finance and how that finance is supplied. With IF, the range of possible stakeholders exceeds development

agencies and central governments and can include national NGOs, local banks or financial intermediaries, sub-sovereign governments, users and International Finance Institutions (Cardone and Fonseca, 2006). IF does not rely on a single strategy, but promotes a diversified approach, highlighting finance options from both private and public sectors combined (Crockatt and Barry, 1999). Cohen (2010) argued that IF methods are not strictly ‘innovative’ but instead refer to alternative *delivery* methods in which some form of private capital is involved. Cohen further argued that infrastructure IF refers to the combination of private/public funding in which the financial mechanisms are bundled to deliver projects more efficiently (i.e. on a value-for-money basis).

Sustainable approaches to infrastructure financial provision

Infrastructure provision and sustainable development are well-recognized and distinct (yet inextricably linked) concepts bounded by geographical location (Teriman *et al.*, 2010). Choguill (1996) emphasized that adequate infrastructure provision is paramount to sustainable development. From a macro-perspective, Choguill (1996) and Teriman *et al.* (2010) concurred that efficient infrastructure facilitates delivery of goods, services and information while simultaneously supporting physical, economic and social growth. At a micro-level, regional ‘neighbourhood’ infrastructure is often perceived as a building block that supports sustainability of the human environment (Choguill, 1996, 1999). Choguill (1999, 2007) and Parr (2008) acknowledged the active considerations of sustainability issues in infrastructure provision, concluding that these are a continuous process, involving resource exploitation that encompasses integration of economic development, social concerns and environment protection in a mutually reinforcing manner. This is important because within the context of sustainability, people must live, work, enjoy a safe environment and utilize social infrastructure and facilities for their well-being (Parr, 2008).

Within the extant literature, three main approaches to sustainable provision have been identified and explained in terms of financing, funding and delivering (Cohen, 2002). Financing embraces how providers raise funds for capital investments (Cohen, 2002; Semler, 2005; Cardone and Fonseca, 2006; Platz, 2009). Ploeg and Casey (2006) posited that financing refers to how up-front capital (for constructing, renewing, rehabilitating or reconstructing an existing asset) is secured, that is,

how can governments raise funds for these investments? Platz (2009) attempted to answer this question via five theoretical and practical options. Firstly, in agreement with others (Kehew *et al.*, 2005; Martell and Guess, 2006; Beck *et al.*, 2007), it was explained that in countries where revenue receipts exceed their costs for consecutive periods, governments may save for investments. Secondly, countries may use current receipts (‘pay as you go’), where governments cover up-front costs through revenues or savings. In this scenario, they would not borrow or save, but match capital investment to what they collect in a given period. Thirdly, developers could lend and repay later using current receipts (hereafter referred to interchangeably as ‘financing mechanisms’ or ‘debt financing’). Fourthly, they may rely on grants or intergovernmental transfers and finally, public providers may choose to privatize part of their operations and raise equity.

In a similar vein, Ploeg and Casey (2006) explained infrastructure funding as referring to how up-front capital costs are repaid or recovered, highlighting general tax revenue and fees on infrastructure usage. Funding can be sourced through a combination of the two options, but taxes (general revenue) and user fees remain the two basic methods. To summarize, sustainable methods for infrastructure delivery are: (1) via the public sector (traditional approach, most used) and (2) the private sector (see, for instance, Cohen, 2002) (Figure 3).

Examples of IF in Ghana

Following independence from the then British Empire in 1957, the Ghanaian economy weakened. This restricted investment in new (and maintenance of

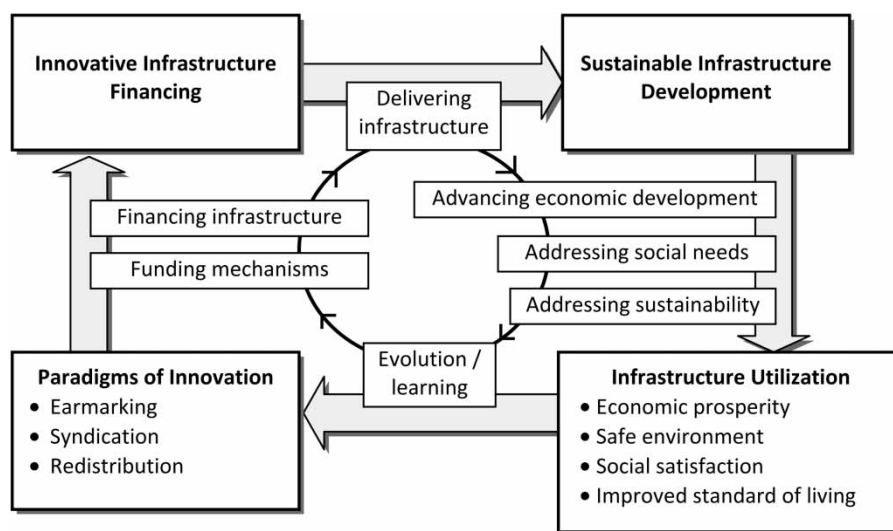


Figure 3 Sustainable innovative financing framework

existing) infrastructure (GPRS, 2003). The situation worsened during 1970–80 because of the economic depression facing many least developed countries (LDCs) and resulted in a downward trend in almost all major facets of its economy. Coupled with a population boom, mass rural–urban migration and significant growth of cities and towns, the country's infrastructural base eroded and development stagnated (Andreski, 2008). However, since the turn of the twenty-first century, the adoption of market-oriented policies and support from the international community has helped Ghana's economy and infrastructure base improve (GPRS, 2003).

The DACF Act

In an attempt to bridge a huge infrastructure financing gap, Ghana has utilized IF approaches, some of which have been successful, others less so. For instance, in about 1990, infrastructure financing was a major problem confronting Metropolitan, Municipal and District Assemblies (MMDAs) and local authorities had to grapple with the problem of generating adequate revenues from their traditional sources to meet recurrent and development expenditure (Nyarko and Eghan, 1998). In response, the DACF Act 455 was enacted under Section 252 of the 4th Republican Constitution of Ghana in 1992. This mandated Parliament to annually allocate not less than 5% of Ghanaian total revenues to the District Assemblies for development (Nyarko and Eghan, 1998) and to reinforce administrative decentralization with fiscal decentralization.

As a form of IF, the MMDAs' discretion over use of the DACF is limited because around half of the fund must be invested in line with central government's priority spending areas (mainly capital projects). The remainder has often been used to provide counterpart funding to match donor funding (Nyarko and Eghan, 1998). Yet, the use of DACF centres upon innovation and is aligned to earmarking part of the general revenue for infrastructure development—a significant departure from traditional practice. Using DACF to finance infrastructure also involves new financing mechanisms for leverage of resources (matching donor funding), and this makes the approach innovative. Despite the insurgency of problems regarding its utilization and management, there is no doubt that the DACF constitutes a large chunk of financial resources to the infrastructural provision of MMDAs. There is ample evidence to suggest that the DACF has served a good purpose in bringing infrastructural development to the MMDAs.

Over the years, the Common Fund has been used as a mechanism to provide finance to the MMDAs, to provide infrastructure in the fields of education, health

and water (hitherto neglected). A proactive strategy for encouraging the MMDAs to increase their Internally Generated Fund capacity is by way of increasing their shares of the DACF. The basis for this as explained by Nyarko and Eghan (1998) is anchored on four factors, mainly, need factor, equalizing factor, responsive factor and service pressure. The 'need factor', which by statutory requirement apportioned 35% of the DACF 'sharing formula', sought to address imbalances among levels of development within MMDAs. In this context, GDP *per capita* is used as an indicator for the level of development and relative need among them. The 'responsive factor', which statutorily apportioned 20% of the DACF sharing formula, sought to motivate MMDAs to improve their revenue mobilization generation effort, which is assessed using *per capita* revenue generated. The 'service pressure factor' mandatorily apportions 15% and seeks to assist in improving existing services and facilities which as a result of population pressure are deteriorating faster than envisaged. The remaining 30% of the DACF, the 'equalizing factor', sought to ensure that a minimum funding was available for all MMDAs.

Revolving funds

In the context of water infrastructure development, Ghana has experienced the utilization of revolving funds. This is a sustainable account whose income remains available to finance continuing operations without any fiscal year limitation, thus recovering the principal, cost of capital, loan loss provision and administrative costs *inter alia* through charges made for water service delivery. The Association of Water and Sanitation Development Boards (AWSDBs) was established in 1995 in a Canadian International Development Agency-funded rehabilitation project involving 14 priority communities. A minimum deposit was required for operations and management, representing 5% of project capital costs. Fourteen communities formed a private association to save the deposit, which was then transferred to the community water sector agency. As of 2005, accumulation of funds had grown, and 22 more communities had joined (Cardone and Fonseca, 2006). A key strategy of the AWSDBs for the mobilization of deposits was to establish a reserve fund, which is invested in Treasury Bills and other short-term, high return investments. Interest earned on the fund represents a large capital base for member boards in each district to satisfy their water supply and sanitation activities. Credit provision began in 2001 and monies had been disbursed to 20 member water boards as at 2005 for major replacement works and to cover the waived 5% community contribution for the poorest communities.

Credit delivery processes

These comprise both formal and informal methodologies. Formal pre-screening techniques require member boards to have their application approved by the District Assembly, which also acts as guarantor in the case of default. Amounts accessed depend on the value of shares purchased by the respective board, the extent of planned rehabilitation and expansion and the board's available funds. The reserve fund (invested similarly as above) involves new or non-traditional sources of revenue, new financing mechanisms designed to leverage resources and new fund management techniques, all of which are infrastructure IF concepts. The AWSDBs have taken steps to ensure profitability by charging commercial rates. However, a low rate of loan recovery (32%) has affected the level of reserve and the AWSDBs' potential to earn income to support its operations. Continuous withdrawal has depleted reserves. Low investment levels mean low returns, which further reduces the capital base and the ability to support member boards (Cardone and Fonseca, 2006).

The Ghana Road Fund (RF)

Ghana was one of the first countries in Africa to establish an RF under a legislative instrument and raise funds via tolls to ensure continuation of maintenance and new build. The object of the Road Fund Act (536) of 1977 is to finance routine, periodic and rehabilitation of public roads in Ghana (Aidoo, 2005). However, road maintenance continues to face difficulties such as irregular and insufficient release of funds and an inadequate financial management system. During 1996, in an attempt to rectify these difficulties, the government expanded revenue through fuel levies, vehicle registration fees and road-use fees. The levy provides about 90% of RF revenues with tolls, transit and license fees providing the remainder. Financing the road network now comes from three main sources: government, road users and foreign donors. Until recently, the government has been the largest funding source of road construction and maintenance (AfDB/OECD, 2006). For example, for the period 1996–2001, the RF contributed 25%, development partners 44% with Government Consolidated Fund the remaining 31% (Andreski, 2008). The RF is innovative because it supplements development partners' funding and the consolidated fund (i.e. receipts from the country's own coffers derived from tax income and other government levies).

As set out extensively in Heggie and Vickers (1998), there were, and still are, a range of such funds in the developed world—notably in the USA and Japan—and in quite a large number of transition and developing countries. The performance of such funds had,

however, been mixed and generally quite poor in Sub-Saharan Africa. Some of the common problems encountered with the RF were poor financial management; absence of independent audits; extensive use of funds for unauthorized expenditures; diversion of funds and weak oversight, depriving its intended purpose (Heggie, 2003). As a result, most of these earlier RFs had actually been closed down—very often under intense pressure by the World Bank and the IMF (Brushett and Kumar, 2001; Kumar *et al.*, 2006). Emerging from this process was the 'second generation' RF, the first created (in Zambia) in 1993 and of which there are now more than 20 in place in Sub-Saharan Africa (Heggie, 2003). The key characteristics of second-generation funds as an IF alternative are: (1) a sound legal basis—separate RF administration, clear rules and regulations; (2) strong oversight—broad-based private/public board; (3) being an agency which is a purchaser, not provider, of road maintenance services; (4) sound financial management systems and lean administrative structure; (5) regular technical and financial audits and (6) revenues which are incremental to the budget and arise from charges related to road use.

The Housing Bond Scheme

Last but not the least, Ghana has utilized a Housing Bond Scheme to finance housing infrastructure. In 2004, the Ministry of Works and Housing with National Trust Holding Company (NTHC) raised US\$200 million worth of domestic and foreign capital through a Housing Bond Scheme. The plan was to sell 5-year bonds on the international market, but regulations required the government to have a local 'co-arranger' in place, hence NTHC's involvement. Historically, it had only been possible to raise about US\$5 million through domestic bonds in Ghana, so this scheme aimed to generate at least 70% of the funds from international sources (mainly the UK and USA). Funds were to be used for the provision of low-income, safe and affordable housing for Ghanaian workers. This example aligns with the IF concept of finding new or non-traditional sources of revenue.

Despite the innovative approaches highlighted earlier, proliferation of infrastructure development is allied to the global economy, particularly *availability* of funding and investors' disposition towards risk. Recent global downturn has acted negatively on the former, while for risk, investors seeking to maximize return given a global recovery may choose developed economies in favour of emerging ones. At this juncture, these aspects combined somewhat weigh against Ghana and the African continent in general. Africa faces a gap of US\$31 billion per year (Foster and Briceño-Garmendia, 2009), and most forecasters expect this to worsen given the present, global financial climate (Beck *et al.*, 2000; Platz, 2009).

Conclusions

Across the globe, nations are turning to IF of infrastructure because traditional financing sources are inadequate and, consequently, have led to huge and growing infrastructure deficits. Governments in developing countries have continued to embrace private sector investment to fund critical infrastructure even during the current period of economic uncertainty. With regard to increasing public finance, scope for raising additional taxation, and moreover the political will to allocate public funds towards infrastructure development, appears limited. A call for stakeholders to design and implement IF tools to deliver needed Ghanaian infrastructure is deeply rooted among increasing demand for limited government resources; limitations among banks for infrastructure investment; difficulties in securing private sector finance due to the effects of the global downturn, financial markets and limitations of bank debt and the impossibility of raising additional revenue from increasing taxation and the skewed nature of funds from major external sources. The current global economic crisis has also stimulated renewed interest in mechanisms that limit countries' exposure to volatile international financial flows.

The infrastructure financing gap can only be addressed by raising additional finance, adopting lower cost technologies and adopting less ambitious targets for infrastructure development. This study sought to trace the evolution and development of IF tools adopted to finance major infrastructure projects in Ghana and set out to advance a conceptual framework that accurately reflects this practice, by demonstrating that IF is all-encompassing in both developed and developing countries. However, the literature relating to conceptual underpinnings of infrastructure IF and delivery has revealed lack of coherent agreement in definition and context. Notwithstanding this, the study draws heavily on extant literature to conclude that IF aligns to a wide range of public finance issues, including reform of government service delivery, new tax tools, PPP arrangements and different applications of traditional financing. Convergent views agree with this, and conclusions are that IF takes a blended approach of financing, utilizing private and public funding and in a manner in which the financial mechanisms are bundled to deliver projects more timely, efficiently and on a value-for-money basis. Anchored on the premise of timely and efficient project delivery, IF also appears to oscillate around measures such as new or non-traditional sources of revenue, new financing mechanisms designed to leverage resources, new fund management techniques and new institutional arrangements.

Normally supported by legislative instruments, IF is deeply rooted in identifying creative ways for governments to generate additional fiscal space within their

budgets. For instance, consistent with Dixon *et al.* (2005), PPPs, which have been labelled as IF of large and complex infrastructure projects, are usually enabled by legislation. Along with the latter, other strategies are employed, including matching key characteristics of the infrastructure with IF tools, recognizing IF non-exclusivity in use and clear identifying infrastructure project goals. The study also draws on extant literature to answer the question as to whether characteristics of the project are essential in design and implementation of IF and concludes that successful application of a tool largely depends on these key characteristics. The novelty of this study is exhibited in its contribution to knowledge at theoretical and practical levels. Theoretically, it has built on earlier works and extended understanding of Ghanaian infrastructure IF. Practically, the study has developed and presented graphically and in the form of intuitive discourse a conceptual framework.

Limitations of the study

In-depth analyses of primary IF phases (preparation, implementation, monitoring and evaluation) of the empirical examples presented were not explored. Neither were challenges, success factors and new solutions of these empirical examples discussed among stakeholders. Further study would also be beneficial to assess how infrastructure IF impacts achievement of overall project objectives. Finally, anchored on the notion that success is a matter of perception and divergence of perspective (Lavagnon *et al.*, 2010), other factors may also influence the success and failure of IF tools, so research might examine respective correlations between success measures and the stakeholders' viewpoints. These limitations offer opportunities for further research, which may be expressed as hypotheses, *viz*:

H_1 = IF tools will be used to varying extents among four distinct phases of the funding process, grouped in terms of preparation, implementation, monitoring and evaluation;

H_2 = IF challenges, success factors and solutions will vary markedly between stakeholders;

H_3 = relationships will exist between IF and (will have an impact upon) achievement of project objectives;

H_4 = correlation will exist between IF success measures and the viewpoints of stakeholders.

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