Effect of the Payment Process on the Performance of Construction Companies in Rwanda: Case of Rwanda Biomedical Center and Ministry of Health

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Abstract*: The challenge facing construction firms is that many construction projects delay and go beyond the expected and proposed timeframe. The argument is that contractors are not paid on time, and this has led some construction projects to stop their activities due to a lack of funds. The overall objective of this research was to examine the effect of the payment process of public institutions on the performance of the construction industry in Rwanda. The study has used both descriptive and analytical research designs. The sample size of this study was 150 composed by contractors, managers, supervisors, and engineers from 35 construction companies that worked with RBC and MoH. The field data were collected using a questionnaire, the data was analyzed using SPSS. As key finds, the descriptive statistic of payment process variables shows the respondents agreed that infrastructure/ IFMIS doesn't play any role in the delay of payment process with an $\bar{X}$=1.688 and σ= 0.35, the respondents strongly agreed that processing time is a major cause of delay of payment process which causes poor performance of construction companies in Rwanda with an $\bar{X}$=4.16 and σ= 0.365, the respondents agreed that cash flow plays an important role in payment process with an $\bar{X}$=4.32 and σ= 0.32. The regression result indicates that R2 is 0.624. This means that 62.4% of the performance of construction companies is explained by the factor variable of the payment process: Processing Time and Cash flow. The regression coefficient revealed that infrastructure was positive but not significant (β_1= 0.093; p= 0.252). Processing time is positively affecting the performance of construction companies as indicated by a positive coefficient (β_2= 0.453; p< 0.05). Cash flow is positively affecting the performance of construction companies as indicated by a positive coefficient (β_3=0.229 and ρ=0.007). The study concluded conclude that the performance of construction companies in Rwanda depends on the payment process, especially on processing time and cash flow. The study recommends that: 1) Government institutions should process the payment of contractors as fast as possible to boost the performance of construction companies in Rwanda. 2) Government institutions should make sure that cash flow is available, the budget line is provided, and budget reallocations are requested and approved on time to avoid any interruption of construction activities which leads to the poor performance of construction companies in Rwanda. 3) The recommendation for policymakers is to advocate for the integration of an article on the penalty for delayed payment in procurement law.

***Keywords*: Construction companies, Ministry of Health, payment process, performance, Rwanda Biomedical Center.**

I. BACKGROUND OF THE STUDY

Construction projects are considered successful when delivered within the scheduled execution period, allocated budget, and specified quality. performance of a construction firm based on delivery time, budget cost of the proposed project, and quality of the delivered facility. Late payment in construction projects such as infrastructure facilities is a serious issue at all levels of nations which brings a huge amount of money, it takes extra time as an extension of the projects leading to increased losses and incurring poor revenue outsourcing and revenue through lawsuits between contractual parties, and project abandonment are incurred (Owolabi, 2014).

Payment is the main source of construction work and the completion of any activity depends on the continuity of the flow of funds without interruption. Unfortunately, there is often an interruption of fund flow. In recent years, most disputes in construction projects have been concentrated on a single issue which is the delay in paying contractors' invoices, both in developed and developing countries (Mohamed, Omar & Essam, 2020).

In the UK, paying construction firms at late times increased by $ 26 billion in 2008 to $ 50.6 billion in 2012, which shows a significant change in the amounts due to contractors and the need to estimate the contractual compensation for late payment problems. Usually, a clause is written into contracts stating that if the contractor delays the contractor's payments, the project's duration extends by the same amounts of delaying payments and this has caused poor performance of construction firms (Department for Business Innovation and Skills, 2015).

In Australia, approximately 26% of all disagreements are related to payment problems in Australia, whereas, in New Zealand, the disputes relating to payment between the contracting parties were 80% of all cases, and the contractors rarely recover their full payment. The conditions of payment, according to the national law, consider that the contractors are the weak party and do not take into consideration the profitable situation of the contractor to reduce disputes in the future (Ramachandra & Rotimi, 2015).

In South Africa, the type of competitive strategies used by construction companies in attaining their strategic objectives is

the generic competitive strategies which are related to non-financial performance and differentiation and cost-leadership policies are effective in helping construction firms to understand their performance and achieve construction companies' goals (Oyewobi, 2014).

In Nigeria, Akinradewo and Aigbavboa (2019) observed that certain factors impacted directly or indirectly contractors' profit in the construction industry; factors such as; the reduction of waste on construction sites, reduction in expenditures and cost, reduction in time spent on construction projects, the efficiency of labors on-site, getting retention on time thereby attracting another job which will allow construction companies attain their goals and as well as performance.

In Kenya, most of the construction companies in Kenya have been forced out of business as others have become bankrupt, whereas others have had their properties auctioned by financiers and worst of it is that some firms have lost subsequent contracts due to non-performance as a negative result of the delayed payment of their invoices (Auditor General of Kenya, 2019).

In Tanzania, as of 2014, the construction industry contributed to about 14% of the total GDP of 7.1%. Despite its fundamental significant importance, the construction industry in Tanzania is challenged with a lot of problems including lack of resources finance, skilled human resources, local quality materials, incapacitated institute, miserable experience, knowledge, and low skills, inadequate technology, lack of tactical planning and management skills, lack of core competence as well as historical poor performance. As a result, the construction sector has prevailed in attaining a poor image and fallen short of expected performance measured in terms of contract time overrun budget, quality, safety, and environment. In the same vein, cemented that, most executed projects suffer from cost and time overruns, with unsatisfactory quality and safety (Mhando, 2017).

In Uganda, it is shown and proved that construction firms fail due to poor project procurement processes, poor project financing, factors such as risk occurrence factors, communication, and many more. Poor performance in Uganda has hindered their project's success as it costs the country lose huge amount of money which is billions in shillings due to poor execution of the projects. Construction projects are regarded as one of the projects that cost a lot of money due to time extension aligned with extra budget (Seninde & Muhwezi, 2021).

In Rwanda, the Rwandan Ministry of Health and RBC have been challenged by the Office of Auditor General for the delay of construction projects and lack of performance for selected construction companies. In the last four years, the reports of the Auditor General have reproach to MoH and RBC that construction project has exceeded the time agreed in contracts which lead to loss of objective of those construction project and value of money. One of the reasons given by institutions for delaying in contract execution, especially for the construction project was the delay of payment (Government of Rwanda, 2018).

In accordance with Article 174 of the procurement law Payment in installments determines the payment modalities if the contract execution commences, payment in installments for the executed activities is also affected. However, payment in installments may or may not be made for tenders that are to be completed within a period of less than three (3) months. The amount paid in one installment cannot exceed the value of the executed activities after deducting part of the advance. The general conditions of the procurement contract determine for each type of tender, the type of activities to be paid in installments, and the number of such installments. The payment of any invoice shall not exceed forty-five (45) days (Government of Rwanda, 2018).

The idea of this study comes from the challenges faced by the two institutions to explain the unjustified delay for the construction project expressed by the office of the Auditor General. In the component of the value of money, they have noted a significant delay in a construction project where they recommend proper monitoring of the civil works, effective contract management, and also ensure that the construction project is completed on time to facilitate the use of constructed facilities by beneficiaries (Government of Rwanda, 2018).

II. STATEMENT OF THE PROBLEM

The Construction project requires a huge amount for completion, in Rwanda, Construction firms are paid in installments for the executed activities as specified in public procurement law, this was created to pull the burden on contractors and have a cycle of cash flow in the construction project. Many constructions project in Rwanda have been forced to delay or stop working due to payment delays. The impact of late payments is a massive problem for contractors and particularly their subcontractors. The procurement law of 07/09/2018 article n0. 174 stipulates that the payment of any invoice shall not exceed forty-five (45) days. The completion of construction project delays due to the invoices which are not paid within the time agreed in the contract, this has led some construction projects to stop their activities due to lack of funds. Some of the construction projects stop at early stage and other are completed with extension of time which accumulates a lot unplanned cost, Auditor General of report of Rwanda (2021).

For smaller sized firms, late payments can have devastating consequences on the company's financial stability. If payments aren't coming in as agreed, contractors can be left to float the cost of the project themselves, using their own money to ensure the job is completed

All these mentioned issues have led construction companies to poor performance. Therefore, this study aims to establish the effect of the payment process on the performance on construction firms in Rwanda.

III. RESEARCH OBJECTIVE

The general objective of this research was to examine the effect of the payment process of public institutions on the performance of construction companies in Rwanda. Specific objectives of this study were: to examine the effect of infrastructure on performance of construction companies in Rwanda; to evaluate the effect of processing time on performance of construction companies in Rwanda; to investigate the effect cash flow on performance of construction companies in Rwanda.

IV. RESEARCH HYPOTHESIS

$H_0$1: There is no significant effect of infrastructure on performance of construction companies in Rwanda. $H_0$2: There is no significant effect of processing time on performance of construction companies in Rwanda. $H_0$3: There is no significant effect of cash flow on cash flow on performance of construction companies in Rwanda.

V. CONCEPTUAL REVIEW

The study articulates the literature review on payment process of public institution, delay in payment process, cash flow, performance and other related variables that are in relation to institution payment process and performance of construction companies. Hence, the literature is as below:

Payment process of Public Institution

According to Government of Rwanda (2018), the contractor, in other words the creditor, is defined as an entrepreneur who has signed a contract and agreed with the other party which is a government institution to supply goods, or offer services, in this case, it is construction works or consultancy services or any other related service as far as construction is concerned. The meaning of this is that both parties must fulfil the required documents and agree on terms and conditions regarding the work to be performed. Good must be delivered, works or services must be completed to some degrees as indicated in the agreement, which is the contract, the completed part of the work of full completion must be presented to the public institution where the concerned/officials agreed and verify everything as stated in the contract. Payment is made after thorough check of the work or service (Seminega, 2018). If there is an addendum on the initial contract term a contract amendment has also to be agreed on by the two parts (Government of Rwanda, 2018).

Delaying in payment may results into deterioration of any company's performance. A well organized and timely payment to firms is a crucial factor leading to enhanced performance since the cash flow position of a company determines its performance and allows the firm to achieve its stated objectives thus, timely payment is necessary for construction firms to complete their projects on time (Jiang, 2010).

Lengthy process in payment can threaten the survival of any company as it becomes so hard to plan without a clear cash flow projection. Therefore, distorting all project plans and expected revenue flow, suggesting that firms find it hard to break even. Eventually resulting into company's resolution and liquidation (Hamid, Zakaria, Mohd, Abdul & Mohandes, R, 2016).

Protracted payment delays produce more cash flow difficulties that brings about delay projects completion. Performance especially for small firms get adversely effected to the extent of reporting cash deficits due to late payments, making it difficult for those firms to cover for their expenses which create a greater likelihood for further delayed payment in future leading to negative cash flow (Miller & Wongsaroj, 2017).

Payment delays will increase project cost consequently, and the contractor's performance might negatively be affected. Besides, the quality of work can be affected by the crowdedness of the workforce in the project (Miller & Wongsaroj, 2017). The project supervisors may jeopardize project quality by softening the project control to get the work done. Sometimes long working duration is employed to compliment the losses in productivity during the standard working hours but extended working hours have physical, mental 2020 and emotional physiological effects (United State Department of Labor, 2020).

Infrastructure

Schwegler (2016) Argued and revealed that communication is a key to construction projects as it transfers information faster between owners of the construction firms, supervisors, managers and participants in the firm. It helps improve and quicken the construction project process and its performance. Using information technology has a lot of profits and benefits, first of all, using information technology reduces costs and improves the facility in terms of material usage. The owners can monitor their project progress using information technology without wasting much energy. With such benefits, the whole project normally can take the expected time and budget without extra time and charges.

Rwanda has adopted the Integrated Financial Management Information System (IFMIS) with is refers to the automation of public financial management (PFM) processes, that involved budget preparation and execution to accounting and reporting, with the support of an integrated system for financial management of line ministries, spending agencies and other public sector operations. Core IFMIS system also integrates with other information systems, such as human resources, payroll & pension, e-procurement, and revenue (tax and customs).

The scope of an Integrated Financial Management Information System can differ from Government to Government to include simple General Ledger System to a comprehensive system covering Budgeting, Revenue Accounting, Expenditure Control, Debt Management, Resource Management, Human Capital Management, Payroll processing, Accounting, Financial Reporting and Auditing processes across central government or even including local government and quasi-governmental agencies (Techno brain group, 2021).

Many sub-Sahara economies experience losses amounting to billions of dollars, as a result of delayed completion of infrastructural projects, which undermines the noble goal of poverty reduction. Much time spend on completion of the construction projects result in extra money which has an effect on the citizens in Sub-Sahara African countries. The implication is that the cost incurred by late payment can do some other work that can improve people's life in developing countries. Costs arising due to such delays often manifest themselves in terms of accumulated interest on loans, high cost of maintaining management staff, as well as continuous escalation in wages and material prices (Gutman & Chattopadhyay, 2015).

Processing Time

The Contractor prepares a transmission letter accompanying the invoice with all required supporting documents as determined in the contract as well as all other documents clarified in this circular paper. All those documents are submitted to the debtor Institution. They are submitted to the reception desk and the Contractor remains with a copy for reception stamp as evidence that the invoice has been received. Within 3 working days without any reaction to the invoice, this implies that the invoice presents no errors and has been accepted by the Institution and the depositor of the invoice can expect the payment to be done within the period provided for in contract terms (Seminega, 2018).

The Contractor must be paid within the period defined in the contract document. When the period of payment is less than 45 days, the public Institution may be allowed to exceed this period but starting from the reception and acceptance of the invoice, this period can never go beyond 45 days determined by regulations (Government of Rwanda, 2018). The public Institution that has received the invoice cannot exceed 3 working days without returning it back to the owner in case it presents some errors or shortcomings. When it returns to its depositor, the public Institution is obliged to provide written explanations clarifying its errors or shortcomings to be corrected before payment proceedings (Rwanda Public Procurement Authority, 2018).

Cash Flow

Cash flow has an effect and can impact each and every aspect of the construction project implementation process. A lack of funds can lead to project and business complications. Researchers understood cash flow in the context of time extension, project delays, business failure, and forecasting. Furthermore, contractors that do not satisfactorily handle their cash flow will be unable to compete in the building industry. A lack of finance, according to research and investigations, is the main and fundamental cause of building project failure (Zayed & Liu, 2014).

The most difficult and critical challenge currently facing contractors is securing sufficient cash flow at all stages of construction project implementation, where sufficient cash flow aids in meeting three goals: paying for overhead, labor, and material costs; completing construction activities on time; and reducing finance liabilities. As a result, contractors avoid doing work that exceeds available cash or credit at any time during the project (Zraqat, Zureugat, Al-Rawashdeh, Okour, Hussien & Al-Bawab, 2021).

In construction project, the cash flow plays an important role in the financial stability of the construction firm. Some firms experienced failures because of the lack of cash flow to cover the operational expenses, rather than lack of efficient management and mentioned also that the difficulty in predicting cash availability is related to the difficulty of the in-and-out cash flow, and the interdependencies among different projects (Huang, 2016).

The cash inflows for a contractor' results from a progress payment received from the client and outflows to project operational expenses such as materials, labor, equipment, and subcontractors' payments. The owner of the project or construction firm owner believes in cash flow from the public institution in order to finance the project. The issue occurred when the institutions are not paying on time and this affect the performance od the constructions companies and also affect the institutions on the other hand; cash flow has a significant role in sustaining the projects in a way that cash helps pay all the materials needed and everything on site, cash flow is regarded as the catalyst that push the facilities to the next level (Huang, 2016). Having sufficient cash flow is very important for the lifelong of the business since without it, there is no way, a firm will manage to handle the activities requiring finances in them. Enough cash flow is necessary most of the time when the firm is examining the difference between incomes got from payment of the activities done and expenses incurred. All expenses must be covered by revenues which can be regarded here as cash flows, the expenses are employees, utilities and anything that take cash away from the firm, so cash flow covers all that and the predication the cash flow gives hope (Omopariola, 2019a). Having sufficient cash to meet general expensesisanecessitytostimulatesuccessfulfinancialperformanceinconstructionprojects and organizations (Omopariola, 2019b). Firms that deal with construction projects and which have sufficient cash flow and know-how to handle cash, invest more in projects, as it attracts the attention of major stakeholders and brings about firms' growth opportunity. The converse is also true. Adequate cash flow intensifies the contractor's profit and ensures that the project owners obtain value for money in terms of cost, time, performance and sustainability, and could mean the difference between organizational success or insolvency. By way of a reflection of a project and construction firm's financial performance in agreement with completion of the project as per contract and final account settlement, sufficient cash flow serves as a key indicator of that contracting firm's financial strength, due to its effects on whether to performance or profitability (Lowe & Elias, 2010).

Performance of Construction Companies

A construction company's failure is mostly due to a lack of money to fund day-to-day operations. Failure is unfavorable for any business and must be avoided at all costs because its consequences extend beyond the contracting organization, which affects the construction sector as well as the whole society. Apart from that, cash looks to be the most treasured resource in construction firms, so cash flow should be the most significant managerial factor (Omopariola, 2019b).

Okuwoga (2014) Opined that the performance of the construction sector is regarded as the source of concern to both public and private sector customers. Key performance indicators include factors such as time, cost, quality, client satisfaction, client changes, business performance and safety in order to enable measurement of project and organizational performance throughout the construction industry. This information can then be used for benchmarking purposes and will be a key constituent of all construction firms advance towards achieving best practices (Duggan & Elisa, 2019).

In the construction firms, there are indicators of the performance which provide construction firms with an understanding of their financial health and accomplishment. Poor performance of construction projects and construction companies is an omnipresent global phenomenon. This has been attributed to the dwindling in the world economy and non-pursuit of financial growth by construction companies. Thus, it becomes vital for corporate organizations which are construction companies seeking to augment performance to prudently manage the operation and financial features of their businesses if they desire to have inimitable, valuable, non-substitutable and rare resources to maintain a competitive advantage (Tjahjadi, 2020).

It is anticipated that the pursuit of financial growth and well-being will lead to the appropriate application and management of financial performance indicators. In turn, this enhances the delivery of successful quality projects that meet customers' requirements and alleviate disagreements between project shareholders (Omopariola, 2019b).

To track performance growth and well-being, performance indicators are required it is stated that the construction sector performance problems in emerging economies can be classified in three layers: problems of shortages or inadequacies in industry infrastructure mainly supply of resources, problems caused by clients and consultants and difficulties produced by contractor ineffectiveness and inadequacies (Alfan, 2013).

Muizz (2020) opined that; inefficient site management, unforeseen ground conditions and low speed of decision making involving all project teams are the three most significant factors causing delays and problems of time performance in local building works. Thus, the effects of delays may include time and cost overruns, litigation and project abandonment and the arguments are that that cost, and time performance has been identified as general problems in the construction industry worldwide.

The construction industry functions in an extremely modest environment and contractors cannot survive without resourceful management. Consequently, contractors are prompted to introduce low profit margins in tender bids to compete within the industry, a strategy which inadvertently impacts upon their performance (Adjei, Frank, Emmanuel, David, Erika, 2018).

Studies have indicated that a shortage of liquidity is a key problem triggering project failure or business insolvency. This is because, liquidity assesses whether an organization's capability to meet their short-term liabilities consequently, their constituents an absolute key resource for construction companies. Moreover, a contractor's performance is necessary in the execution of several construction projects concurrently (Adjei et al, 2018). Performance largely determines the quantity of a construction firm's profit, which also affects the value of shareholders' wealth. To survive in an increasingly competitive global market, a company must remain liquid to preserve a good credit rating and maintain goodwill in the market essential ingredients that prevent insolvency (Egbide, 2013).

VI. THEORETICAL REVIEW

Institutional Innovation theory

Institutions are composed of cultural-cognitive and regulatory elements that together with associated events and resources give meaning to life. The three pillars of institutions are regulatory, normative, and cultural cognitive. The regulatory pillar emphasizes the use of rules, laws, and sanctions as an enforcement mechanism, with experience as the basis for compliance. The normative pillar refers to norms on how things should be done and values that are preferred or desirable, social obligation being the basis of compliance. The cultural-cognitive pillar rests on shared understanding as common beliefs and symbols (Scott, 2004).

The institutional theory reflects directly on how institutions operate. In this case, the regulatory pillar emphasizes on having procurement among other functions of the institutions that create and implements rules, set procedures, and laws. This also means adherence to set standards by the government on policies in procurement procedures. The normative pillar outlines what is desirable in procurement in relation to its function and effect on service delivery. The cultural cognitive pillar rests on the expectations and beliefs of people being served with a focus on how they expect to be served.

Resource Based View Theory

Resource based theory identifies and analyzes an organization's strategic advantages that will in turn be a source of competitive advantage. These competitive advantages may be organizational, human, or financial and their advantages are conferred based on their rareness, uniqueness and value. Resource Based Theory emphasizes that competitive advantage in organizations is determined through proper planning and functioning of procurement. The theory has two assumptions

used in analyzing competitive advantage using this theory; one, firms within the same industry may have diverse resources and the other, believes this dissimilarity in resources may continue for a long duration. A resource becomes a competitive advantage when it is inimitable. If all organizations in an industry have the same resources there would not be any competitive advantage available (Barney, 1991).

Resource efficiency enables procurement to achieve more with less. Resources enable firms to improve efficiency and save on unnecessary costs. Procurement practices should be uncommon and difficult to imitate, for example, sourcing processes. Both operational and organizational functioning is incorporated in the Resource-Based View. Organizations that purchase internationally function well at the business level. Uncommon resources keep away the competition and enable organizations to achieve higher profits (Barney, 1991).

Enterprise resource planning systems are expensive to install and not all companies have embraced their use, this means that companies that have already installed it are a step ahead of the competition. Effective Collaboration contributes to sourcing performance by capturing additional value for end users through effective collaboration with suppliers and supplier involvement in the development of product specifications. Sourcing positively impacts procurement by enabling better performance. This is achieved by casting the net wide enough to achieve the best possible deal. As products mature and value shifts innovation takes place (Barney, 2003).

Resource-Dependence Theory

The resource-dependence theory focuses on a set of power relationships based on exchange of resources (Pfeffer & Alison, 1987). It recognizes that organizations do not have all the resources they might require in the process of value-creation, hence will often become dependent on each other (Emerson, 1962; Hunt & Morgan, 1996). The key issue then becomes how organizations manage their power-dependence relationships to maintain their functional and operational requirements (Pfeffer & Salancik, 1978). In this regard, RDT assumes that organizations often form coalitions to increase their power and make other organizations dependent on themselves (Heide, 1994).

Resource management and control exertion are the approaches offered by resource dependency theory to deal with uncertainty and dependence in business transactions. In their argument on the issue of resource dependence in supply chains, Ketchen and Hult (2007a) highlighted the dissimilar nature of dependence in the traditional and best value supply chains. Whereas traditional supply chains tend to behave opportunistically in relation to their power-dependence advantage along the chain, best value supply chains exploit dependency as a means of fostering trust and commitment to achieve supply chain requirements (Crook & Combs, 2007; Ireland & Webb, 2007). This indicates a dramatic change in the resource-dependence prediction caused by the realities of contemporary business, such as the need for collaboration.

VII. EMPIRICAL REVIEW

Infrastructure and Performance of Construction Companies

Olanipekun, Nunayon and Olugboyege (2017) Observed that construction sector is regarded as one of the industries using information technology techniques such as software management systems, database and communications. For some decades, numerous processes, functions, operations were done with difficulty because of absence of information technology field. In addition, most of the work was done manually which led to additional cost, time and bad performance.

Hasan et al. (2018) did a study on a 30-year systematic review of literature about factors affecting construction productivity. A reasonable consensus exists on a few factors: non-availability of materials, inadequate supervision, skill shortage, lack of proper tools and equipment and incomplete drawings and specifications. It was also found that traditional construction projects remained the main focus.

Processing Time and Performance of Construction Companies

In the framework of the Iranian construction industry, Ghoddousi et al., (2015) surveyed construction companies in category Grade 1 and Grade 2. Those companies represented the top construction companies in the Iranian construction industry. It was revealed that the amount of remuneration, timelines of remuneration, and incentive payments, which are related to the financial health of the construction firms, are graded number one, number five, and number seven, respectively. A recent study by Rad and Kim (2018) showed consistency in the findings when compared to Ghoddousi et al., (2015); it was found that the delay in payment was a dominant performance factor. Furthermore, Jamshidi and Hatefi (2016) found that the changes in provisions and errors in design were major reasons for claims by contractors.

Mahamid (2012) made an analysis of a total of 52 causes of delay and find the most contributing factors as the political situation, segmentation of the west bank and limited movement between areas, award project to the lowest bid price, progress payment delay by the owner, and shortages of equipment. From the total 43 examined causes of delay were categorized under seven main groups. The predominant were investigated shortage of construction materials in the market, fluctuations in cost/currency, late financing, and payments of completed work by the owner, effects of subsurface conditions, shortage of labor, the inadequate experience of the consultant, difficulties in financing project by the contractor, the low productivity level of labors, unqualified workforce, and variation orders/changes of the scope by the owner during construction.

Cash Flow and Performance of Construction Companies

A study by Tim Xu and Zhou (2015) found that the construction industry has a high percentage of insolvencies compared to other businesses and according to the findings of several writers such as James, Woung and Thomas (2010) and Omopariola and Windapo (2019), cash flow concerns and inadequate financial

management are the major reasons for failure in the construction industry.

A study by Shurrab (2018) evaluated the effect of motivational dimensions on the construction project managers in Jordan, and it was found that a good wage level is the top performance motivator. Paying on time was the second motivational factor as per Al-Abbadi and Agyekum-Mensah (2019) findings in Jordan. Maintaining the construction company's financial stability is essential to provide a reasonable wage level and it is a driver to improve productivity (Sweis et al., 2014); however, it was ranked last among the most influencing productivity factors in Jordan.

Other studies analyzing large numbers of construction projects (Czarnigowska & Sobotka, 2013; Magnussen; Purnuș & Bodea, 2013; Sebestyen & Toth, 2015) revealed that approximately 70% of the projects were completed with significant differences between estimated and actual costs. As a result, it is questionable to consider planned costs as an independent variable when planning construction time. Furthermore, because the projects are being implemented in different locations and at different times, the costs must be made comparable for any statistical time cost model.

VIII. CONCEPTUAL FRAMEWORK

Under this study, a conceptual framework is a logical diagram that shows how variables interchangeably affect each other. It can be used in different categories of work where an overall picture is needed. It is used to make conceptual distinctions and arrange ideas.

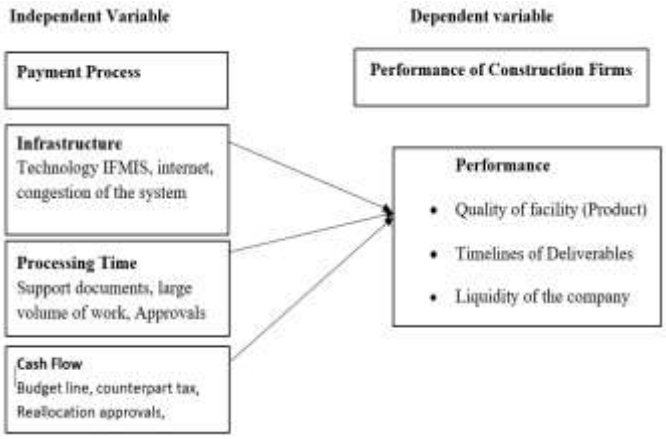

Figure 2. 1: Conceptual Framework

IX. RESEARCH GAP

Most of the study reviewed were done out of Rwanda, example; a study by El-Gohary and Aziz (2014) conducted from Egypt, investigated the effect of delay payment on construction productivity and a questionnaire survey targeted 300 of the top grades contractors in Egypt, and the collected data were categorized into three categories, management, human, and industry. It was found that the laborer experience, incentive programs, material availability, leadership, and efficient supervision are the most influencing productivity factors.

Another example is a study of Hiyassat et al., (2016) which surveyed 100 engineers and 100 supervisors working for contractors in Amman, Jordan's capital. It was found that proper planning, worker–management relationship, education and experience, climate, and technology are the main productivity factors. One of the studied aspects was related to the relationship between financial stability and productivity. It was found that productivity is positively correlated with the company's financial strength. This fact is aligned with Shurrab (2018) findings. Another study by Shurrab (2018) evaluated the effect of motivational dimensions on the construction project managers in Jordan, and it was found that the good wage level is the top productivity motivator. Paying on time was the second motivational factor as per Al-Abbadi and Agyekum-Mensah (2019) findings in Jordan. Maintaining the construction company's financial stability is essential to provide a reasonable wage level and it a driver to improve productivity (Sweis et al., 2014); however, it was ranked last among the most influencing productivity factors in Jordan.

Hence, there is no study done in Rwanda on the payment process of public institutions on the performance of construction companies in Rwanda. In this understanding, there is no equity law that punishes both sides when it comes to delay. When a contractor delays, there is a punishment reserved but it's not vice versa. Contractors realized that public institutions delay in payment and thus, they attribute the cost of delaying to the price units of items and invoice the public institutions, hence, public institutions pay an extra charge indirectly and unknowingly. So, most of the studies focused on delayed payment, and the current study on the effect of the payment process on the performance of construction companies will bridge the gap.

Research Methodology

Research Design

This study adopted a mix descriptive, empirical, and correlational research design; by descriptive design, we use measures of frequency, and percentage, measures of central tendency such as mean, measures of dispersion or variation such as standard deviation (Yellapu, 2018). By empirical design, the research adopts a question and planned design for the research, it was focused on primary data where a questionnaire was used to collect data respondents' perceptions on effect of payment process on performance of construction companies in Rwanda. Correlational design was used by computing inferential statistics allow to test a hypothesis or assess if the data is generalizable to the entire population.

Study Population and sampling size

Population of the study according to Mwangi (2016) is usually where the researcher desires to generalize the outcomes from, and for purposes of the study, the population of the study is composed by the contractors, managers, supervisors, and engineers from 35 construction companies worked with RBC and Ministry of Health of Rwanda represented by 150 as population. Contractors are the owners of the construction companies; managers are the employees of construction

companies and as well as supervisors and engineers. Finance administration are from RBC and Ministry of Health. Contractors are the ones that have been working or worked for RBC and Ministry of health for the last five years. Since the population was small and easy to reach, there was no need to calculate the sample size. The population remains the same as the sample size which is 150.

Data Collection instruments

Primary data were collected for this study and a questionnaire were adopted. A questionnaire is a set of questions logically prepared to be completed by the respondents themselves. The list of questions was done in a way that addressed the objectives of the study. The researcher used a sampling frame to identify respondents and distribute the questionnaires. Part A entailed the background of the respondent, a part was based on the effect of the payment process and part C will be the performance of construction companies whose contracts were signed by RBC and the Ministry of Health. The questionnaire addressed the respondents from RBC and the Ministry of Health with their contractors and it adopted a five Likert scale where: 1. Strongly Disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Strongly Agree.

Validity and Reliability

While construct validity, validity was used through variance explained factor (VEF) trough SPSS version 23 while content validity of questionnaires was done by different experts and the supervisor in this field of institution payment process and performance of construction companies. Once content validity index is greater than 0.6, the questionnaire was valid. To pilot the research questionnaire, 20 copies of questionnaire were taken to RBC and Ministry of Health. The researcher adjusted the instrument in RBC and MoH and the findings of the pilot study were not included in the main finding of the study. The Cronbach alpha coefficient was determined to measure the internal consistency of the study. Once Cronbach's Alpha coefficient is above 0.70 as the minimum cut-off, the study was reliable.

Data Analysis

The collected data were analyzed, with respect to the study objectives, using both descriptive and inferential research design. The tools of analysis in this study were Statistical Package for Social Sciences (SPSS) version 23 for descriptive data and analytical data. The obtained results were presented in form of tables. In addition to descriptive statistics, regression analysis was adopted to analyze the effect of the payment process on the performance of construction companies in Rwanda.

Regression model

Linear regression analysis was adopted in this study, it examined the effect of payment process on the performance of the construction firms.

Model Specification

The research model of data analysis applied are the following:

$$\boldsymbol{Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \mu} \qquad \textbf{(1)}$$

Where: Y = Performance; $\mathbf{x_1}$ = Infrastructure; $\mathbf{x_2}$ = Processing time; $\mathbf{x_3}$ = Cash flow; $\boldsymbol{\mu}$ = Error Term; β_0, β_1, β_2 and β_3 are coefficient of estimates

X. RESULTS

10.1 . Socio-Demographic Characteristics of the Respondents

The survey was conducted on a sample of 150 respondents were 47.3% were male and 52.7% were female. 50.0% were aged between 41-50 years old; 22.7% were aged between 31-40 years; and 20% were aged above 51 years, while 7.3% were aged below 30 years. The results in Table 4.4 shows that many were 68(58.2%) having a bachelor's degree; followed by respondents having master's degree who are 46(41.8%), This implies that in targeted institution of Rwanda; employees and contractors are educated and qualify for the work. Considering education, 58.2% have bachelor's degree, while 41.8% have master's degree. For marital status, 85.5% were married, 14.5% were single.

10.2 . Effect of infrastructure (IFMIS) on the performance of construction companies in Rwanda

Descriptive statistics results revealed that the mean and standard deviation were (Mean = 1.688 and SD= 0.35). This mean indicates that infrastructure/ IFMIS has a weak effect on the payment process. Most of the respondents agreed that infrastructure/ IFMIS doesn't play any role in the delay of the payment process. It means that the technology/IFMIS is not a cause of delay in the payment process, there was a varied view but well distributed as reflected by the standard deviation of 0.35. Overall, it was noted that infrastructure/ IFMIS is strong as far as the payment process is concerned in construction companies in Rwanda.

Table 1: Descriptive statistics on Infrastructure/ Technology

Infrastructure/Technology (IFMIS)	**Mean**	**S. D**	**Interpretation**
The delay in payment process is caused by IFMIS which is not friendly use for registration and creation of a Payment Order	2.11	0.313	Tend to weak
The delay in payment process is caused by the congestion of system and lack of easy accessibility on IFMIS	1.84	0.372	Weak
The delay in payment process is caused by dependence of IFMIS on internet.	1.09	0.301	Weak
The delay in payment process is caused by the fact that the approval from a level to another is not automatically communicated	2.07	0.294	Tend to Weak
The delay in payment process is caused by the fact that the approval from a level to another is not automatically communicated	1.33	0.471	Weak
Aggregate mean and standard Deviation	**1.688**	**0.35**	**Weak**

Source: Field data, 2022.

10.3 . Effect of processing time on the performance of construction companies in Rwanda

Descriptive statistics results revealed that the grand mean and standard deviation were (Mean = 4.19 and SD= 0.365). This mean indicates a strong effect of processing time on the payment process. Most of the respondents strongly agreed that process time is a major cause of delay of the payment process which causes poor performance of construction companies in Rwanda.

Table 2: Descriptive statistics on Process Time

Processing Time	Mean	S.D	Interpretation
The delay of invoice processing is due to lack of required sufficient supporting documents which must be uploaded.	3.92	.335	Moderate
The delay of invoice processing is due to the large volume of works of finance department staff	4.85	.379	Strong
The delay of invoice processing is due to the number and level of approvals	3.10	.438	Moderate
The delay of invoice processing is due to the negligence of users to complete or to analyze the submitted Payment Order	4.25	.301	Strong
The delay in payment process is caused by rejection of invoices due to calculation errors during registration of Payment Oder.	4.84	.372	Strong
Aggregate mean and standard deviation	**4.19**	**.365**	**Strong**

Source: Field data, 2022.

10.4 . Effect of cash flow on the performance of construction companies in Rwanda

Descriptive statistics results revealed that the grand mean and standard deviation were (Mean = 4.32 and SD= 0.32). This mean indicates a strong effect of cash flow on the payment process. Most of the respondents agreed that cash flow plays an important role in the payment process. However, in terms of whether the delay in the payment process is due to reallocation is moderately accepted, there is at least the same view as reflected by the standard deviation of 0.32. On the overall, it was noted cash flow is needed to process payment.

Table 3: Descriptive statistics on Cash flow

Cash Flow	Mean	S. D	Interpretation
The delay in payment process is caused by the lack of appropriate budget line in IFMIS.	4.08	.275	Strong
The delay in payment process is caused by the lack of cashflow	4.82	.387	Strong
The delay in payment process is caused by the lack of counterpart tax where needed	4.32	.468	Strong
The delay in payment process is caused by the time spent for reallocation approvals.	3.92	.275	Moderate
The delay in payment process is due to the priority of other projects	4.45	.198	Strong
Aggregate mean and standard Deviation	**4.32**	**0.32**	**Strong**

Source: Field data, 2022.

10.5. Performance of Construction companies

This section analyzes the performance of construction companies by using mean and coefficient of variation. The mean indicates how many respondents agree or disagree on statement asked and the coefficient of variation indicates dispersion or how far the respondents are from the mean in the study findings. The results on quality facility regarding the effect of the payment process on the performance of construction companies in Rwanda. The results revealed that the grand mean and standard deviation were (Mean = 4.01 and SD= 0.095). Most of the respondents agreed that delay in the payment process has a negative effect on the quality of the facility is hindered by the factors related to late payment or purchasing material at different times. The results on timeliness regarding effect of payment process on performance of construction companies in Rwanda. The results revealed that grand mean and standard deviation were (Mean = 3.99 and SD= 0.095). Most of the respondents moderately agreed that construction projects are not completed on time. The results on liquidity regarding effect of payment process on performance of construction companies in Rwanda. The results revealed that grand mean and standard deviation were (Mean = 4.46 and SD= 0.570). Most of the respondents agreed that construction projects have not enough liquidity to meet shortt-term obligations.

Table 4: Descriptive Statistics on Performance variables

Descriptive Statistics on Performance Variables	Mean	S. D	Interpretation
Quality Facility	4.01	.095	Strong
Timeliness	4.82	.387	Strong
Liquidity	3.99	.095	Moderate
Aggregate mean and standard Deviation	**4.27**	**.193**	**Strong**

Source: Field data, 2022.

10.6. Inferential Statistics

Correlation Analysis

The main purpose of employing correlation is to examine the extent to which payment processes as measured by infrastructure/technology, process time, and cash flow are associated with the performance of construction companies. Correlation analysis measures the linear association between two variables. The decision rule states that a correlation coefficient ranging from -1 to +1 is used to establish the degree of association, where the sign of the coefficient indicates the direction of the relationship (positive or negative). The correlation coefficient $r<0.5$ indicates a weak correlation, $0.5<r<1.0$ indicates a Moderate correlation, while $r=1.0$ or -1.0 indicates a perfect correlation. The results in table 1indicates that the correlation results are respectively r= -.066 for the relationship between infrastructure and performance which indicates a weak correlation; r= -.409 for the relationship between processing time and performance which indicates a weak correlation; and r= -.346 for the relationship between cash flow and performance which indicates weak correlation.

Considering the significance level (Sig.), the results in table 1indicates that the relationship between infrastructure and performance is not significant since Sig =.496 (sig. >0.05). This indicates that the relationship exists in the sample but not in the entire population. For the relationship between processing time as well as the cash flow and performance, Sig=0.000 (sig<0.05). This indicates that processing time as well as the cash flow are significant to performance. Therefore, for both variables, the relationship exists in the sample as well as in the entire population. Considering the Sign, the results in table 1 indicate that all three variables (infrastructure, processing time, and cash flow) have a negative sign to performance. This indicates that the variables move in the opposite direction. When the delay is caused by infrastructure, processing time, or cash flow increases, the performance decreases.

Table 5: Correlation Matrix

		Infrastructure	Processing Time	Cash Flow	Performance
INFRASTRUCTURE	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	110			
PROCESSING TIME	Pearson Correlation	.047	1		
	Sig. (2-tailed)	.024			
	N	110	110		
CASH FLOW	Pearson Correlation	-.025	-.265**	1	
	Sig. (2-tailed)	.035	.005		
	N	110	110	110	
Performance	Pearson Correlation	**-.066**	**-.409****	**-.346****	1
	Sig. (2-tailed)	.496	.000	.000	
	N	110	110	110	110
**. Correlation is significant at the 0.01 level (2-tailed).					

Source: Field data, 2022

Hypothesis testing

The results in table 2 show that β_0=3.106 and it indicates that the value of performance will be equal to 3.106 other all the independent variables are equal to zero.

$H_0$1: There is no significant effect of infrastructure (IFMIS) on performance of construction companies in Rwanda.

The regression results presented in table 2 revealed that infrastructure was positive but not significant (β_1= 0.093; p> 0.05). Therefore, the null hypothesis was accepted, and the study concludes that the infrastructure is not statistically significant to the performance of construction companies.

These results are consistent with the findings of Casals & Associates (2004), which show that IFMIS provides an integrated computerized financial package to enhance the effectiveness, efficiency, and accountability of public resource management by computerizing the budget management and accounting system for a government.

These results contrast with the most predominant technological challenge of technophobia, the challenges identified as avoidance of new technology in the use of IFMIS.

$H_0$2: There is no significant effect of processing time on performance of construction companies in Rwanda.

The regression results presented in table 2 revealed that processing time was positive and significant (β_2= 0.453; p< 0.05). Therefore, the null hypothesis was rejected, and the study concludes that processing time has a positive and statistically significant relationship with performance of construction companies. This implies that there was up to 0.453 units increase in performance of construction companies for each unity increase in processing time holding all other independent variables constant.

These results are consistent with the fact that payment is considered as the life blood of the construction industry because construction projects often involve very large capital outlay (Ameer-Ali, 2005).

$H_0$3: There is no significant effect of cash flow on performance of construction companies in Rwanda.

The regression results presented in table 2 revealed that cash flow was positive and significant (β_3= 0.229; p< 0.05). Therefore, the null hypothesis was rejected, and the study concludes that cash flow has a positive and statistically significant relationship with performance. This implies that there was up to 0.229 units increase in performance of construction companies for each unity increase in processing time holding all other independent variables constant.

These results are consistent with the finds of study of the factor affecting time and cost performance of construction in Rwanda

which shows that late payment during work progress was identified as the second most significant (29-38%) factor causing delay in the Highrise building project (TUYISHIME Pascal, 2020) and The delay in payment attracts contractors cash flow problems which result in inadequate funds to support construction expense in construction project consume huge amount of money.

These results are supported by the theory state that is typically clear that the lack of liquidity to support day-to-day activities is the foremost cause of a construction company's failure (Singh and Lakanathan, 1992)

Table 6: Model coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.106	.488		6.369	.000
	INFRASTRUCTURE	.076	.066	.093	1.152	.252
	PROCESSING TIME	.445	.082	.453	5.428	.000
	CASH FLOW	.065	.024	.229	2.743	.007
a. Dependent Variable: Performance						

Model summary

The model summary outlined in table 3 shows the results of R-squared, also called coefficient of determination, which is a statistical calculation that measures the degree of interrelation and dependence between two variables. The model determines how much a variable's behavior can explain the behavior of another variable. The decision rule states that R-squared < 0.3 indicates none or very weak effect size, R-squared value 0.3 < r < 0.5 indicates a weak or low effect size, R-squared value 0.5 < r < 0.7 indicates a moderate effect size, whereas R-squared value r > 0.7 indicates strong effect size. The results indicated by table 3 showed that the coefficient of determination R-squared value for this study is 0.624 (0.5 < r < 0.7) indicating a moderate effect size. These results indicate that 62.4% of the variance in performance of construction companies comes from processing time, and cash flow; other remaining 37.6% comes from other factors.

Table 7: Model Summary of infrastructure, Processing time and Cash Flow on performance of construction companies

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.790[a]	.624	.583	.331
a. Predictors: (Constant), Cashflow, Infrastructure, Processing Time				

Analysis of variance (ANOVA)

The Analysis of Variance (ANOVA) is a statistical technique that is used to test the model fitness. The decision rule states that the model fit to predict variables if p- value <0.05; F computed being greater than F critical. The result presented in table 4 indicate that F (3,106) = 16.293 > $F_{critical}$ =2.69, p<0.05. Based on these statistical findings, the model is fit to predict study variables.

Table 8: Analysis of Variance of infrastructure, Processing, and Cash Flow on the performance of construction companies

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.362	3	1.787	16.293	.000[b]
	Residual	11.629	106	.110		
	Total	16.991	109			
a. Dependent Variable: Performance						
b. Predictors: (Constant), CASH FLOW, INFRASTRUCTURE, PROCESSING TIME						

Source: Field data, 2022.

Table 9: Summary of Hypotheses

Hypothesis	Conclusion	p-value	R^2
$H_0$1: There is no significant effect of infrastructure on performance of construction companies in Rwanda.	Accepted	. 252	0.624
$H_0$2: There is no significant effect of processing time on performance of construction companies in Rwanda.	Rejected	. 000	
$H_0$3: There is no significant effect of cash flow on cash flow on performance of construction companies in Rwanda.	Rejected	. 007	

Source: Field data (2022).

XI. CONCLUSION

The study concluded that the null hypothesis was accepted which was saying that there is no significant effect of Infrastructure/Technology (IFMIS) on the performance of construction companies in Rwanda and rejected the alternative hypothesis which was there is a significant effect of Infrastructure/Technology on the performance of construction companies in Rwanda. It means that the delay in the payment process is not caused by the infrastructure/technology (IFMIS).

The study concluded that the null hypothesis was rejected saying that there is no significant effect of processing time on the performance of construction companies in Rwanda and accepted the alternative hypothesis which was there is a significant effect of processing time on the performance of construction companies in Rwanda.

Finally, the study concluded that the null hypothesis was rejected which was saying that there is no significant effect of cash flow on the performance of construction companies in Rwanda and accepted the alternative hypothesis which was there is a significant effect of cash flow on the performance of construction companies in Rwanda.

XII. RECOMMENDATIONS

The study recommends that:

Even if the infrastructure/technology did not show a correlation with performance, we recommend taking care of the maintenance of the IFMIS so that it always remains efficient.

Government institutions should process invoices as fast as possible to boost the performance of construction companies in Rwanda.

Government institutions should make sure that cash flow is available, the budget line is provided, and budget reallocations are requested and approved on time to avoid any interruption of construction activities which leads to the poor performance of construction companies in Rwanda.

The recommendation for policymakers is to advocate for the integration of an article on the penalty for delayed payment in procurement law.

XIII. RECOMMENDATIONS FOR FURTHER STUDIES

Another study should therefore be conducted to determine what influences the other 37.6% of poor performance of construction companies in Rwanda.

We also recommend another study be conducted to determine the cost of the late payment in the unit price of construction company in Rwanda.

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