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Newly independent nations and large engineering projects: The case of the Volta River Project

Abstract

Purpose: The purpose of this paper is to explicate how newly independent nations combined local and international resources to plan and build large engineering projects aimed at enhancing economic development. It discusses the key factors and issues related to the planning and building of the Akosombo dam and related townships from 1962 to 1967.

Design/methodology/approach: Archival information from the Volta River Authority (VRA) together with other archival government data and interview transcripts before, during and after the completion (from the 1950s to the 1960s) of the Volta River Project (VRP)

Findings: The paper presents insights from the Volta River Project in newly independent Ghana and demonstrates how multiple international firms combine with host country stakeholders to usher in one of the most important engineering projects in post-colonial Africa. It also highlights how poor bargaining power and weak integration of projects to future development objectives, with negligence by succeeding political actors could inhibit the full achievement of intended long-term project outcomes.

Research Limitations/implications: Most of the conclusions are drawn from a single project within one country and would need to be supported by additional multi-country research. The study also presents an opportunity to explore how lessons learnt could influence policymaking in new large and complex infrastructure projects.

Originality/value: The paper reviews antecedents, processes and outcomes of a major post-independence infrastructure project in a sub-Saharan African country.

Keywords: engineering projects; megaprojects; Volta River Project; Africa; Ghana.

Introduction

Historically, two streams of research suggest that governments and industry may represent conflicting interest groups in major projects (see Priemus, Flyvbjerg and van Wee, 2008). On one side, a stream of research has demonstrated that privately owned-firms are motivated by profit which could sometimes occur at the expense of other stakeholders including governments. On the other side, another stream of research suggests that governments do not exist to make profit, but are rather expected to identify and deliver social needs. Consequently, when large projects involve the private sector, such conflicting goals could increase the risk of opportunism (see Miller and Lessard, 2000; Priemus et al., 2008). As such, it was chiefly the job of governments to design, finance and implement “mega-project” (Priemus et al., 2008). However, inadequate resources often lead to many mandated government projects failing to be completed on time and on budget to the detriment of tax payers.

One of the shortcomings of the existing streams of research is the failure to explicate how governments designed and implemented new projects during times of significant political change such as the immediate post-independence period. A potentially insightful and unstudied area of research is the issue of how governments in newly independent countries marshalled resources to initiate and implement major projects geared towards economic development. The context of large engineering projects is important, given that they have come to be regarded as “the crucibles in which new forms of collaboration are developed” (Miller and Lessard, 2000, p. 1). For newly independent nations, large engineering projects such as airports, dams and power systems often represented a means to signal a new beginning built on economic development (see Miller and Lessard, 2000).

The present paper is an attempt to expound how such major projects unfold overtime in newly independent nations. Specifically, we explicate how newly independent countries harnessed resources (finance, technological and human capital) from local and international sources to implement complex engineering projects. Our major intention is to demonstrate how such transitions foster economic growth and development in the immediate post-colonial era. Using insights from one of the earliest, largest and best known infrastructure projects in post-colonial Africa, the case of the Volta River Project/Akosombo Dam project in Ghana, we elucidate the role of governments and how organisations learn from such projects.

Our decision to focus on the Volta project was driven by a number of factors. First, some have regarded the Volta River Authority (VRA) as a “successful parastatal, run by an effective administration that was designed by “modernizing bureaucrats” during the waning years of colonial rule (Miescher, 2014b p.186). Second, it is commonly noted that immediately after independence, nations are often characterised by chaos, political instability which is compounded by poor policy making and skills deficits. It has also been suggested that squandering of national resources was particularly prevalent in the immediate post-colonial period. We present one of the highly successful and largest post-colonial projects, which have the potential to enrich our understanding of newly independent countries and how they formulated their policies. For decades, it has remained one of the very few megaprojects which allow scholars to explore the “the interactions between the fields of politics and technology” (Hart, 1980, p. 3). After becoming the first nation in sub-Saharan Africa to gain independence (from British rule) (Amankwah-Amoah and Sarpong, 2016), the construction of the Akosombo dam was intended to send a strong signal with respect to how self-governance could propel economic development. In general, the Volta River Project was expected to usher in a new era of “industrial development” propelled by the generation of hydroelectric power and the

associated technologies as a catalyst for rapid economic growth (Gyau-Boakye, 2001; Decker, 2011).

The paper offers several contributions to the literature. First, although such projects have occurred throughout history, there has been little emphasis on learning from such historical projects during transitional periods. Some researchers have indicated that learning from the failures and successes of such historical events has the potential to further improve our understanding of project management and economic infrastructure development (see Amankwah-Amoah and Debrah, 2010, 2014, 2017; Desai, 2016).

Not only do much of current stream of research overlook historical cases, but they also offer little insights into the role of government in forging and developing partnerships. Thus, our analyses contribute to the literature on megaprojects (Miller and Lessard, 2000; Priemus et al., 2008) by employing a historical case to deepen our understanding of the role of governments and policy-makers in designing and implementing such projects. The study also adds to the burgeoning body of literature on strategic management of large projects (Miller and Lessard, 2000) by delineating key features and nuances of such projects. In contrast to much of the existing literature, we present one of the most successful engineering projects in post-colonial Africa. Furthermore, although studies have explored large engineering projects for decades, it remains “a poorly understood area of management” (Miller and Lessard, 2000, p. 19). This is more so regarding the underlining processes through which they unfold or manifest. We develop a phase model to demonstrate how such multi-party engineering projects unfold over time.

After reviewing the literature on mega projects in the next section, we will turn our attention to the research method and approaches to data collections. We then set out the approaches to

assemble the data on the Volta River Project. Afterwards, the study employs the case of the Volta River Project to illustrate our conceptualisation and analyses. The last section sets out the public policy implications of the study.

Government, private sector and megaprojects: a review

One of the unique features of large engineering projects is that they generally tend to be strategic in nature which requires long-term capital investment and human capital acquisition and development (Miller and Lessard, 2000). Although large engineering projects are generally designed with the aim of creating a platform for economic growth and development (Priemus et al., 2008), lack of access to the latest technologies as well as technical and managerial skills often hamper not only the completion of the project, but also society's ability to accrue the anticipated benefits (Miller and Lessard, 2000; Nolan, Shipman and Rui, 2004). Indeed, ineffective planning could lead to adverse environmental effects such as landscape erosion and toxic emissions (Priemus et al., 2008). This means that technical and managerial skills are required for the planning and implementation of the project and more importantly for the maintenance and management of the project after completion in order to reap the full benefits (Osabutey, Williams and Debrah, 2014).

For newly independent nations, they may require assembling highly skilled individuals and managers outside their national borders to ensure successful completion of projects (Miller and Lessard, 2000; Nolan, Shipman and Rui, 2004). In many instances, projects are increasingly being developed and sponsored through multiple partners encompassing engineering firms, private developers and entrepreneurs (Miller and Lessard, 2000). This represents a shift from the past where most projects were largely developed by large public or private organisations (Miller and Lessard, 2000). It has been well established that large engineering projects in areas

such as energy, petrochemicals, and nuclear-electricity generation generally have cost overruns between 30% -700% (Miller and Lessard, 2000). Some of the possible reasons for cost overruns identified by prior studies include technical advances, changes in scale and scope, and the underestimation of the initial costs (Merrow, McDonwell and Arguden, 1988). Large infrastructural projects are usually characterised by uncertainty and risks which curtails the tendency to introduce new ideas and innovative approaches (Miller and Lessard, 2000; Merrow, 2011). Arguably, by relying on tried-and-tested technologies/techniques and sticking rigidly to initial plans, the risk of project failure and overruns could be reduced (Dodgson, Gann, MacAulay and Davies, 2015). However, since such large scale and complex projects have long durations it is difficult to keep all external factors constant. The need to anticipate changes requires strategic scenario planning.

The literature on public-private projects can be categorized into three areas of research. On the one hand, the traditional project management literature has argued that governments are historically inefficient in carrying out major projects. This stream of research indicates that government policy and appointment of individuals based on political affiliations rather than competence often deprive such projects of the necessary talent and expertise (see also Andriessse and Van Westen, 2009). Consequently, decisions are driven by political rather than economic factors (see also Doganis, 2006; Andriessse and Van Westen, 2009). The literature on project development and evolutions has indicated that the incremental and sudden increases in the projected time period are often attributed to a lack of depth in the understanding of project requirements to allow the incorporation of strategic thinking during the planning and implementation process. Researchers have suggested that this then creates further administrative and delivery delays which adds to the cost and complexities of the project (Miller and Lessard, 2000). Consequently, the overall costs exceed the project cost and time of delivery.

In the area of public-private partnerships, studies have indicated that projects are often subjected to minimal interference and sudden changes relative to government-owned projects (see Miller and Lessard, 2000; Priemus et al., 2008). However, a line of research has shown that partnerships have largely produced profitable outcomes for governments and the wider public.

Insert Figure 1 about here

The resource-based perspective (Barney, 1991) has emphasized that the possession of highly skilled individuals can underpin firm and project successes. Indeed, the skills and knowledge possessed by highly skilled individuals are a key source of competitive advantage which can be difficult to replicate. Finally, in the area of strategic management, research has shown that strategic alliances can lead to sharing of risk, opportunities to tap into others' resources and provides wider access to scarce resources (Gulati, 1998; Huang, 2017). Government-private sector projects can, therefore, be seen as collaborations which lead to the pooling of resources (financial, expertise, technology, etc.) from government and the private sector. Such an approach ensures a more efficient utilisation of national resources during project design, execution and management to achieve the desired outcome (Priemus et al., 2008). To an appreciable extent public-private partnerships, if managed properly, could minimise transaction costs.

Another relevant theoretical lens is the transaction costs theory. Transaction costs broadly refer to the costs associated with doing business (Peng, 2014). Past studies have demonstrated that organisations are also more inclined to internalise activities that can be performed at lower cost whilst concurrently relying on the market for functional activities in which other organisations have a comparative advantage (Puck, Holtbrügge and Mohr, 2009; Klein, Frazier, and Roth, 1990). Such collaborations can pave the way for the parties to enjoy economies of scale, reduce

cost and share risk (Hennart, 1988). Rooted in this theory is the assertion that collaboration between two parties are often sought to provide more efficient mechanisms for business activities. Accordingly, organisations are more inclined to select governance structure that curtails transaction costs (Peng, 2014; Puck et al., 2009).

The above discussion implies that project developments are shaped by interest groups and the interplay of project-specific and external factors, as depicted in Figure 1. This study seeks to fill this gap in the current literature by explicating the evolution of such megaproject. The study evaluates the antecedents, implementation and post completion outcomes.

Research setting and data sources

We relied on a case study method to provide the in-depth understanding of the processes inherent in such large-scale infrastructure projects (Miles and Huberman, 1994; Yin, 2003). We utilise the government of Ghana archival data on the project even before independence in 1957. Additional data was collected from the archives of VRA. The study was anchored in an archival method which relies on underutilised government and privately-held data on the project's development and execution. These records were examined by two researchers to ascertain patterns and features of the project central to the research question. Based on this approach, three types of data were assembled. The first was interview transcripts of works conducted by the government in the 1950s and 1960s. Second, government data on the original projected and estimated costs. The last category of data relates to execution-related data which include organisations involved (both foreign and local), human resources (both foreign and local) used and other project related events such as negotiations, resettlements, etc. The data also sheds light on the sources of financial resources for the project and how that influenced stakeholder involvement and bargaining power.

The Volta River Project: a historical overview

The Akosombo dam was a hydroelectric project initiated and implemented in the immediate post-independent Ghana (previously known as the Gold Coast prior to independence in 1957) under Kwame Nkrumah (1957–1966). Ghana was among the first group of sub-Saharan African nations pushing for independence from colonial rule in the 20th century. One of the main objectives of the project was to help develop a sustainable source of energy which would power Nkrumah's industrialisation agenda. In 1949, the government of the then Gold Coast assigned to a British firm of consulting engineers- Sir William Halcrow and Partners the task of examining the proposed Volta power scheme and to deliver a report on the health, navigation and communications effects of possible development of the Volta River Basin (GhanaWeb, 2014).

When the consulting engineers published their report in 1951, the Government had already reached the conclusion that a port was also needed to “serve Accra and the east, in addition to the expanded port facilities at Takoradi” (GhanaWeb, 2014, p. nd). By the early 1950s, the Ghanaian government in tandem with partners had designed the original plan for the Akosombo Project. Perhaps the most striking feature of the project was the detailed collaboration between local stakeholders, Nkrumah's government, and foreign partners geared towards providing the conditions for economic development. For leaders such as Nkrumah in the post-colonial environment, it was essential for African leaders and for that matter newly independent nations to demonstrate competence, confidence, innovativeness and commitment to help usher in a new era of prosperity (Biney, 2011). It was also at the core of the Ghanaian government policy to help bring about economic development as centre piece to national policy.

In 1953, the government established the Volta River Preparatory Commission under Commander Jackson with the aim of harnessing the power of the Volta for development (GhanaWeb, 2014). In the run up to the declaration of independence in 1957, in the then Gold Coast Legislative Assembly debate in 1953, Nkrumah and his fellow members of the Convention People’s Party unequivocally supported the establishment of the commission to explore the feasibility of the project (Miescher, 2014b). By this time, the Preparatory Commission in 1956 reported that the project was both economically feasible and technically sound. This led to a resounding support for the project from the government, opposition parties and the general public (GhanaWeb, 2014). In 1956, the Preparatory Commission’s report recommended the project to include “fully integrated aluminium industry, a new city and miles of railway tracks” (Miescher, 2014b p. 185).

In 1959, Kaiser Engineers of Oakland proposed a scaled-down version which included the construction of the Akosombo Dam and an aluminium smelter in Tema which was a departure from the aluminium industry advocated by the Preparatory Commission (Miescher, 2014b p. 185). Consequently, the project was to generate power for the Volta Aluminium Company (VALCO), an aluminium smelting company at Tema as well as cater for commercial and domestic demand (Gyau-Boakye, 2001). The plan attracted attention of the government and politicians who also believed in the development of the dam. The VRA had the responsibility to build and operate the dam. This responsibility was eventually expanded to include resettlement of people in the Volta Basin (Miescher, 2014b p). Table 1 summarises key events in the resettlement process during the evolution of the project.

Insert Table 1 about here

Pre-independence strategic formulation

Political independence from British rule, in 1957, created unprecedented enthusiasm which promised the need for accelerated development. Nkrumah began to put his support for the project into action. From the beginning, the Volta project had industrial and economic development at its heart. Buoyed by the new spirit of independence and prior commitment to pan-Africanism, Nkrumah's attitude towards this project was about laying the foundations for a stronger nation as well as sending a message to the rest of the world that newly independent nations were capable of fostering economic development and managing their own affairs. Over time, the Akosombo hydroelectric project came to be managed by the VRA. Within a quarter of a century, the Volta River Project had transformed the local economies by providing jobs for the local people as well as instilling a degree of pride in the locals as the Dam emerged to become Ghana's main source of energy supply. Anecdotal evidence suggests that the project helped to upgrade the engineering capacities in the country at the time. Since the 1960s, when Ghana became a republic, considerable resources were marshalled to help ensure successful completion of the project. Today, the Akosombo project still remains one of the historical legacies of modernisation in Ghana since the late 1950s (Miescher, 2014b). Table 2 provides a summary of factors that influenced the project. It shows the multiplicity of stakeholders and participants in the project. International firms from the U.S., the U.K., Italy, Canada, Japan, Austria, etc. were involved in the project implementation. The interests of the U.S. government as well as their firms were paramount and this is apparent in the financing of both the dam and the related aluminium smelter. The evidence shows that this increased the bargaining power of the U.S. firms (Manu, 2003), which was reflected in extremely generous terms to the U.S. firms Kaiser and Reynolds. Some of these terms were unfavourable for the host country: Demonstrating the possible drawbacks when a country's development projects rely extensively

on foreign capital. Such a development agrees with Amsden (2003) that as foreign capital becomes more important in a country's growth dependence increases. This is inimical to bargaining power and the realisation of the full benefits of project outcomes for host nations.

Insert Table 2 about here

Managing public-private partnership

Our analyses also show that a series of collaborations were forged between the government and the private sector. Nkrumah sought expertise from international agencies and professionals to help overcome the talent shortage experienced in the newly independent nation following the departure of many highly educated British nationals after independence. Although Nkrumah's policy was partly responsible for the departure of many British nationals after independence, it soon became evident that it was difficult to fill the skills gaps after their departure (Manu, 2003). Public-private partnerships, therefore, helped to fill the resource gaps. This resulted in multiple project participants with varying interests. Despite the bilateral government and sector interests the Volta River Project was expected to provide a sustainable source of electricity for economic growth and development.

Resource constraints meant that the newly independent nation placed greater emphasis on securing international support for the project. Nkrumah visited the United States in 1958 as part of his strategy to elicit the support of US and President Eisenhower (GhanaWeb, 2014). Following the visit, the Ghana and U.S. governments secured the services of Henry J. Kaiser Company, a US firm of consulting engineers to reassess the engineering elements and their potential costs (GhanaWeb, 2014). This was also surprising given that Nkrumah demonstrated

wariness and suspicions towards the private sector (Esseks, 1971a, 1971b). In March 1959, the report by Kaiser was delivered which recommended that the:

“Akosombo gorge, originally pinpointed by Kitson, provided and added that there was the possibility of smaller hydro-electric project at Kpong and Bui which could follow as and when the need arose” (GhanaWeb, 2014, p. nd).

Filling the expertise void was central in Nkrumah’s policy in the context of the Akosombo project.

“In 1962, the Canadian hydro engineer Frank Dobson was appointed as its first chief executive. Dobson brought a Canadian directness and hands-on approach that were quite different from the hierarchical and racialized structure of the colonial civil service ingrained in Ghana’s public administration” (Miescher, 2014b p. 186).

In stark contrast to Nkrumah’s approach of soliciting international experts for the project, many areas of the economy were characterised by “the Africanization of domestic industries” i.e. nationalisation of many foreign/western-owned businesses at independence. There are, however, some compelling arguments for the decision to adopt different policies for different sectors. First, the constriction policy can be explained by the factors that at independence Nkrumah recognised the lack of human capital expertise within his own political party and within the newly independent nation as a whole for this project.

Table 1 and Table 2 show a number of parties involved in the project. Underscoring and highlighting the importance of multiple state and multilateral organisations to ensure success of the project. The United Nations (UN)/Food and Agriculture Organisation (FAO) World Food Programme (WFP), for example, was actively involved in the resettlement programme. The

government accepted the need for external private and multi-lateral bodies that possessed requisite expertise and experience of such large complex projects. In addition, Nkrumah sought the support and collaboration of neighbouring countries including Upper Volta with the aim of gaining their support for the project and also bringing the communities around the lake together and into the jurisdictions of Ghana. Indeed, Nkrumah “was convinced that 'electrification' would trigger the industrialisation of the country” (Ergas, 1982, p. 535).

“By the time full Independence was achieved on 6th March 1957, extensive meetings had already been held between the government, the United Kingdom Government and two aluminium companies...The aluminium companies wanted to be assured of certain factors in advance – for example, the cost of power...depended on the conditions under which other Governments might lend Ghana money” (GhanaWeb, 2014, p. nd).

Faced with this puzzle, Nkrumah sought to strike the right balance by tapping into the talent pool from foreign organisations. Thus the main activity centres on the role of the dam in facilitating economic development. He was able to tap into the reservoir of talents offered by the close relationship with the United States. Although the local communities were initially supposedly displaced, the long-term aim was to provide gainful employment to many locals. New business opportunities emerged as a result of the dam and the development of the townships. More details on issues surrounding the planning and building of the Akosombo Township are shown in Table 3.

Insert Table 3 about here

Project completion

From the beginning, “the Akosombo hydroelectric project had six generating units, out of which four units with a total installed capacity of 588MW, including a 15% overload capacity, were completed in 1965 and the additional two, with installed capacity of 324MW, including 15% overload capacity, were completed in 1972” (Gyau-Boakye, 2001, p. 18). Within the local community, one study by Miescher (2014b, p. 184) made this observation:

“Ghanaians express pride about Akosombo, the large hydroelectric dam commissioned in 1966. They consider the Akosombo dam not only the most impressive testimony to the country’s development but also a powerful reminder of how the country’s first leader, Kwame Nkrumah, envisioned to reach the elusive goal of modernity”.

The Volta project is regarded as the country’s “greatest-ever undertaking” which led to the development of one of the world's largest man-made lakes (Davis, 2003). Although the dam project displaced around 80,000 local residences, the government developed a policy to resettle the people taking into account the social and environmental effects. During the 1970s, major steps were taken to maintain the conditions and functionality of the dam including equipment upgrading and repairs. It could be argued that political agitations from opposition parties and the air of political instability which ultimately ended Nkrumah’s regime prematurely also adversely affected the anticipated benefits of the Volta River Project. Related planned projects such as the development of infrastructure and transportation networks linking local and urban communities were not pursued. The end of Nkrumah’s political regime affected the pursuance of related projects. Although the main project continued to operate, the related projects aimed at getting the full benefit of the investment were not pursued by succeeding governments. The issue of new governments’ failure to continue the implementation of projects initiated by

preceding governments has become symptomatic of Africa's slow development since independence.

Discussion and Conclusions

The study attempted to shed light on how major projects unfold overtime in newly independent nations. Using the case of the Akosombo project, the study demonstrates how visionary leadership helped to usher in conditions for the Volta project to succeed. However, it can be argued that the Volta River Project was completed successfully, largely, due to the historical urgency at the time for the country to develop quickly and demonstrate to the local population the benefits of independence from colonial rule. It was also meant to showcase to the outside world the potential development post-independence. The Volta project and its timely completion stem from the leadership skills exhibited by Nkrumah in marshalling support from relevant stakeholders and mobilising national and international resources. This also entails galvanizing local support for the resettlement programme which helped to create a favourable environment for the project development, implementation and completion. However, it demonstrated that resource constraints of newly independent nations, for example, in finance and human capital adversely affect the operation and management of large infrastructure projects. Beyond visionary leadership there is the need for human capital development to support large infrastructure projects.

The study also serves as a yardstick to measure the impact and influence of Nkrumah in post-colonial Africa in initiating and implementing major projects. The present study also provided analysis of a host of factors that helped to mitigate failures and contributed to the successful completion of the project. Arguably, our study suggests that the success of a project should not be measured by the completion of the main infrastructure development project but how the

project is linked to short – and long-term economic development. In particular such projects and their outcomes need to be evaluated over a period of time for the potential historical lessons for future development. In addition, such projects may be more successful if host country firms could improve their bargaining power.

Consistent with prior scholarly observations (see Miller and Lessard, 2000), the study has shown that project formulation and successful implementation requires cross-functional and cross-national teams with different expertise and experiences. From public policy standpoint, the study lends support to the view that private-public collaboration can provide the engine for establishing infrastructure development for economic growth particularly in instances when the host countries lack the initial financial wherewithal. The important issue is for the host country governments to ensure that the lack of finance would not influence bargaining power negatively. The nuances inherent in the development of projects involving multiple stakeholders with unmatched resource bases and how resource constraints can affect long-term success and outcomes have been expatiated. The study also provides “new” insights on the role post-colonial governments played in planning and developing projects linked to national development. The study shows that the influence of host country leadership and foreign government involvement shape the nature, implementation, and outcomes of such large projects. The present study supports the hypothesis that government-private sector collaboration can be harnessed with respect to major infrastructure development projects aimed at economic development at the nascent stage of development.

Limitations and directions for future research

A number of important factors limit the degree of generalizability of the study. First, we limit the analyses to a single project within one country with unique historical events and cultural

features. Given that the nature of colonisation could have influenced development paths of newly independent countries, the generalizability of the findings to other countries is limited. Another limitation is that the study lacks first-hand accounts given that the project occurred several decades ago. There is the need for more current empirical studies that would compare the anticipated outcomes to the achieved benefits of such projects and how policy could have improved expected outcomes. For example, even though our present archival study showed a lot of challenges during the resettlement process, there has been no study that has evaluated the sustainability of the resettlements and the long-term social and economic impacts on communities. There is also the need to evaluate how lessons learnt could influence similar projects in current multi-party political dispensations within such developing countries.

Overall, our understanding of the issues surrounding the involvement of multiple stakeholders in large scale and complex development projects require further scholarly attention. In addition, there is room for future research to explore why many bold post-colonial initiatives often failed to reach the implementation or completion stages. It may be important for future studies to distinguish between the long-term consequences of such megaprojects for local populations and the economic benefits accrued by the nation as a whole. Such analyses could shed further light on the sustainable resettlement and relocation issues. It is hoped that the study would serve as an important starting point by which scholars of strategy, project management and business history could inject further energy in “bringing back history” into the international business and host country political and economic development discourse.

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Figure 1: The process of megaproject evolution

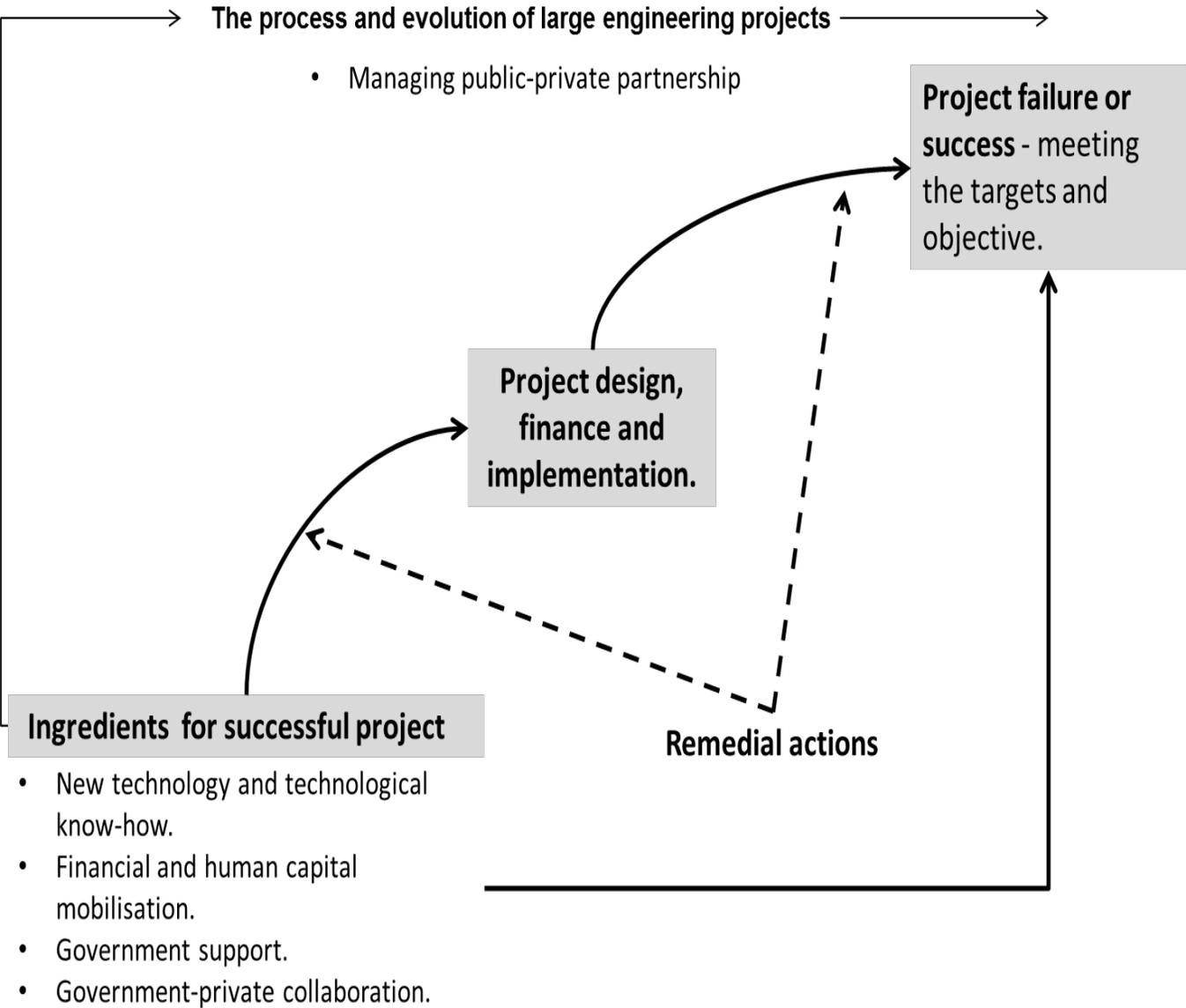


Table 1: The resettlement Process for the Volta River Project

Steps	Key events
1962	<p><i>Social survey:</i> Site selection opinion survey – gathering information on village groupings, houses and number of people to be resettled.</p> <p><i>Site Selection:</i> decision to select 48 new sites to resettle the population</p> <p><i>Clearing and Construction:</i> First resettlement village at Nkaw kubew, in the Eastern Region of Ghana – experimental programme to evaluate ‘nuclear’ type house for settlement.</p> <p>Construction section of the resettlement division of Volta River Authority (VRA) managed the process. Selected designs were submitted to the Ministry of Communication and Works and the Faculty of Architecture of the Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana. Survey of sites was done under general supervision of the survey division of the Ministry of communications and works. Three consulting engineering firms (Ostenfeld & Johnson, Berantende Architekten Und Ingenieure (BAI) and the Ghana Architectural and Civil Engineering Company) undertook the construction of a 250 mile of trunk road to replace flooded roads and improve access to new sites.</p>
1963	<p>Physical development and migration of people from villages to be flooded (by the Volta Lake) into the new areas was begun in August. Total number of houses completed by 31st December 1963 was 3,412 and 6,146 acres had been cleared.</p>
1964	<p>House construction peaked at 300 houses per week resulting in the completion of 8,500 nuclear houses creating a total of 11,747 houses representing roughly 91% of the projected requirement. Alongside, 388 classrooms, 396 market stalls, and 119 latrines were constructed in 41 settlements. In addition, the VRA reconstructed 131 miles, repaired 172 miles of existing roads in poor conditions and completed 144 miles of new road. Contractors involved include; A Kassardjian Limited, Asuama Contract Works, Combined Supplies and Constructions Ltd, Trans-Volta Togoland Development Contractors, and Maxwell Brothers Limited.</p> <p>By the end of year cumulative total of families evacuated came to 10,174 (as a result of the evacuation of 9,070 additional families to 44 new settlements).</p> <p>To enhance process of resettlement ‘Post Evacuation Development’ programmes, Self-Help Housing Completion</p>

	Programmes, Food Aid and Agricultural Development programmes were initiated.
1965	In April a six-month crash programme to complete 'nuclear' houses by adding rooms through technical aid and communal labour was begun. 10,121 rooms were added to 7,052 nuclear houses signifying 60% work completion. As at 31 st December 1965 total population resettled stood at 77,409, number of households 14,799, number of villages 757, and number of new settlements 52.
1966	<p>Details of population affected as at 31st December 1966 are as follows: population (77,442), number of households (14,805), Number of villages (758), number of settlements (52).</p> <p>United Nations (UN)/Food and Agriculture Organisation (FAO) World Food Programme (WFP) food aid project started in December 1965 and run the whole of 1966.</p> <p>Community development assistance was provided by the Department of Social Welfare and Community for most of the year. In addition witnessing and church services were organised by the Christian Council of Ghana.</p>
1967	<p>Due to inadequate farmland, government responded to settlement farmers' petition to be exempted partly or entirely from paying annual local council levies by accepting UN/FAO WFP recommendations. WFP appraised the Volta River Resettlement Project from the 17th February to 10th March.</p> <p>A total of 12,951 families were evacuated by the end of the year, with 1,896 more families outstanding.</p>

Source: VRA Annual Reports (1962-1967); Lawson, 1968; Decker, 2011; Owusu-Ofori & Obeng-Odoom, 2015

Table 2: Factors that influenced the Volta River Project

Factors	Details
Contractors	Kaiser Engineers from the U.S. and Impregilo, a consortium of Italian firms, were responsible for the construction. Dam and power station component parts were sourced from various countries. Hitachi Limited of Japan supplied turbines and Canadian General Electric the generators. UK firm, Chicago Bridge Ltd. produced the penstocks (water flow tubes to turbines) and the gantry cranes (for maintenance work on the power station) were made in Austria whilst substation equipment came from Italy.
Smelter	The smelter was built, owned and operated by a partnership. Kaiser Corporation owned 90% and Reynolds Metals 10%. In terms of aluminium production these two US firms were ranked third and fourth in the world only behind Aluminium Company of America and ALCAN.
Project Financing	Half of the costs of the dam and power stations were financed by the Government of Ghana. The other half (managed by the VRA) was raised from loans from the World Bank, the US Agency for International Development and the US Export-Import Bank. Three quarters of the costs of the smelter was financed by the US Export-Import Bank, while Kaiser and Reynolds provided the rest which was fully guaranteed against risk by the US Government.
Agreement	Concessions on Master Agreement between the Government of Ghana and the owners of smelter include: <ul style="list-style-type: none"> (a) No import duty on alumina or other materials to be used in the construction or operation of smelter until April 1980. (b) No restriction or taxation of aluminium exports. (c) No payable company tax until October 1978. Afterwards tax rate agreed on 2 January 1961 to be paid until 1997. (d) Dividends to be free of tax until April 1980. <p>Note: - Terms extremely generous terms and would ensure Kaiser and Reynolds recoup investment more quickly.</p>
Resettlement problems	The lake inundated an area occupied by about Eighty thousand people; about sixty-eight thousand were placed by government agencies in resettlement villages over the period 1964-66 with roughly twelve thousand resettling themselves.

	<p>By 1968 FAO survey suggested that only about twenty-six thousand remained in the resettlement villages with some forty-five thousand people moving within a period of four years. The reasons are not hard to find but could include:</p> <ul style="list-style-type: none"> (a) Inadequate housing provision: Settling families were given a one-room “core” house which they were expected to complete, but could not obtain materials to build the extra rooms. (b) Inadequate farming land provision: 128,000 acres of land had been used productively in the flooded basin. By 1972 only 16,700 acres had been cleared for agricultural use in resettlement villages. This adversely affected subsistence farmers who had to find livelihoods elsewhere despite a substantial inflow of food aid. (c) Inadequate compensation: Despite being promised compensation for crops, buildings and land flooded by the new lake, most displaced people received virtually no payment. Whilst some received derisory amounts for the crops and buildings no compensations were paid for lands. (d) Inadequate commitment: Not enough money, time or effort was invested into the scheme, which was seen as peripheral to the aluminium and electricity ventures. The Volta River Project, consequently, made life worse for the 80,000 displaced people. (e) Poor Public health management: Another problematic side-effect was the spread of schistosomiasis (or bilharzia) around the Volta Lake. The transmission of the disease depends upon frequent contact of human beings with the still or slow-moving water in which the snails live. Before formation of the Volta Lake, infection rates in the area were 1% to 5%. By 1968 this had increased to 80% with 100% prevalence in particular villages.
Negotiation positions	<p>Kaiser was initially advisers to the Nkrumah Government but soon became involved in the construction of the dam and the operation of the smelter. The Kaiser corporation, therefore, used their huge bargaining power to get very good terms and a supply of cheap hydroelectricity for their operations. Kaiser could easily have gone elsewhere if the negotiations over the Volta River Project did not favour them since bauxite and hydroelectric potential were numerous worldwide.</p>

Source: VRA Annual Reports (1962-1967); Hart, 1980; Noer, Manu, 2003; Decker, 2011;

Table 3: Planning and building Akosombo Township

Year	Activities
1960	¹ Doxiadis Associates was hired to draw up the master plan for the new township. Its founder, Constantinos Doxiadis, sought-after urbanists, drew the final plan for Tema, Ghana's new industrial city adjacent to the deep-sea harbour outside Accra, the capital by 1960.
1961	² Ghana's National Assembly passed the Volta River Development Act, which created the VRA as a statutory public utility corporation with the task 'to plan, execute and manage the Volta River development'. The Act placed the Akosombo Dam, the Volta Lake and its environment, and the Akosombo Township under VRA jurisdiction. Duties encompassed electricity generation for industrial, commercial, and domestic use, as well as the operation of transmission lines.
	³ The Akosombo Township, in Doxiadis' planning, was earmarked as part of the 'Accra-Tema-Akosombo Triangle' meant to integrate the population and economic potential of the nation's capital, the industrial port city, interconnected by a motorway and the hydroelectric power inland at Akosombo.
1962	⁴ Upper Akosombo, called Community 1 in the master plan, situated at an elevation of 400 feet overlooking the dam site provided privileged housing for expatriate engineers and supervisors. By 1962, 81 housing units for high incomes earners had been completed. The other Akosombo, Community 2 (for low income dam workers), was located below a wooded slope and closer to the river. In 1962, it consisted of 157 family and 786 one-room bachelors' housing. The township's development, during dam construction over a five-year period, anticipated a workforce with dependents of about 20000 people living in two residential communities

¹ Doxiadis Associates, revising earlier planning, envisioned Tema to become a city with 250000 inhabitants in 25 years; see Doxiadis Associates, 'The town of Tema, Ghana: plans for two communities', *Ekistics*, 13 (March 1962), 159-71; E. C. Kirchherr, 'Tema 1951-1962: The evolution of a planned city in West Africa', *Urban Studies*, 5:2 (1968), 207-17; and now V. d'Auria, 'From tropical transitions to ekistic experimentation: Doxiadis Associates in Tema, Ghana'

² (a) Volta River Development Act, 1961, (Act 46), Sect. 10 (I). (b) *Ibid.* Sect. 14 (I).

³ Kirchherr, 'Tema', 215. See also DA, files 24494 and 24414, 'Accra-Tema-Akosombo regional programme and plan: Final report', 22 Feb. 1961, DOX-GHA 12, and 'Accra-Tema-Akosombo final programme and plan for the metropolitan area: Summary report', 24 Feb. 1962, DOX-GHA 14.

⁴ VRA-Library 711-4 (667) D75, Doxiadis Associates, 'Akosombo master plan', 8, 10 and 20.

1963	<p>⁵The government constituted the VRA into the local authority of the Akosombo Township. The VRA hired Doxiadis Associates as consultants and appointed A. B. Futa, a seasoned administrator, as the first town manager.</p> <p>⁶In the early part of the year there was only one school in the township, the exclusive Akosombo International School of Community 1, which enrolled children of expatriate and senior Ghanaian staff. Some children of other workers attended poorly staffed crowded schools, over two miles away, in Amangoase.</p>
1964	<p>⁷Futa opened the Community 2 primary and middle school with an enrolment of 400 pupils with a kindergarten for children aged four to five as a less expensive alternative to day nursery.</p>
1965	<p>⁸The VRA commenced power generation in September 1965, a few months after Impregilo completed the dam. Soon thereafter, the township was connected to the grid making electricity one of its indicators of industrialisation and modernity.</p>

⁵ VRA-A Service Department & Registry (SD-R)/356, Agreement between VRA and Doxiadis Associates, 24 Sept. 1962.

⁶ VRA-A RMT/128, Alice A. Appea, 'Welfare officer's report for December 1962', Jan. 1963.

⁷ VRA-A MSD/94, Resident Manager, Akosombo, to Chief Executive, June 1964, 2.

⁸ 'Akosombo area gets power', Ghanaian Times (Accra), 13 Oct. 1965.