

Financing a Public-Private Partnership Project: The Case of the Accra Sewerage System

Prince Elisha Nsiah-Asamoah¹, Dr. David Ackah, PhD²

¹PhD. Student, Business University of Costa Rica

²President, Institute of Project Management Professionals

Email: nanayawghgh@yahoo.com| drackah@ipmp.edu.gh

Abstract

Project finance is the long-term financing of economic infrastructure and industrial projects based upon the projected cash flows of the project rather than the balance sheets of the project sponsors. Projects can be financed with equity from one or more sponsoring firms and non-recourse debt for investing in a capital asset - to own and invest in the project. Equity and debt instruments such as shares, venture capital, institutional investors, bonds, loans and debentures serve as sources of funding for infrastructural and developmental projects. Other specialized sources for funding projects are grants, crowd funding and peer-to-peer funding. Project finance creates value by reducing the costs of funding, maintaining the sponsors financial flexibility, increasing the leverage ratios, avoiding risk, reducing corporate taxes, improving risk management, and reducing the costs associated with market imperfections. It involves non-recourse financing of the development and construction of a particular project in which lenders look to the revenue expected to be generated by the project for repayment of its loans and to the assets of the project as collateral for its loan rather than to the general credit of the project sponsor. Project finance has its own challenges especially Public Private Partnership Projects. Public Private Partnership for developmental and social infrastructures involve the private sectors in the designing, building, financing and operating public infrastructure in institutional sectors such as power generation, transportation-roads, or railways, water supply, energy, hospitals, sanitation, waste management, affordable houses and schools.

Public Private Partnerships (PPPs), project financing for public infrastructure, are now emerging as a viable source of infrastructure investment in developing countries. A successful PPP arrangement capitalizes on the strengths of the private and public sectors to provide a better and more cost-effective public service, and speed up the rate of its implementation or coverage. The growth in PPPs has been attributed to several reasons, including increased efficiency in project delivery and operation; reinforcing competition; access to advanced technology; and reducing government budgetary constraints by accessing private capital. Sewerage fecal sludge waste management is an emerging issue in urban sanitation and is fast becoming an insurmountable challenge across Ghana, requiring urgent solutions and access to sewerage network. Rapid urbanization and migration to cities results to the inability of local districts assemblies to tackle its sewage systems and use of safety toilets at houses. In order to come up with viable solutions to this problem in Accra the capital of Ghana, Accra Sewerage Systems an Engineering Procurement Construction company initiated public-private partnership to construct the sewerage system at Korle lagoon popularly called "Lavender Hill" in Ghana.

The Accra Metropolitan and Government of Ghana are the beneficiaries of the project. Therefore, this participatory research was undertaken to investigate the project financing of Accra Sewerage System, its operations and environments in which it was carried out, the budget model used by Jospong Group of Companies in collaboration with Government of Ghana under the Public Private Partnership sector operations. The target population was focused group participation of key stakeholders such as project managers, staffs of Accra Sewerage Systems and Accra Metropolitan Assembly and other stakeholders from various public and private institutions close to the project. Face to face, interviews for focused group and discussions were conducted between the researcher and a sample size of 200 respondents and data collected was analysed. The research findings prove that the project sources of funding were from; Internal Generated Funds from the Jospong Group of Companies, Bank Loans, Equity financing from Owners and Grant from the government of Ghana and its development partners.

The data collected indicated that Accra Sewerage Systems Project was financed with a total cost of \$25,000,000 and \$500,000 cash inflows from Ghana Government for management and operational cost. It was therefore necessary to look into the project viability and its payback period since Internal Generated Fund (IGF) from the Jospong Group and Bank Loans was the source of funding to the project. In analyzing the project viability and payback, it was therefore necessary to apply the project-financing model known as the Payback Period. Therefore with an initial investment of \$25,000,000 and \$500,000 cash inflows from Ghana per month: As against the payback period decision "accept the project only if its payback period is less than the project performance duration". It is therefore known that, an initial investment of \$25,000,000 will be paid within fifty (50) months as against the project performance duration. It is true that the Accra Sewerage System Project was a viable project with a payback period estimated to be approximately 8 years. The findings of the study also reveal that the three major impacts of the Accra

Sewerage System Plant within the communities; the project have improved the living condition of the people, aquatic life, the project has stopped the nuisance of disposing raw faecal into the sea and the project has eliminated bad stench from the community. Furthermore, the respondents indicated that the social impacts of the plant have brought is an improved tourism business in the community and has help community members to be more responsible. The Plant treat human faecal wastes without any health or environmental impacts meeting environmental and regulations and standards for faecal management.

Keyword: Project Financing, Sewage System, waste management, faecal waste treatment, Public Private Partnership

1. INTRODUCTION

Ghana's economy has enjoyed a high rate of economic growth over the past decade, compared with other African Countries. Ghana is tipped to lead Africa as the fastest growing economy in 2018, with a growth rate of 8%, because of increased oil and gas production. This will boost the economy and increase infrastructural developments in the country, including domestic electricity production as well as exports revenue (Nagy, H., Káposzta, J., Neszmélyi, G. I., & Obozuwa, O. G. 2018; Parker, S. C. 2018). The change in growth is attributed to rising commodity prices, fuelled by expanding demand in the global economy (myjoyonlineJan16, 2018). In the bid to maintain continuing growth, Ghana has increased electricity provision, road construction, sanitation facilities and telecommunication networks (Pinz, A., Roudyani, N., & Thaler, J. 2018). Financing of infrastructural projects is not only from proceeds from natural resources and tax revenues, but also from private funding and international donor agencies (Owusu-Manu, D. G., Edwards, D. J., Kutin-Mensah, E. K., Kilby, A., Parn, E., & Love, P. E. 2017). The scarcity of financial resources for undertaking infrastructural projects by both the public and private sectors forms the basis for the advocacy by various sectors of the economy for efficient financial management and use of resources in project implementation (Ahmad, E., Bhattacharya, A., Vinella, A., & Xiao, K. 2018; Barr).

Project finance refers to the financing of long-term infrastructural projects and public services on the basis of a non-recourse or limited recourse financial structure. The project debt and equity used to finance the project are paid back from the cash flow generated by the project. It involves non-recourse financing of the development and construction of a particular project in which lenders look to the revenue expected. The revenue generated from the project is used to repay its loans; and the assets of the project rather than the general credit of the project sponsor are used as collateral for its loans (M. J., & McClellan, G. S. 2018; Humphreys, E., van der Kerk, A., & Fonseca, C. 2018). Project financing encompasses the legal work required for the development, the equity and non-recourse debt financing as well as the construction, operation and maintenance of major industrial infrastructural projects. These infrastructural projects include sewerage treatment plants, power plants, water plants, hydrocarbon processing and chemical plants, pipelines, transmission lines, toll roads, airports and other social developments needed in a country (Osei-Kyei, R., Chan, A. P., & Dansoh, A. 2017; Yescombe, E. R. (2017); Ameyaw, E. E., & Chan, A. P. 2015; Lambrecht, I. B., & Ragasa, C. 2018).

Project funding and project financial engineering have significant impact on the project cost, the cash flow and the success of the project. Few project managers have more than a rudimentary understanding of this important element of overall project management strategy (Larsen, J. K., Shen, G. Q., Lindhard, S. M., & Brunoe, T. D. 2015; Fleming, Q. W., & Koppelman, J. M. 2016; Kerzner, H., & Kerzner, H. R. 2017). It is important to recognize that the means an organization uses to finance its projects can have a huge impact on its ability to successfully control costs, manage its cash flow and maintain an acceptably positive degree of value for the project. Project managers who do not select a useful type of financial model for financing their investment projects can greatly compromise the ultimate worth of their projects (Larsen, J. K., Shen, G. Q., Lindhard, S. M., & Brunoe, T. D. 2015; Fleming, Q. W., & Koppelman, J. M. 2016; Kerzner, H., & Kerzner, H. R. 2017). Public private partnerships (PPP) are institutions that use public policies, regulations or financing to leverage private sector financing. The characteristics of PPPs for financing projects include:

- A contractual relationship between a public entity and a private organization,
- The allocation of risks between the public and private partners, consistent with their willingness and ability to mitigate risks, in order to encourage the private partner to mobilize financing,
- The mobilization of increased financing,
- Payments to the private sector investor for delivering the services

2. LITERATURE REVIEW

2.1 Project Financing

Project finance is the process of financing infrastructure and industrial projects based upon the projected cash flows of the project rather than the balance sheets of the project sponsors. It involves non-recourse financing of the development and construction of a particular project in which lenders look to the revenue expected to be generated by the project for repayment of its loans and to the assets of the project as collateral for its loan rather than to the general credit of the project sponsor. Other theories define project financing as the creation of a legally independent project company, financed with equity from one or more sponsoring firms and non-recourse debt for investing in a capital asset. The project company invests only in the particular project for which it is created and the project debt is structured without recourse to the sponsors (Nevitt and Fabozzi, 2000; Esty, 2004; Boardman, A. E., Greenberg, D.

H., Vining, A. R., & Weimer, D. L. 2017; Delmon, J. 2017; Nicholas, J. M., & Steyn, H. 2017). The use of debt instruments such as bonds, loans and debentures serves as a source of funds for developmental projects (Lasa, Y. M., Takim, R., & Ahmad, N. 2018; Stowell, D. P. 2017). Equity instruments such as shares, and venture capital investors serve as sources of funding for infrastructural and developmental projects (Boardman, A. E., Greenberg, D. H., Vining, A. R., & Weimer, D. L. 2017). Other specialized sources for funding projects are grants and crowd funding (Hope, O. K., & Vyas, D. 2017). The economic criteria for appraisal comprise financial metrics decision making, the criteria for investment appraisal, such as the Net Present Value (NPV), the Internal Rate of Return (IRR), the Return on Investment (ROI), and the Payback Period (PP), (Pasqual et al., 2013). These financial metrics are tools used in appraising the economic viability of projects (Nicholas, J. M., & Steyn, H. (2017).

Payback period is the most common approach to project selection (Kivilä, J., Martinsuo, M., & Vuorinen, L. (2017). It considers how rapidly the project returns the initial investment in the project (Kerzner, H., & Kerzner, H. R. 2017). Although easy to understand, the payback method does not take into account the time value of money. The use of Net Present Value (NPV) in industry for project valuation is also commonplace (Wiesemann et al. 2010), and it is endorsed as a theoretically correct decision criterion in corporate financial theory (Brealey, Myers and Allen 2011; Berk and DeMarzo, 2011). It is the difference between the present value of cash inflows and cash out flows over the period. The Internal Rate of Return (IRR) is used in place or in conjunction with the Net Present Value (NPV) and other criteria such as the payback or residual income for investment evaluation (Magni, C. A. 2015). IRR is the interest rate at which the net present value of all cash flows from a project equals zero. It is the breakeven point of a project Net Present Value (NPV). The NPV and IRR are two of the most important criteria for choosing among investment projects (Padilla et al, 2013). In many circumstances, investment projects are ranked in the same order by both criteria –thus NPV and IRR. Li et al., (2013), considered NPV and IRR as indexes for evaluating the investment risk (Boardman, A. E., Greenberg, D. H., Vining, A. R., & Weimer, D. L. 2017).

Sensitivity analyses of the Internal Rate of Return (IRR) in some economic situations provided some evidence. This is in support of the contention that the results of sensitivity analysis of Net Present Value (NPV) and Internal Rate of Return (IRR) may differ substantially (Percoco and Borgonov, 2012). The general approach in determining to accept or reject decisions for a project via investment appraisal techniques, such as the NPV and the IRR, is to treat the cash flows as known with certainty (Bas, 2013; Petković, D. 2015; Gotze, U., Northcott, D., & Schuster, P. 2016). Practically, project finance has two main types, Greenfield and brownfield. According to Ernst and Young (2015), “Greenfield project refers to an asset or structure that needs to be designed and constructed, where no infrastructure or building previously existed, and brownfield projects involve an existing asset or structure that requires improvement, repair or expansion”. Gardner & Wright (2012) point out that, generally, the execution of greenfield projects should take 12 to 18 months to secure funding. A large proportion of equity investors refuse to invest in Greenfield projects. They prefer investment in operational brownfield projects. While investments in well-managed greenfield projects can provide assets dynamics influence and high return on capital, the focus of greenfield investors has been biased towards renewable energy and PPP projects (Marsh and McLennan, 2015).

2.2 Characteristics of Project Financing

Due to a number of reasons, project developers and project sponsors choose project financing. A typical project-financing model has certain features that can be identified with. The characteristics of project financing are;

- Special Purpose Vehicle (SPV): this is an entity created by a parent company to undertake specialized operations; and it is protected from the financial risk of the parent company. SPVs are created for purposes of risk sharing, protection against creditors and bankruptcy and securitization. SPVs provide the parent company with tax savings and isolated financial risk.
- Limited Recourse (LR) or Non-Recourse (NR): Projects with limited recourse prevent the lender from going after the assets of the borrower when the collateral asset used in securing the loan cannot fully payoff the indebtedness. Limited recourse facilities favour borrowers, whilst lenders prefer recourse loans.
- The Leverage Project Finance (LPF) always has an element of indebtedness. The huge initial capital required to start projects pushes project developers to source funds using either equity or debt. Project companies use more leverage when the project risk is high (Byoun et al; 2013)

2.3 Project Finance Life Cycle

The Project Life Cycle (PLC) is the process followed by all project managers in completing a project. It provides a framework for managing any type of project. The project life cycle is a standard procedure used by teams to achieve success on a project (Turner, J. R. 2014; Kerzner, H., & Kerzner, H. R. 2017). Project Finance Life Cycle (PFLC) is the process through which funds are solicited for the development of projects. It starts with fund sourcing where the project company identifies and solicits funding for the project (Kerzner, H. 2017). During this stage, the company considers the type of funding required and is available for the project. After sourcing for funds, the project company will prepare a proposal for the development of the project. The proposal will specify how the funds will be used to develop the project, the project costs and the expected revenue from the project (Levitan, B., Getz, K., Eisenstein, E. L., Goldberg, M., Harker, M., Hesterlee, S., & DiMasi, J., Kerzner, H. 2018). Accepted project proposals get the required funds. In providing the necessary funding, the investor will sign a contract with the project developer through loan agreements or other contractual agreements. Such agreements ensure that the projects terms and conditions of the loan agreement (Delmon, J. 2017; Salacuse, J. W. (2017).

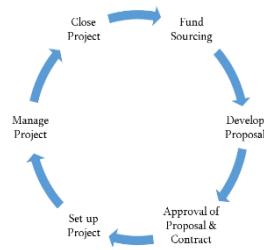


Fig 1: Project Cycle

The projects are developed when funds are released from the investor or sponsor. The setting up of a project requires that the project is constructed by the project specifications under the project charter. After the completion of the project, it is managed to generate enough revenue to pay off the investors. The project is closed once all outstanding investor funds are paid, or as stipulated under the loan agreement.

2.4 Project Development Financing

Project financing is increasingly becoming complex in today's dynamic environment. A range of factors, such as geopolitical, commercial, legal, environmental and social challenges, is considered in project development financing (Lasserre, P. 2017). In project development financing (PDF), the Project Finance Cycle (PFC) — from the initial structuring and project development to financing — is considered. Other issues such as joint ventures, project mergers, acquisitions, dispositions and project restructurings also affect project development financing. Project development involves planning, organizing, coordinating and controlling the project team from the sourcing of funds and initiation to the closing of the project (Heagney, J. 2016; Turner, R. 2016; Harrison, F., & Lock, D. 2017; Nicholas, J. M., & Steyn, H. 2017).

2.4.1 Advantages of Debt Financing

The use of debt as a source of financing provides a number of benefits as follows:

- Debt finance provides the borrower complete control and access to the business or project. The project sponsor does not have external interference from the lenders. This provides the borrower the ability to run the project and generate the required returns without external influence.
- The use of debt finance exempts the project sponsor from paying huge taxes. Loan repayments are classified as expenses, which are not taxable. This allows the funds saved to be used in developing the project.
- Debt financing provides low interest rates to borrowers compared with other sources of finance such as equity.
- The use of debt finance facilitates planning. The borrower knows well in advance the amount of principal and interest to pay at any point in time per the loan repayment schedule.

2.4.2 Disadvantages of Debt Financing

Although debt financing provides borrowers with benefits, it also has drawbacks.

- Debt financing requires borrowers to make loan repayments. The project developer therefore has to ensure that the project generates the required revenue to be able to service the loan. The inability of the project to generate the required revenue will affect the cash flow of the project.
- Defaults in making the agreed payments will affect the credit rating of the project. This will affect the ability of the project to secure future loans.
- The assets used by the borrower as collateral in the loan agreement can be lost to the lender in the event of default.

2.5 Risks in Financing Projects

Investments are associated with risks. Investors are ready to choose very high risks, which generate very high returns (Guiso et al, 2018). Individual projects present risks to investors, which vary from project to project. The risk in financing a project will determine the nature of project, its location and the parties involved in the project. The risks in project finance are construction risks, operational risks, supply risks, authorisations/regulatory risks, foreign exchange risks, credit risks and political risks (Taylan, O., Bafail, A. O., Abdulaal, R. M., & Kabli, M. R. 2014; Binder, J. 2016; Weber, B., Alfen, H. W., & Staub-Bisang, M. 2016).

Construction Risks: These are risks relating to ensuring that projects undertaken on the basis of proper and timely construction expectations of all parties. The need to complete projects over the construction schedule is crucial to satisfying the obligations of the project finance agreement, generating revenue to fund the loan repayment schedules. Delays in construction, cost overruns and performance shortfalls in the construction of the project give rise to construction risks (Burtonshaw-Gunn, S. A. 2017).

Operational Risks: The operational risks occur or might not after completion and handing over of the project. The constructed project must be operated and maintained in such a way that the expected cash flows generated from the project can repay the loans. To prevent operational risks from occurring, the project sponsor has to ensure the engagement of a competent manager, undertake insurance and provide extensive reports on obligations and inspections (Lee, C. W., & Zhong, J. 2015; Williams, T. 2017).

Supply Risks: Projects are constructed with third parties services, raw materials, equipments and suppliers from different sources. The delay from any of these parties during the project construction either caused by supply interruptions, or cost overruns from price volatility in raw materials and other commodities used in the project. The non-availability of raw materials throughout the lifetime of a project will cause the project to face supply risks. To address some constraints, projects are undertaken with long-term supply agreements and qualified suppliers to mitigate these risks (Almeida, H., Hankins, K. W., & Williams, R. 2017; Furlong, C., De Silva, S., Gan, K., Guthrie, L., & Considine, R. 2017; Liu, J., Jin, F., Xie, Q., & Skitmore, M. 2017).

Authorisations/Regulatory Risks: Risks associated with authorization or regulatory result from projects where governmental licenses, environmental, fire and approvals permits are required to construct or operate. In undertaking such projects, the procurement of the licenses, permits or approvals must be initiated before starting the development of the projects or paying for the costs of the projects. Approvals can come later (Almeida, H., Hankins, K. W., & Williams, R. 2017).

Foreign Exchange Risks: Exchange rates affect the financing of projects across different economies. The project sponsor must consider foreign exchange risks that can be triggered through currency devaluation/depreciation and currency inconvertibility. The volatility in exchange rates can cause cost overruns in projects, which can affect the budget of the project sponsor (Liu, J., Jin, F., Xie, Q., & Skitmore, M. 2017).

Credit Risks: Credit risks in project finance occur when project developers undertake projects with long gestation periods. Large scale and capital-intensive projects usually require huge upfront investments. Such projects are able to generate revenue to cover costs over the long term (Scorge, 2011). The providers of funds for projects face the risk of

default in the short term, on the part of the project developers (Almeida, H., Hankins, K. W., & Williams, R. 2017; Furlong, C., De Silva, S., Gan, K., Guthrie, L., & Considine, R. 2017).

Political Risks: Financing capital intensive and large-scale projects exposes investors to political risk. Political interference from host governments in emerging economies has driven investors to require guarantees from these governments. Investors have therefore resorted to the use of multilateral development banks and export credit agencies (Scorge, 2011; Brink, C. H. 2017; Giambona, E., Graham, J. R., & Harvey, C. R. 2017).

2.7 Challenges in Financing Projects in Ghana

Financing projects in Ghana has been a challenging. The high cost of credit and limited access to finance are the main challenges facing project developers in the country. High cost of credit affects project operations, cost and profitability of projects, which have long gestation periods. Project developers who are not able to generate enough revenue from the operations of the project stand the risk of losing assets used as collaterals (Ofori, P. A., Twumasi-Ampofo, K., Danquah, J. A., Osei-Tutu, E., & Osei-Tutu, S. 2017; Danquah, J. K., Analoui, F., & Koomson, Y. E. D. 2018). Limited access to finance by project developers from various sources of funding can affect the financing of projects. This is due to inadequately resourced financial institutions. In addition, poor macro-economic indicators also discourage the granting of credit for project development (Dansoh, A., Frimpong, S., & Oteng, D. 2017).

Projects' Operational Risks: Operational risk arises from poor project implementation and processes. These processes include procurement, sourcing, construction, engineering and financing. Project risk affects the project deliverability. Such risks are set out in the project charter (Taylan, O., Bafail, A. O., Abdulaal, R. M., & Kabli, M. R. 2014; Binder, J. 2016). In project construction, predicting and managing operational risks are very crucial to the survival and completion of the project. In handling such risks, Krane & Olsson (2009) recommended that reducing the probabilities and consequences of risks are alternative options, apart from identifying the opportunities and threats of the project. The extent of operational risk will depend on the project's impact (Weber, B., Alfen, H. W., & Staub-Bisang, M. 2016). Generally, the degree of operational risks is a function of the size of the project and the risk management framework of the project. The project sponsor must ensure that the company undertaking the project has the right workforce and expertise to undertake the project. Analysis of competence will prevent structural and project failures (Weber, B., Alfen, H. W., & Staub-Bisang, M. 2016).

Project Markets Risks: Project market risks identify with inflation, interest rate, foreign exchange and commodity market transactions and other indicators whose prices are set by market forces. The prices of raw materials and machinery as well as the salaries of project staff that make up the project cost are influence by market risks (Kwaning, C. O., Nyantakyi, K., & Kyereh, B. 2015; Bascom, W. O. 2016). Undertaking projects in a developing country such as Ghana requires taking considerable measures against market risks. Failure to account for such risks causes time and cost over-runs (Savage, 2012; Hirst, P., Thompson, G., & Bromley, S. 2015; Sornette, D. 2017). Exchange rate risk arises when projects are conducted in currencies other than the currency of the country where the project is being executed. This affects project costs and profits as well as presentation of financial information. The use of financial derivatives such as equity financing can help mitigate the effects of foreign exchange risk. Interest rate fluctuations affect the cost of funding projects. Interest rate increases raise project cost and reduce profits. The use of interest rate swaps ensures that interest rate risk is addressed. Changes in the prices of raw materials and other commodities on the world market are mitigating the use of commodity derivatives (Bascom, W. O. 2016; Labys, W. C. 2017; Edwards, R. D., Magee, J., & Bassetti, W. H. C. 2018).

2.8 Different Theories

Raising Project Capital: Project financing involves financing capital-intensive projects on the basis of long-term cash flows, using a leveraged structure. Raising funds to undertake such capital-intensive projects is challenging due to the strict and changing requirements of capital providers. These challenges have resulted in high cost of borrowing capital from market, making raising project capital difficult. In the currently changing business environment, the use of various forms of debt and equity instruments to raise capital has been a critical factor in determining project performance and project costs (Lasa, Y. M., Ahmad, N., & Takim, R. 2015; Pinto, J. 2017; Yu, P. S., Chen, Z. Z., & Sun, J. 2018).

PPP Projects: Public-Private Partnerships (PPPs) have enjoyed a global resurgence and have become icons of modern public administration (Hodge and Greve, 2009). In recent times, the rising infrastructural needs, coupled with

budgetary constraints of governments, have caused policy makers to seek innovative ways of financing public infrastructure. Among the available options is the use of private sector finance and expertise in the provision of public infrastructure and services through public-private partnerships (Carbonara et al, 2015). Several researchers and industry practitioners, with slight variations (Cuttaree and Mandri-Perrott, 2011), have defined public-private partnerships (PPPs). According to FHWA (2004), a public private partnership is a “long term contractual agreement formed between public and private sector partners, who allow more private sector participation than is traditional. The agreements usually involve a government agency, contracting with a private company, to renovate, construct, operate, maintain or manage a facility or system”. However, Brinkerhoff and Brinkerhoff (2011) argue that the function specific definition of public-private partnerships, which focuses on the provision of infrastructure financing, construction, operation and maintenance, limits its scope. They suggest that a mutual commitment between the public entity and the private organization is the key. The features of a public private partnership are the allocation and sharing of risk among the parties (Ke et al, 2010), the long-term partnership (Middleton, 2000) and availability of resources (Akintoye et al, 2003).

2.9 Public Private Partnership (PPP) Projects in Ghana

The government of Ghana, faced with monumental infrastructural development needs and public service delivery challenges, adopted the use of Public-Private Partnerships (PPP), thereby freeing government resources for other equally important purposes. In furtherance of this policy stance, the Government of Ghana, through the Ministry of Finance (MOF), developed a national Public- Private Partnership Policy. This policy covered all sectors and levels of Government- Metropolitan, Municipal and District Assemblies (MMDAs) Ministries, Departments and Agencies (MDAs)- and sector specific needs. The public private partnership ideology has been used in Ghana over the past two decades, with the participation of the private sector in developmental projects. However, the government adopted PPP as a national policy in 2004 when the National Public-Private Partnerships Policy Guideline was launched (MOFEP, 2011). Due to insufficient technical expertise and weak institutional structures (Osei-Kyei and Chan, 2016), the policy was revitalized in 2011 by the Ministry of Finance, through the establishment of the Public Investment Division of the ministry. With the support of the World Bank, the PPP policy was enacted into law, to facilitate the implementation of the PPP policy. The PPP law was expected to provide a sound and sustainable way of improving PPP preparation, procurement and management.

The absence of clear government policy guidelines and procedures, immature financial markets, unstable economic conditions, misallocation and incomplete transfer of risks and high participation and transaction costs are the main challenges facing PPP in the country (Chan et al, 2010; Ismail & Haris, 2014; Osei-Kyei & Chan, 2015). Public-Private Partnership arrangements in Ghana are guided by principles that ensure cost efficiency and service quality. The guiding principles are value for money, risk allocation, ability to pay, local content and technology transfer, safeguarding public interest and consumer rights, environmental, climate and social safeguards, clear objectives and output requirements, accountability, transparency, competition, contracting authority, ownership and commitment and stakeholder consultation (Yescombe, E. R. 2018).

3. METHODOLOGY

Borrego et al. (2009) establishes that no particular research method is better than another. The choice to use a particular method is driven by the research problem. In this study, the researcher seeks to determine how the project was financed, the payback period after completion of the project and the period it has been in operation. The instrument used is a research questionnaire. This was designed to provide anonymity for participants and encourage them to provide honest answers. The questions are in a closed-ended form to make them easier to answer. The questionnaire is tailored to how the project was financed and the return on investment to the investor. The questions are in a closed-ended form to make them easier to answer. They seek to obtain the following items of information from participants; demographic data, the financial model used in financing the Accra Sewerage System, the type of PPP contract used in financing the Accra Sewerage Systems, the risk in financing such a project and the environmental impact of the project in the surrounding communities.

Sources of Data: Two sources of data will be used in this research work to provide the necessary input for analysis to arrive at an outcome for the research. These two types of data were primary data and secondary data. The primary data was collected specifically from respondents on the topic: Investigating the Project Financing of Accra Sewage System, its operations and the environments in which is carried out using the financial budget model in the Jospong Group of companies in collaboration with Government of Ghana under the Public Private Partnership sector operations. Data collection through administering the questionnaires distributed to project managers, staff of the Accra

Sewerage Systems, selected staff of the Accra Metropolitan Assembly, neighbouring communities surrounding the project site and other stakeholders from various public and private institutions. Secondary data is information sourced from other alternatives by the researcher. For this study, the secondary data obtained is from various publications by authors who have written on the topic under consideration. These publications include periodic journals, textbooks, various government reports, company websites and online data sources. All cited materials are duly acknowledged in the references.

Target Population: The target population for this study consists of project managers, staff of the Accra Sewerage Systems, selected staff of the Accra Metropolitan Assembly, neighbouring communities surrounding the project site and other stakeholders from various public and private institutions. The Accra Sewerage System is selected because of the project financing by a private investor under a Public-Private Partnership arrangement.

Sampling Technique: The sampling methods for this research work are the purposive random and convenience simple random methods. The purposive method was used because of the focus group identified as project managers, the staff of Accra Sewerage Systems and selected staff of the Accra Metropolitan Assembly. Random sampling was used in administering questions to communities surrounding the project site and other stakeholders from various public and private institutions. These sampling methods were selected for the purpose of the research objectives.

Samples: A sample is a portion of a population or universe (Tailor, 2005), and a population does not necessarily mean a number of people (Walliman, 2011). Sampling size is a function of the nature of the population, type of data to be used, type of analysis and availability of funds for the study (Saunders et al, 2009). The study will use purposive and convenience sampling techniques to select respondents. The purposive sampling (or judgment sampling) technique is the deliberate choice of a participant due to the qualities the participant possesses. Non-random technique is used in qualitative research to identify and select information-rich cases for a most proper utilization of available resources (Patton, 2002). The proficiency, availability and willingness of the respondents to participate and share opinions in an articulate, expressive, and reflective manner influence the use of this approach. However, purposive sampling methods place primary emphasis on saturation (Miles, 1994), while convenience sampling methods place primary emphasis on generalization. Convenience sampling (Haphazard or Accidental Sampling) is a type of non-probability or non-random sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study (Dörnyei, 2007). Convenience sampling helps to collect information from participants who are easily accessible to the researcher (Lawrence et al, 2013). Convenience sampling's affordability eases the readiness of respondents and influenced the researcher to use this sampling technique.

Questionnaires: The instrument used was a research questionnaire. This was designed to provide anonymity and encourage respondents to give honest answers. The questions focused on knowledge relating to the project financing of the Accra Sewerage System, its operations and the environment in which it is carried out. The questions were constructed in a closed-ended form to make them easier to answer. The aim was to obtain the demographic data of the respondents, the financial model used in financing the Accra Sewerage System, the type of PPP contract used in financing the Accra Sewerage System, the risk in financing such project and the environmental impact of the project on the surrounding communities.

Interviews: After a couple of visits, the researcher identified respondents to be given the questionnaires, on the basis of their convenience and availability. The purpose of the research was explained and the question were explained in detail to the respondents so that they would not doubt the researcher. This was to ensure safe responses and prompt a healthy understanding between the researcher and respondents. The period for the distribution and collection of the questionnaires and for conducting interviews was for a period of twelve (12) months. By the end of the period, the researcher was able to recover most of the questionnaires distributed. Interviewing project managers, the staff of the Accra Sewerage System, the selected staffs of the Accra Metropolitan Assembly and key stakeholders that were involved directly in the construction of the project also took place during the period. This was to provide a full perspective of their activities for analysis.

Data Analysis and Detestation: Analysis of the data was done by using the Statistical Packages for Science and Solution (SPSS version 17) and Microsoft Excel 2016. The data obtained was grouped, coded and fed into the software

to generate the analysis and produce the results. Statistical frequency distribution tables and charts were used to present the findings for easy interpretation and easy identification of the patterns and relationships between variables.

4. ANALYSIS OF RESEARCH ISSUES

4.1 Research Question 1: What was the Financial Model used in Financing Accra Sewerage Systems (Focus Group – Staff of SSGL)?

The main purpose of the question was to get the financial models on how the project was finance and to provide guidance on the sources of financing project, implementation and maintenance of Sewerage Systems in Accra. Funding models are not universal as the implementation environment of cities and town's Sewage System infrastructure may differ, thus requiring adjustment to the models. From the responses given, there was not much significant difference between the responses that were reported from the participants on the financial model used in financing Accra Sewerage Systems. While some reported that, they use monies from the internally generated funds, bank loans and grants from local donors. Others also reported that they should use debt financing, central government financing, bank loan and equity financing. The responses were quoted below:

- It depends; we used debt financing, equity financing and few times central bank to finance the projects with an advance mobilization grant. Nevertheless, the Jospong Group used it resources to finance most of the project. *(FMI)*
- Well, we had mobilization grants from the client (in this case government as part payment). Sometimes in addition, we do equity financing of our projects. *(HOD)*
- Our bankers have always helped us to mobilize to go to the site and start the work. What happens is that, anytime we get the project, we contact our bankers and then they work out some small money to start. Sometimes, we use some of our internally granted funds to start the projects and we receive grants from our local donors to start the project. *(FM2)*
- The good projects give us mobilization grants. We try to find any public private partnership from anywhere. *(M) and (DP)*
- Ok, our Bankers have always advanced an appreciable overdraft facility to most of the jobs we had started. *(FM2)*
- I would say that, we usually seek help from public private partnership to support our projects. *(PS) and (S)*
- Well, project facilitators are force to raise the needed capital to start an awarded contract from their own funds that is by self-financing. *(SM) and (OCS)*
- Usually, we always rush to our bankers for loans so that we can go borrow money to start our projects. Sometimes, we self-finance our projects. *(HED) and (HOM)*

Almost all the participants suggested that the financial model used in financing Sewerage System project fall on the capital ability of the construction company. Unfortunately, almost all the participants alluded, to the fact the mobilization grants from government was made available to them from the central government.

4.1.1 Source Fund for Accra Sewage Systems Project

Out of the twenty (20) interview questionnaires that were disseminated to the focus group that was the staff of AMA and SSGL, it came out that, the project source of fund or financing model was:

- Internal Generated Fund,
- Bank Loans
- Grant from Local Donor or Development Partners.

The data collected indicated that Accra Sewage Systems Project was constructed at a total cost of \$25,000,000 and \$500,000 cash inflows from Ghana Government for management and operational cost. It is therefore necessary to look into its viability and its payback period of the project since Internal Generated Fund (IGF), and Bank Loans was source

of funding to the project. Again, the participants were further asked to indicate the type of model they would have used for the project. The responses are quoted below: *It depends, but most at times, we use the forecasting model to generate funds to support our sewerage system project. Usually, we rely on the discounted cash flow model and budget model in financing our sewage project. It can be concluded, from the participant's comments that they usually use the forecasting model and discounted cash flow.* The study supports the findings of Bilinski, Lyssimachou and Walker (2013), who concluded that most sewage project are finance using the forecasting and discounted model. This outcome is at complete variance to the study by Bonini, Zanetti, Bianchini and Salvi (2010), who concluded that most projects are finance using Merger model and Initial public offering model.

4.2 Research Question 2: What is the Type of Contract used for Construction (Focus Group – Staff of SSGL)?

This section sought to find out the type of contract used in financing Accra sewage system projects. From the responses as given, there was not much significant difference between the responses expected as compared to question 1 on the type of contract used for financing and construction of Accra Sewerage Systems. While some reported that, the contracts are usually between them and the Ministry of Local Governments and Accra Metropolitan Assembly. Others also reported that they usually operate on open financier build and operate equipment and Public Private Partnership contracts. Others also reveal that they sign the turnkey contract. The responses are outline below:

- It depends; we have a sign management contract of Accra Sewerage Systems Ghana limited to support our financing. A contract sign between Accra Sewerage Systems Ghana and the Ministry of Local Governments and Accra Metropolitan Assembly. *(FM2) and (DP)*
- Well, we sign a contract to build and operate equipment supply (in this case with the central government). *(HOD)*
- We try to find contracts of Public Private Partnership from anywhere. Sometimes it is difficult but at least we are always successful so we cannot complain. *(M) and (DP)*
- I would say that, we usually seek help from Public Private Partnership to support our projects. We sometimes call them the Fixed Price Contracts. *(PS) and (S)*
- Usually, we rely on Procurement Engineering Contracts for Sewerage Systems Management. *(DP) and (M)*
- Ok, sometimes we depend on turnkey contract, Build Operate and Own (BOO). Where we build or construct the project with our own monies and transfer project back in some years. *(GM), (MD) and (SM)*

Almost all the participants suggested that there was a contract between them and the Ministry of Local Government and Accra Metropolitan Assembly. The outcome of this study agrees with the study done by Awuah and Yeboah (2010), who concluded that majority of the contracts are sign by the district Assemblies and the Central Government. Others also reported that they usually operate on open financier build and operate equipment and Public Private Partnership Contracts. Furthermore, the study supported the work of Algarni, Ardit and Polat (2007), who concluded that majority of the contract are based on build operate and transfer arrangement. In addition, some indicated the use of turnkey contract, where they build with their own funds and transfer project back in some years.

4.3 Research Question 3: What is the Risk in financing such Project (Focus Group – Staff of SSGL)?

Again, amongst the participants there was a consensus that there are various risks involved in financing government projects. The views expressed are presented below:

- While the respondent explained that sometimes, there is lack of funds in the government coffers. The participants also described the risks to be inadequate government budget allocation. Nobody is interested in pre-financing project again. Because they fear, their capital would be lock up for so long. Now, it is difficult to get a loan approved for you to go back to site and work. Every financier wants his or her money at the agreed duration. Unfortunately, it is not the case in this situation; sometimes it could take up to two years before the lender gets their monies. So honestly, it is really affecting our ability to borrow money to do a project now in Ghana. *(DP) and (FM2)*

- Due to central governments, numerous projects to attend to and all projects must be attended to financially, so usually there is a drain on the limited resource of the government. Hence, some of the projects suffer delayed payments. The delayed payments affect everything we do. The banks do not want to finance anything we take to them. The sad thing is that, by the time the money is paid, the interest on the overdraft facility would have balloon to an unmanageable debt portfolio. Now we are all working for the banks. *(M) and (FMI)*
- Lack of proper planning of project before commencement periods by government, allocation of funds becomes very difficult when the entire project is not well analysed and implemented well. *(HOD) and (PS)*
- Design changes and scope creep, numerous variations and additions to previous design and size of projects leads to payment delays, especially if the project drawings and specifications do not cover the details of those changes. *(HOP) and (SM)*
- Change of government causes delayed in payments. In that when a new government is elected into power, some of the projects of the previous government are abandoned and may affect honoring of public project payments. Anytime there is a change of governments, projects stands a risk of not operating. *(DP), (FM2), (GM) and (ES)*
- The participants indicated that most of the risks in financing projects are election of or change of government, insufficient planning before the project commence, public projects are too many and the central government is not able to fund all projects at the same time and design changes, variations and additions in the course of doing the project. This support Sornette (2017) findings that most projects suffer when there is change in government. However, the findings are inconsistent with Labys (2017) and Bascom (2016) who concluded that changes in raw materials and other construction tools prices are the major risk contractor's face in their work.

4.4 Research Question 4: What is the Environmental Impact of the Project?

This section sought to find out the environmental impact of the projects to the surrounding communities. From the responses given, there were not many differences in the responses that were reported from the participants. While some reported on provision of direct and indirect job acquisition, others also reported on the health benefits. Outbreaks of water-borne diseases, cholera, and malaria in the area are reduced after reconstruction of the sewerage project. The projects also improve the value of the land tenure system of the area. The responses are quoted below:

- Well, these projects provide direct and indirect jobs to the community members. Indirect jobs like food selling. In addition, the projects reduce the rate at which community members acquire diseases. *(M) and (FMI)*
- It depends, but most at times; these projects give or provide employment opportunities for the indigenous people in the community. *(HOD), (S), (PE), (ITO) and (SM)*
- Mostly, these projects help members of the community to get work to do and increase the wellbeing and the living standard of the members. *(M), (HOM) and (GM)*
- Well, the projects improved the health conditions of the people thereby decreasing the rate at which they get illness. Also, outbreaks of water-borne diseases, cholera and malaria infection in the area are reduced drastically. *(SM) and (OCS)*
- These projects increase the living conditions of the people in the community. The residents rate of visiting the nearby hospital decreases. *(FM2) and (ES)*

It conclude that the project provide direct and indirect job opportunities to members of the community. In addition, the project helps to reduce the rate of residents visiting the hospital because of good health they enjoy. Outbreaks of

water-borne disease and malaria infection in the area are reduced. The findings are consistent with Awuah and Amankwa-Kuffour (2002) who concluded that the projects offer employment to members of the community.

The community members were also ask to state the environmental impacts of the projects. The details of the responses are represented in Table 6.

Table 6: Environmental Impacts of the Project in the Community

Environmental impact	Frequency	Percent
Control water and soil pollution	14	7.0
Improved aquatic life living and reduced open disposal of faecal waste	21	10.5
Enjoy better hygienic environment and get employment opportunities	20	10.0
Improve health and reduction in outbreak of diseases	10	5.0
Improved the living condition of the people and aquatic life	44	22.0
Stopped the nuisance of disposing raw faecal into the sea	32	16.0
Improved sanitary conditions in the community	15	7.5
Public health conditions of the environment is protected	19	9.5
Eliminated bad stench from the community	25	12.5
Total	200	100

The findings in Table 6, reveals that 14 (7.0%) of the respondents indicated that the reconstruction of the projects in their community have controlled water and soil pollution. 21 (10.5%) stated that the project have improved aquatic life living and reduced open disposal of faecal waste in their community. Twenty - 20 (10.0%) also indicated that they enjoy better hygienic environment and get employment opportunities. Again, 10 (5.0%) of the respondents stated that the project in the community, have improve health condition, reduce outbreak of diseases, 44 (22.0%) of them reveal that the project have improved the living condition of the people and aquatic life and 32 (16.0%) of the respondents indicated that the project has stopped the nuisance of disposing raw faecal into the sea. Furthermore, 15 (7.5%) of the respondents reveals that the project has improved sanitary conditions in the community, 19 (9.5%) stated that the public health conditions of the environment is protected because of the project and 25 (12.5%) of them indicated that the project has eliminated bad stench from the community. It concludes that the three major environmental impacts of the sewerage system project are that; the projects have improved the living condition of the people and aquatic life. The project has stopped the nuisance of disposing raw faecal into the sea and the project has eliminated bad stench from the community.

4.5. Research Question 5: What is the social impact of the project?

The abundance of poor sewage systems and its use as a weapon raises questions about community social cohesion. Poor sewage systems in a community are noted for their strong social cohesion. Achieving this through a social network, a process that tends to assist the poor to weather the storms and challenges associated with urban life. Interviews with the participants revealed the following:

- In particular, poor sewage systems are partly blamed, on lack of discipline among the citizenry with regard to lack of toilets at individual houses, their non-participation in the communal cleaning exercise and their indiscriminate dumping of refuse.
- Again, the respondents were also to indicate the social impact of the project and the details of their responses are represented in Table 7.

Table7: Respondents View on the Social Impact of the Project

Social impact	Frequency	Percent
The community get social amenities such as water	39	19.5
Get employment opportunities and improve sanitation	14	7.0
Members get employment to improve their livelihood	21	10.5
The community are motivated to practice healthy lifestyle	46	23.0
Reduction in water-borne diseases	2	1.0
Elimination of open defecation	43	21.5
Improved tourism business in the community	12	6.0
Help to educate members to be more responsible	23	11.5
Total	200	100

The results in Table 7 reveals that 39 (19.5%) of the respondents indicated that the community get social amenities such as water, 14 (7.0%) stated that the community members get work to do and get an improve sanitation environment and 21 (10.5%) also indicated that community members get employment to improve their livelihood. Again, 46 (23.0%) of the respondents stated that the projects motivate the community members to practice healthy lifestyle, 2 (1.0%) of them reveal that these projects have reduce water-borne diseases in the community and 43 (21.5%) of the respondents indicated that the project has eliminated open defecation in the area. Furthermore, 12 (6.0%) of the respondents reveals that the project has improved tourism business in the community and 23 (11.5%) stated that the projects going on in their community has help community members to be more responsible. The findings are consistent with Awuah and Amankwaa-Kuffour (2002) who concluded that the social impact members enjoy are improved healthy lifestyle of the people.

4.6 Research Question 6: What is the Economic Impact of the Project on Neighboring Communities?

This question sought to establish the economic impact on the community members. Some indicators were used to collect data. The analysis of the data is presented in Table 8.

Table8: Economic Impacts of the Projects on Neighboring Communities

Environmental impact	Frequency	Percent
Indigenous people get job and increase their business	44	22.0
Odour elimination and improved hygienic condition	10	5.0
Enjoy hygienic environment and employment opportunities	35	17.5
Improved living standards of members of the community	7	3.5
Provide employment opportunities for the youth	14	7.0
Decrease illness which eventually reduces cost	16	8.0
Improved tourism business in the community	17	8.5
Reduction of diseases and provision of jobs in the community	19	9.5
Reduced the outbreaks of water-borne diseases	28	14.0
Provision of more direct and indirect jobs in the community	10	5.0
Total	200	100

The results in Table 8 reveals that, 44 (22.0%) of the respondents indicated that the indigenous people had jobs during the project construction by the Sewerage Systems. 10 (5.0%) stated that the project have eliminated bad scents in their neighbourhood and improved hygienic condition and 35 (17.5%), also indicated that they enjoy hygienic environment and employment opportunities. Again, 7 (3.5%) of the respondents stated that the projects going on in their community have improved living standards of members of the community, 14 (7.5%) of them reveal that these projects have provided employment opportunities for the youth and 16 (8.0%) of the respondents indicated that the project has decrease illness which eventually reduces cost. Furthermore, 17 (8.5%) of the respondents reveals that the project has

improved tourism business in the community, 19 (9.5%) stated that the projects going on in their community has reduce the rate at which they get diseases and provided jobs for individuals and 28 (14.0%) of them indicated that the project has reduced the outbreaks of water-borne diseases. The remaining 10 (5.0%) also indicated that the projects have provided more direct and indirect jobs in the community.

It can be concluded that the three major economic impact of the project on neighbouring communities includes the indigenous people get job and increase their business, the community members enjoy hygienic environment and employment opportunities and the projects reduced the outbreaks of water-borne diseases.

4.7 Research Question 7: What is the Project Performance Duration (Focus Group – Staff of SSGL)

Meeting requirements is one of the key success factors for project management. To measure this factor you need to develop measures of fit, which means the solution completely satisfies the requirement. A requirements performance index can measure the degree to which project results meet requirements. Types of requirements that might be measured include functional requirements (something the product must do or an action it must take), non-functional requirements (a quality the product must have, such as usability, performance, etc.). Fit criteria usually derived sometime after the requirement description is first written. You derive the fit criterion by closely examining the project performance duration against the payback period of the project. This will help the sponsor to make a decision on the viability of the project.

4.8. Accra Sewage Systems Performance Duration

In order to address this, the participants were asked to express their opinion on the performance duration for the entire project after construction. The responses are quoted below:

- Well, such projects can take 8 years before any other or major maintenance of the project with maintenance mentality. (*DP*), (*FMI*) and (*FM2*)
- Ok, for this issue the project can be use close to 8 years without a major shut down. (*M*), (*HOM*) and (*GM*)
- Most at times, the project can take 8 years before a total change in equipments, but we do regular maintenance and upgrade. (*HOD*), (*S*), (*PE*), (*ITO*) and (*SM*)

Under the project performance duration, twenty (20) interview questionnaires was disseminated to the focus group which was the staff of AMA and SSGL, all the twenty respondent indicated that, the project performance duration is 8 year. Almost all the participants suggested that the project would last for 8 years before a major maintenance of Accra Sewerage System project.

4.9 Research Question 8: What is the Payback Period for the Project?

In trying to answer the research question above, respondents were asked to provide the payback period for the project. From the responses as given by the participants, the payback periods for the project were between 8 and 15 years interval. While some reported that the payback period was 8 years, others also reported 15 years interval. The responses are quoted below:

- Well, usually the payback period for one project is within 15 years interval. (*HOD*), (*S*), (*PE*), (*ITO*) and (*SM*)
- Mostly, the payback period for such project is estimated at approximately 8 years. (*M*), (*FMI*), (*FM2*), (*HOM*) and (*GM*)

It conclude that the payback period for a project is estimated to be approximately 8 years. The finding supports the work of Femi (2005), who concluded that payback period, is assume to mature in 8 years interval.

4.10 Analysis of Project Viability and Payback Period

In analyzing the project viability and payback, it is therefore necessary to apply the project-financing model known as the Payback Period. Payback Period is the time in which the initial cash out flow of an investment is expected to be recovered from the cash inflows generated by the investment. It is one of the simplest investment appraisal techniques.

Formula: The formula to calculate payback period of a project depends on whether the cash flow per period from the project is even or uneven. In case they are even, the formula to calculate payback period is:

$$\text{Payback Period} = \frac{\text{Initial Investment}}{\text{Cash Inflow per Period}}$$

When cash inflows are uneven, we need to calculate the cumulative net cash flow for each period and then use the following formula for payback period:

$$\text{Payback Period} = A + \frac{B}{C}$$

In the above formula, **A** is the last period with a negative cumulative cash flow; **B** is the absolute value of cumulative cash flow at the end of the period A; and **C** is the total cash flow during the period after A. The *decision rule* this model is “accept the project only if its payback period is LESS than the project performance duration”. Therefore with an initial investment of \$25,000,000 and \$500,000 cash inflows from Ghana per month:

Project Initial Investment = \$25,000,000

Cash Inflows per Months = \$500,000

Project Performance Duration = 8years

Therefore:

$$\text{Payback Period} = \frac{\$25,000,000}{\$500,000} = 50 \text{ months} \approx 4\text{years, } 2\text{months}$$

As against the payback period decision “accept the project only if it’s payback period is LESS than the project performance duration”. It therefore knows that, an initial investment of \$25,000,000 will be paid within fifty (50) months as against the project performance duration. It is true that the Accra Sewage System Projects was viable.

4.11 Testing Of Hypotheses

There is no statistically significant difference comparing project finance budget model using public private partnership to government finance projects. Pearson correlation analysis method was used to test whether projects finance budget model using public private partnership (PPP) to government finance projects. The null hypothesis was tested at 0.05 significance level.

Table 9: Correlation between Public Private Partnership Finance Project and Government Finance Project

	PPP	Government finance project
PPP	1	.853
Sig.(2-tailed)		.000
N	200	200
Government finance project	.853	1
Sig.(2-tailed)	.000	
N	200	200

*p < .05 ** p<.01 ***p < .001

The results in Table 9 shows that there is a significant relationship between the Public Private Partnership (PPP) finance project and government finance project since the value of p which is 0.000 (p=0.000) is less than 0.05 (p<0.005). Again, there is also a strong positive relationship between the independent variable and the dependent variable because the correlation coefficient which is r = 0.853. Base on this, it can be concluded that the Public Private Partnership (PPP) finance project has a significant effect on government finance project. Therefore, the null hypothesis

is rejected and the researcher failed to reject the alternative hypothesis. It conclude that there is statistically significant difference between project finance using public private partnership to government projects. This might be that, for the Public Private Partnership (PPP) project, the contractors receive their money or payment in time. However, for the central governments projects, it takes a longer period for the contractors to receive their pay or money.

5. EVALUATION OF THE RESEARCH

Summary: The study investigated the project financing of Accra Sewerage System, its operations and the environments in which it is carried out using the financial budget model in the Jospong Group of Companies in collaboration with Government of Ghana under the Public Private Partnership sector operations. The study employs participatory method to conduct the research. The approach involves the participation of key players in the industry such as project managers, staff of Accra Sewerage Systems, Accra Metropolitan Assembly selected staffs, neighboring communities surrounding the facility project site and other stakeholders from various public and private institutions. In all two hundred community members and 20 staff of Jospong group of companies, project managers and staff at Accra Metropolitan Assembly were selected for the focused group study. Self-administered questionnaire was used as an instrument for the study. Statistical Packages for Science and Solution (SPSS) version 21.0 was the software used for the data analysis. Frequency tables, Pie charts and Pearson correlation were also use in presenting the data. Conclusions from relevant related literature were captured along to authenticate the findings of the study.

Findings and Discoveries: The summary of the findings are presented as follows:

- It was concluded that the participant's usually use the forecasting model and discounted cash flow in Accra Sewerage System approach.
- The participants suggested that they signed a contract between the Ministry Of Local Government, and Accra Metropolitan Assembly. Accra Metropolitan Assembly is the benefactor of the project therefore the Government pays for the operational and management cost of the project. Accra Metropolitan Assembly are the collectors of the revenue at the project site. A truck pays GHc 20 to discharge its content at the plant.
- The participants indicated that most of the risks in financing projects are change of government, insufficient planning before the project commence, public projects are too many and the central government is not able to fund all the projects at the same time and design changes, variations and additions in the course of doing the project.
- It was concluded that the three major environmental impact of the sewerage system projects are that the projects have improved the living condition of the people and aquatic life, the project has stopped the nuisance of disposing raw faecal into the sea and the project has eliminated bad stench from the community.
- The respondents reveals that the social impacts that the Accra Sewerage System project have brought is an improved tourism business and attracted people to the plant and therefore in the community. The project sited in the community has help community members to be more responsible.
- It was be concluded that the three major economic impact of the project on neighbouring communities includes indigenous people getting jobs and increase their business, the community members enjoy hygienic environment and employment opportunities and the projects reduced the outbreaks of water-borne diseases.
- The duration given by the participants suggests the projects will last for more than 8 years before any major maintenance despite the ongoing regular or routine weekly and monthly maintenance. This period would have been more or close to 15 years if not cited close to the sea.
- The payback period for Accra Sewerage System Plant is estimated to be approximately 8 years. It can therefore conclude that, there is statistically significant difference between project finance using Public Private Partnership to government projects.

Limitations of the Study: The limitations of this study warrant discussion and suggest the need for caution when interpreting the results. The findings of this study will only be generalized for all sampled project managers, staff of Accra Sewerage Systems, Accra Metropolitan Assembly selected staffs, neighboring communities surrounding the

facility project site, but could not be generalized for all Sewerage System age project sites in Ghana because of the sampling procedure used for selecting respondents. In spite of this, the study can be analytical generalize where findings can be generalized to similar circumstances. This can be assure as the study used broad-based and in-depth understanding via the production of rich and diverse empirical evidence (Myers, 2008). In addition, one of the limitations of this study is the issue of validity and reliability. Reliability examines the extent to which the methods used in data collection would provide reliable results in such a manner that comparable conclusions can be drawn by other researchers. It also deals with consistency of results over time, the correct representation of the total population in the study and whether results can be reproduce using similar methodology (Saunders, Lewis & Thornhil, 2007). Validity also deals with the soundness and strength of the findings of the study and its ability to persuade the audience to pay attention to the findings of the study. The researcher addressed reliability and validity concerns by integrating data sources and collection methods, which enhance the quality of results, obtained using the qualitative approach (Myers, 2008).

Recommendations: From the summary of the major findings of this study, it is recommended that:

- Considering the impact of Accra Sewerage System Plant on beneficiary agencies and citizens in general and the challenges associated in the course of implementation –the allocation of funds for the project, it is imperative that measures are put in place to mitigate the negative impact.
- Government should consider developing options to promote similar projects in other districts, metropolitan, municipal assemblies and adequately provide sustainable delivery of prompt payment systems for the service providers and contractors.
- The central government must ensure better integration of capital and operational expenditure in the preparation and execution of municipal budgets to sewerage projects.
- The municipal and district assembly should make sure sewerage systems enterprises are responsible and accountable for development and operation of infrastructure; clarify division of roles and responsibilities between sewerage systems enterprises and municipalities through performance contracts.
- It is essential to compose an investment plan, which includes all costs required to complete a sewerage systems project, including operational losses during the start-up years. This will allow partners and participating banks in the transaction to provide sufficient funding, without being fully dependent on internally generated funds.
- In these transactions it is important that the estimated finance costs during the start-up phase are taken into account and that at least 10% of capital expenditure is incorporated in the investment plan under a clearly specified contingency cost category plan. Although Sewerage System Project Funds and guarantee agreements usually provide for obligations of the sponsor to fill eventual financing gaps, an agreement among partners at the start of the project on how to finance cost increases, mitigates the project's financial risks.
- A strong strategic investor's financial strength was essential when additional funds were required to compensate for the lower than expected cash generation for investment of sewerage project purposes and to finance cost over run on capital expenditures.

Further Study and Research: With the government of Ghana being a major player in the Ghanaian sewerage systems construction industry, it should take the initiative and encourage other stakeholders to study into the multi-criteria selection methods and determine which is/are suitable for any type of contract and type of client or stakeholder involved. The ultimate beneficiary of payment delays and its associated cost is the society who is the end-users of the sewerage systems projects. However, this research did not capture views outside the Accra Metropolitan Assembly on the subject matter. It would be interesting for future researchers to find out their perceptions about the subject matter.

Conclusions

- The research findings prove that the project sources of funding were from; Internal Generated Funds (IGF) from the Jospong Group of Companies, Bank Loans, Equity financing from Owners and Grant from the government of Ghana and its development partners.
- The data collected indicated that Accra Sewerage Systems Project was finance with a total cost of \$25,000,000 and \$500,000 cash inflows from Ghana Government for management and operational cost. It was therefore necessary to look into the project viability and its payback period since Internal Generated Fund (IGF) from the Jospong Group and Bank Loans was the source of funding to the project.
- In analyzing the project viability and payback, it was therefore necessary to apply the project-financing model known as the Payback Period. Therefore with an initial investment of \$25,000,000 and \$500,000 cash inflows from Ghana per month: As against the payback period decision “accept the project only if it’s payback period is less than the project performance duration”. It therefore knows that, an initial investment of \$25,000,000 will be pay within Fifty (50) months as against the project performance duration. It is true that the Accra Sewerage System Projects was a viable project.
- From the findings, there were clear signs of some delays in payment. The delays in payment within the construction industry sometimes affect all stakeholders in the industry and everything including the Accra Sewerage System operations and have to burrow for management and operational cost. The project was successfully completed on time and hence the company ability to deliver successful projects in other districts in Ghana.
- The findings of the study reveals that the three major environmental impact of the Accra Sewerage System Plant are that; the project have improved the living condition of the people and aquatic life, the project has stopped the nuisance of disposing raw faecal into the sea and the project has eliminated bad stench from the community. Furthermore, the respondents indicated that the social impacts that the Accra Sewerage System Plant has brought is an improved tourism business in the community and has help community members to be more responsible.
- The duration for construction Accra Sewerage System Plant project was within the project plan time of two years and can be repeated in other districts in Ghana. The payback period for Accra Sewerage Sewage project system was estimated to be approximately 8 years. It was concluded that there is statistically significant difference between Project Finance using Public Private Partnership to finance government projects.

References

- Ahmad, E., Bhattacharya, A., Vinella, A., & Xiao, K. (2018). Involving the Private Sector and PPPs in Financing Public Investments: Some Opportunities and Challenges. In *Fiscal Underpinnings for Sustainable Development in China* (pp. 123-159). Springer, Singapore.
- Algarni, A.M., Arditi, D., & Polat, G. (2007). Build Operate-Transfer in Infrastructure Projects.
- Allen, F., Brealey, R. A., & Myers, S. C. (2011). Principles of Corporate Finance, 10.Aufl., New York et al.
- Almeida, H., Hankins, K. W., & Williams, R. (2017). Risk management with supply contracts. *The Review of Financial Studies*, 30(12), 4179-4215.
- Ameyaw, E. E., & Chan, A. P. (2015). Risk allocation in public-private partnership water supply projects in Ghana. *Construction Management and Economics*, 33(3), 187-208.
- Arnold, U., & Yildiz, Ö. (2015). Economic risk analysis of decentralized renewable energy infrastructures—A Monte Carlo Simulation approach. *Renewable Energy*, 77, 227-239.

- Ashiagbor, D., Deiana, R., Kappeler, A., Minsat, A., & Nguyen-Quoc, T. (2018). 9. Financing Infrastructure in Africa. *Banking in Africa*, 201.
- Ashiagbor, D., Deiana, R., Kappeler, A., Minsat, A., & Nguyen-Quoc, T. (2018). 9. Financing Infrastructure in Africa. *Banking in Africa*, 201.
- Awuah, E., & Amankwaa-Kuffuor, R., (2002). *Characterization of Wastewater, its sources and its Environmental Effects. I-Learning Seminar on Urban Wastewater Management Economic and Social Commission for Western Asia (2003)*,
- Awuah, P., & Yeboah, O. (2010). *Faecal sludge management at Lavender Hill, Accra*, Part of BSc. thesis, Department of Civil Engineering, KNUST Kumasi.
- Barr, M. J., & McClellan, G. S. (2018). *Budgets and financial management in higher education*. John Wiley & Sons.
- Bascom, W. O. (2016). *The economics of financial reform in developing countries*. Springer.
- Berk, J., & DeMarzo, P. (2011). *Corporate Finance*, global ed. Essex: Person Education Limited.
- Bilinski, P., Lyssimachou, D., & Walker, M. (2013). Target price accuracy: International evidence. *The Accounting Review* 88(3), 825-851.
- Binder, J. (2016). *Global project management: communication, collaboration and management across borders*. Routledge.
- Blum, K. M., Andersson, P. L., Renman, G., Ahrens, L., Gros, M., Wiberg, K., & Haglund, P. (2017). Non-target screening and prioritization of potentially persistent, bioaccumulating and toxic domestic wastewater contaminants and their removal in on-site and large-scale sewage treatment plants. *Science of the total environment*, 575, 265-275.
- Boardman, A. E., Greenberg, D. H., Vining, A. R., & Weimer, D. L. (2017). *Cost-benefit analysis: concepts and practice*. Cambridge University Press.
- Boardman, A. E., Greenberg, D. H., Vining, A. R., & Weimer, D. L. (2017). *Cost-benefit analysis: concepts and practice*. Cambridge University Press.
- Bonini, S., Zanetti, L., Bianchini, R., & Salvi, A. (2010). Target price accuracy in equity research. *Journal of Business Finance & Accounting* 37(9-10), 1177-1217.
- Borrego, M., Douglas, E. P., & Amelink, C. T. (2009). Quantitative, qualitative, and mixed research methods in engineering education. *Journal of Engineering Education*, 98(1), 53-66.
- Brink, C. H. (2017). *Measuring political risk: risks to foreign investment*. Routledge.
- Bryman, A., & Bell, E. (2011). *Ethics in business research*. Business Research Methods.
- Burtonshaw-Gunn, S. A. (2017). *Risk and financial management in construction*. Routledge.
- Danquah, J. K., Analoui, F., & Koomson, Y. E. D. (2018). An evaluation of donor agencies' policies on participatory development: The case of Ghana. *Development Policy Review*, 36, O138-O158.
- Dansoh, A., Frimpong, S., & Oteng, D. (2017). Industry environment features influencing construction innovation in a developing country: a case study of four projects in Ghana. *International Journal of Technological Learning, Innovation and Development*, 9(1), 65-95.

- Delmon, J. (2017). *Public-private partnership projects in infrastructure: an essential guide for policy makers*. Cambridge University Press.
- Dörnyei, Z. (2007). *Research methods in applied linguistics*. New York: Oxford University Press.
- Droste, R. L., & Gehr, R. L. (2018). *Theory and practice of water and wastewater treatment*. John Wiley & Sons.
- Edwards, R. D., Magee, J., & Bassetti, W. H. C. (2018). *Technical analysis of stock trends*. CRC press.
- Esty, B. C. (2004). Why study large projects? An introduction to research on project finance. *European Financial Management*, 10(2), 213-224.
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1-4.
- Fleming, Q. W., & Koppelman, J. M. (2016, December). *Earned value project management*. Project Management Institute.
- Furlong, C., De Silva, S., Gan, K., Guthrie, L., & Considine, R. (2017). Risk management, financial evaluation and funding for wastewater and stormwater reuse projects. *Journal of environmental management*, 191, 83-95.
- Giambona, E., Graham, J. R., & Harvey, C. R. (2017). The management of political risk. *Journal of International Business Studies*, 48(4), 523-533.
- Goldin, I. (2018). *Development*. Oxford University Press.
- Gotze, U., Northcott, D., & Schuster, P. (2016). *INVESTMENT APPRAISAL*. SPRINGER-VERLAG BERLIN AN.
- Gregoire, T. G., & Valentine, H. T. (2007). *Sampling strategies for natural resources and the environment*. Chapman and Hall/CRC.
- Grimsey, D., & Lewis, M. K. (2005, December). Are Public Private Partnerships value for money?: Evaluating alternative approaches and comparing academic and practitioner views. In *Accounting forum* (Vol. 29, No. 4, pp. 345-378). Elsevier.
- Grimsey, D., & Lewis, M. K. (2017). *Global Developments in Public Infrastructure Procurement: Evaluating Public-Private Partnerships and Other Procurement Options*. Edward Elgar Publishing.
- Grimsey, D., & Lewis, M. K. (2017). The problems of large (mega) projects: Evaluating Public-Private Partnerships and Other Procurement Options. In *Global Developments in Public Infrastructure Procurement*. Edward Elgar Publishing.
- Halpin, D. W., Lucko, G., & Senior, B. A. (2017). *Construction management*. John Wiley & Sons.
- Harrison, F., & Lock, D. (2017). *Advanced project management: a structured approach*. Routledge.
- Heagney, J. (2016). *Fundamentals of project management*. Amacom.
- Heldman, K. (2018). *Project management jumpstart*. John Wiley & Sons.
- Hirschman, A. O. (2014). *Development projects observed*. Brookings Institution Press.
- Hirst, P., Thompson, G., & Bromley, S. (2015). *Globalization in question*. John Wiley & Sons.

Hope, O. K., & Vyas, D. (2017). Private company finance and financial reporting. *Accounting and Business Research*, 47(5), 506-537.

Hounslow, A. (2018). *Water quality data: analysis and interpretation*. CRC press.

Humphreys, E., van der Kerk, A., & Fonseca, C. (2018). Public finance for water infrastructure development and its practical challenges for small towns. *Water Policy*, wp2018007.

Jinadasa, K. B. S. N., Meethiyagoda, T. A. O. K., & Ng, W. J. (2018). Solid Waste (SW) Leachate Treatment using Constructed Wetland Systems. *Constructed Wetlands for Industrial Wastewater Treatment*, 263-282.

Kerzner, H. (2017). *Project management metrics, KPIs, and dashboards: a guide to measuring and monitoring project performance*. John Wiley & Sons.

Kerzner, H. (2018). *Project management best practices: Achieving global excellence*. John Wiley & Sons.

Kerzner, H., & Kerzner, H. R. (2017). *Project management: a systems approach to planning, scheduling, and controlling*. John Wiley & Sons.

Kim, M., Chowdhury, M. M. I., Nakhla, G., & Keleman, M. (2017). Synergism of co-digestion of food wastes with municipal wastewater treatment biosolids. *Waste Management*, 61, 473-483.

Kivilä, J., Martinsuo, M., & Vuorinen, L. (2017). Sustainable project management through project control in infrastructure projects. *International Journal of Project Management*, 35(6), 1167-1183.

Kwaning, C. O., Nyantakyi, K., & Kyereh, B. (2015). The challenges behind smes' access to debts financing in the Ghanaian financial market. *International Journal of Small Business and Entrepreneurship Research*, 3(2), 16-30.

Labys, W. C. (2017). *Modeling and forecasting primary commodity prices*. Routledge.

Lambrecht, I. B., & Ragasa, C. (2018). Do development projects crowd-out private sector activities? Evidence from contract farming participation in Northern Ghana. *Food Policy*, 74, 9-22.

Larsen, J. K., Shen, G. Q., Lindhard, S. M., & Brunoe, T. D. (2015). Factors affecting schedule delay, cost overrun, and quality level in public construction projects. *Journal of Management in Engineering*, 32(1), 04015032.

Lasa, Y. M., Ahmad, N., & Takim, R. (2015). Critical success factors in obtaining project financing for private finance initiative projects in Malaysia. In *31st Annual Association of Researchers in Construction Management Conference, ARCOM 2015*. Association of Researchers in Construction Management.

Lasa, Y. M., Takim, R., & Ahmad, N. (2018). Sources of Financing for Public Private Partnership Projects: Lesson Learnt from Malaysia. *Indian Journal of Science and Technology*, 11(20)

Lasserre, P. (2017). *Global strategic management*. Macmillan International Higher Education.

Lawrence A. P., Carla A. G., Jennifer P. W., & Kimberly E. H.. (2013). Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research. Research Gate

Lee, C. W., & Zhong, J. (2015). Financing and risk management of renewable energy projects with a hybrid bond. *Renewable Energy*, 75, 779-787.

Leigland, J. (2018). Public-Private Partnerships in Developing Countries: The Emerging Evidence-based Critique. *The World Bank Research Observer*, 33(1), 103-134.

Leviton, B., Getz, K., Eisenstein, E. L., Goldberg, M., Harker, M., Hesterlee, S., ... & DiMasi, J. (2018). Assessing the financial value of patient engagement: a quantitative approach from CTTI's Patient Groups and Clinical Trials project. *Therapeutic innovation & regulatory science*, 52(2), 220-229.

Li, C., Lu, G., & Wu, S. (2013). The investment risk analysis of wind power project in China. *Renewable Energy*, 50, 481-487.

Liu, J., Jin, F., Xie, Q., & Skitmore, M. (2017). Improving risk assessment in financial feasibility of international engineering projects: A risk driver perspective. *International Journal of Project Management*, 35(2), 204-211.

Liu, S. X. (2017). Water Quality Issues. In *Environmental Management* (pp. 145-176). CRC Press.

Lock, D. (2017). *The essentials of project management*. Routledge.

Magni, C. A. (2015). Investment, financing and the role of ROA and WACC in value creation. *European Journal of Operational Research*, 244(3), 855-866.

Magni, C. A. (2016). An average-based accounting approach to capital asset investments: The case of project finance. *European Accounting Review*, 25(2), 275-286.

Marbuah, G. (2018). Understanding crude oil import demand behaviour in Africa: Evidence from Ghana. *Journal of African Trade*.

Marrone, P. A., Elliott, D. C., Billing, J. M., Hallen, R. T., Hart, T. R., Kadota, P., & Schmidt, A. J. (2018). Bench-Scale Evaluation of Hydrothermal Processing Technology for Conversion of Wastewater Solids to Fuels. *Water Environment Research*, 90(4), 329-342.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd Ed.). Thousand Oaks, CA: Sage.

Munhall, P. L. (1988). Ethical considerations in qualitative research. *Western Journal of Nursing Research*, 10(2), 150-162.

Myers, M. D. (2008). *Qualitative research in business and management*. Sage Publications Limited.

Nagy, H., Káposzta, J., Neszmélyi, G. I., & Obozuwa, O. G. (2018). Effects of International Trade Agreements on the Economy and Society of Africa: Special Focus on Nigeria. In *Establishing Food Security and Alternatives to International Trade in Emerging Economies* (pp. 196-219). IGI Global.

Narayan, M., Solanki, P., & Srivastava, R. K. (2018). Treatment of Sewage (Domestic Wastewater or Municipal Wastewater) and Electricity Production by Integrating Constructed Wetland with Microbial Fuel Cell. In *Sewage*. IntechOpen.

Nevitt Peter K. and Frank J. Fabozzi, 2000, *Project Financing*, Euromoney Books.

Nicholas, J. M., & Steyn, H. (2017). *Project management for engineering, business and technology*. Routledge.

Odoemena, A. T., & Horita, M. (2018). A strategic analysis of contract termination in public-private partnerships: implications from cases in sub-Saharan Africa. *Construction Management and Economics*, 36(2), 96-108.

Ofori, P. A., Twumasi-Ampofo, K., Danquah, J. A., Osei-Tutu, E., & Osei-Tutu, S. (2017). Investigating Challenges in Financing Contractors for Public Sector Projects in Ghana. *Journal of Building Construction and Planning Research*, 5(02), 58.

- Osei-Kyei, R., & Chan, A. P. (2017). Implementation constraints in public-private partnership: Empirical comparison between developing and developed economies/countries. *Journal of Facilities Management*, 15(1), 90-106.
- Osei-Kyei, R., & Chan, A. P. (2017). Risk assessment in public-private partnership infrastructure projects: Empirical comparison between Ghana and Hong Kong. *Construction Innovation*, 17(2), 204-223.
- Osei-Kyei, R., Chan, A. P., & Dansoh, A. (2017). Public-Private Partnership in Ghana.
- Owusu-Manu, D. G., Edwards, D. J., Kutin-Mensah, E. K., Kilby, A., Parn, E., & Love, P. E. (2017). The impact of socio-political and economic environments on private sector participation in energy infrastructure delivery in Ghana. *Journal of Engineering, Design and Technology*, 15(2), 166-180.
- Panford, K. (2017). Ghana's Petroleum: Will the Myth of Ghanaian Exceptionalism in Africa Be Sustained or Broken?. In *Africa's Natural Resources and Underdevelopment* (pp. 75-119). Palgrave Macmillan, New York.
- Parker, S. C. (2018). *The economics of entrepreneurship*. Cambridge University Press.
- Pasqual, J., Padilla, E., & Jadotte, E. (2013). Equivalence of different profitability criteria with the net present value. *International Journal of Production Economics*, 142(1), 205-210.
- Pasqual, J., Padilla, E., Jadotte, E., 2013. Technical note: equivalence of different profitability criteria with the net present value. *Int. J. Prod. Econ.* 142, 205e210
- Patton, M. Q. (2002). *Qualitative research and evaluation methods* 3rd ed. Thousand Oaks, CA: Sage.
- Percoco, M., & Borgonovo E. (2012). A note on the sensitivity analysis of the internal rate of return. *International Journal of Production Economics*, 135(1), 526-52
- Perkins, R. J. (2018). *Onsite Wastewater Disposal: 0*. CRC Press.
- Petković, D. (2015). Adaptive neuro-fuzzy optimization of the net present value and internal rate of return of a wind farm project under wake effect.
- Pinto, J. (2017). What is project finance?. *Investment Management and Financial Innovations*.
- Pinz, A., Roudyani, N., & Thaler, J. (2018). Public-private partnerships as instruments to achieve sustainability-related objectives: the state of the art and a research agenda. *Public management review*, 20(1), 1-22.
- Qasim, S. R. (2017). *Wastewater treatment plants: planning, design, and operation*. Routledge.
- Rethel, L., & Hardie, I. (2017). 13 Bond markets. *Handbook of Globalisation and Development*, 218.
- Robert, O. K., Dansoh, A., & Ofori-Kuragu, J. K. (2014). Reasons for adopting Public-Private Partnership (PPP) for construction projects in Ghana. *International Journal of Construction Management*, 14(4), 227-238.
- Salacuse, J. W. (2017). BIT by BIT: The growth of bilateral investment treaties and their impact on foreign investment in developing countries. In *Globalization and International Investment* (pp. 25-45). Routledge.
- Saunders, M., Lewis, P. & Thornhill, A. (2007). *Research methods for business students. 4th ed.*, Printice-Hall, London.
- Saunders M., Lewis P. & Thornhill, A. (2009). *Research methods for business students. 5th edition*. Essex: Pearson Education Limited.

- Schaider, L. A., Rodgers, K. M., & Rudel, R. A. (2017). Review of organic wastewater compound concentrations and removal in onsite wastewater treatment systems. *Environmental Science & Technology*, 51(13), 7304-7317.
- Schaufelberger, J. E., & Wipadapisut, I. (2003). Alternate financing strategies for build-operate-transfer projects. *Journal of construction engineering and management*, 129(2), 205-213.
- Schwalbe, K. (2015). *Information technology project management*. Cengage Learning.
- Sornette, D. (2017). *Why stock markets crash: critical events in complex financial systems*. Princeton University Press.
- Stowell, D. P. (2017). *Investment banks, hedge funds, and private equity*. Academic Press.
- Swamy, R. R. D., Tiwari, P., & Sawhney, A. (2018). Assessing determinants of PPP project performance: applying AHP to urban drinking water sector in India. *Property Management*, (just-accepted), 00-00.
- Taylor, G. R. (Ed.). (2005). *Integrating quantitative and qualitative methods in research*. Maryland: University Press of America Inc.
- Taylan, O., Bafail, A. O., Abdulaal, R. M., & Kabli, M. R. (2014). Construction projects selection and risk assessment by fuzzy AHP and fuzzy TOPSIS methodologies. *Applied Soft Computing*, 17, 105-116.
- Turner, J. R. (2014). *Handbook of project-based management* (Vol. 92). New York, NY: McGraw-hill.
- Turner, R. (2016). *Gower handbook of project management*. Routledge.
- Von Sperling, M. (2017). *Wastewater characteristics, treatment and disposal*. IWA publishing.
- Von Sperling, M., & de Lemos Chernicharo, C. A. (2017). *Biological wastewater treatment in warm climate regions* (p. 857). IWA publishing.
- Walliman, N. (2011). *Research methods: The basics*. New York: Routledge.
- Wang, Q., Wei, W., Gong, Y., Yu, Q., Li, Q., Sun, J., & Yuan, Z. (2017). Technologies for reducing sludge production in wastewater treatment plants: state of the art. *Science of the Total Environment*, 587, 510-521.
- Warner, M., & Sullivan, R. (Eds.). (2017). *Putting partnerships to work: Strategic alliances for development between government, the private sector and civil society*. Routledge.
- Weber, B., Alfen, H. W., & Staub-Bisang, M. (2016). *Infrastructure as an asset class: investment strategy, sustainability, project finance and PPP*. John Wiley & Sons.
- Wiesemann, D., Kuhn D., Rustem B. 2010. Maximizing the net present value of a project under uncertainty. *European Journal of Operational Research*, 202(2) (April), 356–367.
- Williams, T. (2017). The nature of risk in complex projects. *Project Management Journal*, 48(4), 55-66.
- Wu, X., House, R. S., & Peri, R. (2016). Public-private partnerships (PPPs) in water and sanitation in India: lessons from China. *Water Policy*, wp2016010.
- Yang, Y., Ok, Y. S., Kim, K. H., Kwon, E. E., & Tsang, Y. F. (2017). Occurrences and removal of pharmaceuticals and personal care products (PPCPs) in drinking water and water/sewage treatment plants: A review. *Science of the Total Environment*, 596, 303-320.