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A Regression Model to Enhance the Profitability of Local Construction Contractors in Uganda

*Isaac Buhamizo[1], Lawrence Muhwezi[2] and Ruth Sengonzi[1]

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Abstract: Doubtlessly, the primary goal of every construction company is to maximise profitability. Without this, construction companies cannot survive. Incidentally, Ugandan local construction contractors (LCCs) continue to collapse in a short period, despite enormous public and private investments in the construction sector. This study investigates the profitability of LCCs in Uganda. An investigation was conducted to develop a regression model that would enable LCCs to enhance their profitability and minimise business failure. A questionnaire survey was conducted to collect primary data from 47 local construction companies registered with the Uganda National Association of Building and Civil Engineering Contractors (UNABCEC) and secondary data were collected from audited books of accounts covering from year 2016 to 2018. Thirty-five valid responses were received, representing a response rate of 74%. Data were coded into SPSS version 25, analysed and displayed using the relative importance index (RII), statistical correlation and regression analysis. The findings indicated that the profitability of LCCs was unsatisfactory when compared to the profitability ratios recommended for the construction industry and those of contractors in other countries. The results also indicate that the profitability of LCCs is significantly affected by the timeliness of payments, cost of finance, competitive bidding environment, project delays, price fluctuations and corruption tendencies, in that order. The findings of this study will benefit construction industry players by providing awareness about the factors affecting the profitability of LCCs. A regression model to enhance profitability was developed using regression analysis. This will help LCCs enhance their profitability by developing mitigation strategies that prevent low profitability; consequently, business failure will be minimised.

Keywords: Regression model, Business failure, Local construction contractors, Profitability, Uganda

INTRODUCTION

The construction industry is the cornerstone of developing economies because it underpins the infrastructure development (Colonnelli and Ntungire, 2018). Therefore, it has a multiplier effect on other sectors that rely on the infrastructure. Despite the importance of the construction sector, it faces stagnation and collapse of contracting companies. Business failure has been reported in both developed and developing countries; for instance, in the USA (Rajasekhar, 2017), the UK (Creditsafe, 2018), Nigeria (Oladimeji and Aina, 2018), Rwanda (John, Gwaya and Wanyona, 2019) and Uganda (Ocen, Alinaitwe and Tindiwensi, 2011).

[1]Department of Civil and Environmental Engineering, Kyambogo University, P.O. Box 1, Kyambogo, UGANDA
[2]Department of Civil Engineering, Kabale University, P.O. Box 317, Kabale, UGANDA
*Corresponding author: ibuhamizo@kyu.ac.ug

Uganda's current development strategy is centered on the infrastructure and oil sector (IMF, 2019). This national strategy is reflected in the National Development Plans (NDPs) II and III. Consequently, there are enormous public and private investments in the construction sector. However, nearly all construction projects in Uganda are executed by foreign companies because of stiff competition (Ocen, Alinaitwe and Tindiwensi, 2011). Therefore, many local construction contractors (LCCs) in Uganda have closed businesses within a brief period of their operations. This situation resonates with Tan's (2018) finding, that profitability decreases as competition increases.

Business failure is a serious concern in the construction industry (Ibn-Homaid and Tijani, 2015) because it severely affects the economy. An example of this is the collapse of the Carillion, a prominent construction firm in the UK. Due to the low profitability and debt burden, Carillion left a public debt of GBP1.6 million, a collapse of 2,700 subcontractors and suppliers and over 43,000 workers unemployed (Qamar and Collinson, 2018).

Various researchers have linked low profitability to business failures in the construction industry. For example, John, Gwaya and Wanyona (2019), Mohammed (2016), El-Kholy and Akal (2019) and Mahamid (2012) revealed that financial causes lead to the failure of contracting firms.

Therefore, this study aimed to investigate the profitability of LCCs in Uganda and develop a regression model that would enable them to enhance their profitability and minimise business failure. The objective of this study is to evaluate the profitability of LCCs, establish factors that affect the profitability of LCCs and assess the impact of these factors. These findings will further assist LCCs in developing a considerable and in-depth outlook on these factors. This will enable industry players to develop strategies that enhance the profitability of LCCs and consequently minimise business failure.

LITERATURE REVIEW

Business Failure and Profitability in the Construction Industry

According to Alavipour and Arditi (2019), low profitability is a major cause of contractor failure. Chan and Martek (2017) provided empirical evidence that companies reporting low profitability are at an increased risk of failure. Various scholars in different countries have attributed contractor failure to low profitability in the construction industry, for instance, Creditsafe (2018) in the UK, Rajasekhar (2017) in the USA, Ibn-Homaid and Tijani (2015) in Saudi Arabia, El-Kholy and Akal (2019) in Egypt, Oladimeji and Aina (2018) in Nigeria and John, Gwaya and Wanyona (2019) in Rwanda. Low profitability, which is evidently a major global issue, however, has not been studied in Uganda and therefore, literature on it is limited. The available literature on the collapse of contractors in Uganda attributes it to less competitiveness of LCCs in the sector (Ocen, Alinaitwe and Tindiwensi, 2011). This finding resonates with Segal's (2019) argument that profitability decreases as competition increases. Therefore, competition, among other factors, contributes to low profitability and consequently leads to business failure. The existing literature on contractor failure due to low profitability focuses on other countries. However, this cannot be applied directly to Uganda because of its parallel business environment. Therefore, it is necessary to investigate this area of study.

Several variables that affect the profitability of contractors have been established by previous studies, such as the timeliness of payments (Ansah, 2011; Hwee and Tiong, 2002), project delays (Kikwasi, 2012), risk management (Laryea and Hughes, 2016), cost of finance (Balimwezo, 2009; Colonnelli and Ntungire, 2018), price fluctuations (Mishra and Regmi, 2017), competition (Enshassi, Al-Hallaq and Mohamed, 2006) and corruption tendencies (Colonnelli and Ntungire, 2018). These variables affect the profitability and if not effectively managed it can lead to low profitability and business failure.

Failure to attain adequate profitability leads to several issues, such as failure to meet short- and long-term liabilities, inability to compete and win tenders, failure to meet contractual obligations and eventually, the company closes business. Whenever the construction companies close, this results in unemployment, loss of income, supply chain uncertainty, public debt, the collapse of affiliated suppliers and sub-contractors and a reduction in government revenue.

Relying on the above literature, the following theories informed the study: (1) Ugandan LCCs are collapsing because of low profitability and (2) Uganda LCCs are earning adequate profitability and therefore do not collapse because of inadequate profitability. These theories were tested by evaluating the profitability levels of LCCs in Uganda, establishing the factors that affect the profitability of LCCs in Uganda and assessing the impact of factors affecting the profitability of LCCs.

Measurement of Profitability

Ibn-Homaid and Tijani (2015) stated that a construction company must evaluate its financial performance periodically so that the necessary and appropriate strategies can be put in place to maintain its survival. Blank and Tarquin (2012) indicated that accountants, financial analysts and engineering economists frequently use business ratio analysis to evaluate a company's financial health over time with industry norms. They further recommended that it is necessary to compute ratios for several companies in the same industry for comparison purposes.

The ratios discussed by Blank and Tarquin (2012) include solvency, efficiency and profitability. Furthermore, they discuss the purpose of these ratios as follows: solvency ratios assess the company's ability to meet short-term and long-term financial obligations; efficiency ratios measure the management's ability to use and control the company's assets; and profitability ratios measure the company's ability to earn a return for the owners of the company. Given the general objective of this study, profitability ratios were used to measure the profitability of LCCs.

Profitability analysis

Profitability ratios reflect a firm's ability to generate profits as returns on the funds invested. In addition, they reflect a firm's competitive situation and management quality (Abdul Rahman, 2017). Therefore, profitability ratios can assist in determining the failure or success of the construction companies.

Husna and Desiyanti (2016) stated that profitability ratios include gross profit margin (GPM), net profit margin (NPM), return on assets (ROA) and return on equity (ROE). For instance, Pamulu, Kajewski and Betts (2007) used the GPM, operating profit margin (OPM), NPM, ROA and ROE to evaluate the financial ratios

in Indonesia's construction industry. AlEid (2015) and CLA (2018) analysed the profitability trends of contractors in the UAE and USA, respectively. Monica (2014) compared the profitability of two companies (SAIL and STATA Steel) using the OPM and GPM. Fardiansyah, Achsani and Juanda (2016) asserted that the ROA and ROE are the return ratios that most commonly used by the investors.

The profitability ratios selected for this study are the margin ratios (GPM, OPM and NPM) and the return ratios (ROA and ROE). Abdul Rahman (2017) defined the GPM as the sale's ability to generate profit. In other words, the gross margin alone indicates the profit that a company retains after paying off its cost of goods sold or direct costs. A high GPM reflects a competitive advantage arising from the effective cost control and high quality. The GPM is calculated as the ratio of net income to gross revenue while the OPM establishes a relationship between operating profit and net sales (Babalola and Anifowose, 2018). A higher operating profit ratio means that the company can increase its sales and reduce its operating expenses, indicating good operational efficiency (Babalola and Anifowose, 2018). Husna and Desiyanti (2016) defined the NPM as the ratio of net profit after taxes to revenue. This reveals a company's ability to generate profits after taxes (Husna and Desiyanti, 2016). The ROA measures a construction company's efficiency in utilising its assets (Ibn-Homaid and Tijani, 2015). A high percentage rate indicates whether a company is well managed and has a good return on assets. The ROE is the ratio of net income after taxes to capital (Husna and Desiyanti, 2016). In other words, it measures a company's equity shareholders' ability to earn a return on equity investments.

Strischek and McIntyre (2008) stressed that financial ratios must be compared with the industry's recommended ratios over a long period. They also argued that these ratios have meaning and point to how the company has been run in the years of accounts. According to Halim et al. (2010), if a firm's financial ratios vary significantly from the industry average, analysts should be concerned about why this variance occurs. Equally, management of the company should be alerted to check for survival. Therefore, the profitability ratios of LCCs were compared with the ratios recommended for the construction sector as proposed by Peterson (2009) and those of contractors in other countries such as the USA (CLA, 2018), the UAE (AlEid, 2015) and Indonesia (Pamulu, Kajewski and Betts, 2007).

Factors that Affect Profitability of Contractors in the Construction Industry

The factors affecting the profitability of contractors were identified from the existing literature and classified into four categories, namely management factors, project-related factors, economic factors and market-related factors.

Management factors

These factors affect profitability, which can be directly controlled by the company's management. Strischek and McIntyre (2008) attributed inadequate project management to financial difficulties among contractors. They asserted that poor project management involves incompetent or untrained personnel; these personnel may fail to implement and monitor cost controls or make uninformed economic decisions without clear justification and planning, which can consequently affect

the company's profitability. Davidson and Maguire (2003) also linked management deficiencies to business failure.

Otim, Nakacwa and Kyakula (2011) conducted a study on cost control techniques used on building construction sites in Uganda and their findings indicated that rather than the methods, the problem lies in poor management of processes and laxity in supervision on most sites visited. Without effective cost management, contractors cannot sustain their long-term profitability. According to Yismalet and Alemu (2018), poor cost management and project cost overruns are severe issues in developed and developing countries. They discovered that inadequate financial planning and lack of effective and efficient project cost management systems are among the factors responsible for obtaining low profits.

Project-related factors

These factors are borne by the characteristics of construction contracts. According to Kikwasi (2012), construction project delays and disruptions are among the challenges faced during the execution of construction projects. Lee (2009a) wrote that it is essential for projects to be completed on time so that the amount of liquidated damage is not high, as late completions offset profits.

According to Iyer and Kumar (2016), cash flow is the most important factor affecting the profitability of construction projects under execution. They also indicated that cash flow assumes even greater importance in modern construction businesses as companies handle many projects simultaneously, which necessitates precise planning for fund management. Late payment has been identified as one of the biggest challenges facing small businesses in the UK, with an estimated of 50,000 companies failing each year because of late payments, leading to severe cash flow problems (Qamar and Collinson, 2018). Delayed payments are considered a significant factor because they cause severe cash flow problems for contractors (Ansah, 2011).

Economic factors

Economic factors are variables borne by national economic conditions, including monetary and fiscal policies, the global economy's state and inflation. According to Colonnelli and Ntungire (2018), the construction industry is a high-risk sector for financers because it often requires high fixed capital investments and incurs high sunk costs. The lack of access to finance is especially acute for local construction firms in Uganda, whose ability to borrow is limited by rigidities in the domestic market and a lack of collateral security. In addition, commercial banks' current high lending rates have led to increased business costs and ultimately slow business growth in Uganda (New Vision, 2018). New Vision (2018) further indicated that Uganda's commercial banks' lending rates are as high as 26%. Currently, the majority of the competitors to LCCs are the Chinese firms borrowing at interest rates as low as 3%. Consequently, LCCs are forced to unreasonably lower their profit margins to compete with the foreign companies. Otherwise, foreign firms will continue to outcompete LCCs. As a result, LCCs will suffer financially and collapse.

Price fluctuations are defined by Mishra and Regmi (2017), as the rise and fall in prices of goods, materials and services on the market. They further claimed that a contractor who tenders at a fixed price runs the risk that he may later have to

pay more for materials and labour than the prices and wages current at his tender time. Conversely, the contractor may benefit if the prices and wages decrease. Mishra and Regmi (2017) discovered that Nepalese contractors lose at least 52% of their expected profit because of the price fluctuations in the construction inputs. Therefore, this risk price must be considered at the pre-tender stage but also be monitored post-contract.

Market-related factors

Market-related factors are variables resulting from the industry forces of demand and supply and the nature of practices in the industry. Lee (2009a) claimed that construction contractors worldwide have been forced out of business, primarily because of a highly competitive bidding environment that has resulted in relatively low profitability and even significant losses. For instance, in Gaza Strip where the construction industry is dominated by a competitive construction sector driven by an inferior cost mentality. This created a lot of pressure on contractors to reduce the price during the bidding process for construction contracts, pushing them on the edges of the already worse economic times, resulting in losses in due course (Enshassi, Al-Hallaq and Mohamed, 2006). Uganda is no exception; Ocen, Alinaitwe and Tindiwensi (2011) confirmed that construction businesses in Uganda closed or changed the business in a short time due to the low competitiveness of LCCs.

Colonnelli and Ntungire (2018) claimed that corruption is the leading friction in doing business in Uganda. Therefore, the cost of doing business is high for companies that rely on the government jobs. There are several reasons why sectors, such as construction are prone to corruption. Construction is highly dependent on the public procurement. Coupled with sizable contracts, this gives public officials and consultants many lucrative opportunities to illegally solicit money from contractors.

METHODOLOGY

Research Design

The survey strategy of inquiry was selected because the characteristics of this study resonated with the assertion that surveys mostly use questionnaires, interviews and observations for data collection (Abdulai and Owusu-Ansah, 2014).

Research Approach

A mixed research methodology was selected for this study because it involved qualitative and quantitative research design approaches. The characteristics of quantitative research in this study included: an inquiry into a social problem based on testing a theory composed of variables, measured with numbers and analysed using statistical procedures to determine the predictive generalisation of the theory; viewed truthfulness, which could be measured; the researcher remained distant and independent of the investigation to ensure objective assessment of the situation; the variables were chosen before the study began and remained fixed throughout the study; questionnaires with closed-ended questions were used to collect data; and inferential numerical analysis of data was carried out using

the Statistical Package for the Social Sciences software. The qualitative research methodology that formed part of this study included interviews which was used for primary data collection.

A qualitative approach was incorporated in this study to focus on the meaning of the collected data rather than simply quantifying the phenomena. This enabled the researcher to gather in-depth knowledge of the research topic, which assisted in making judgments on the quantitative data collected. Structured interviews with open-ended questions were used to collect data. All data collected from the interviews were recorded using a cell phone (iPhone 8), later reproduced on paper, conceptualised and categorised according to the research objectives. The data then entered into the MS Excel and analysed using content analysis and lastly, interpretations were made of the data.

Research Population

The target population for this study comprised company representatives with knowledge of company's profitability, namely, directors, project managers, quantity surveyors, accountants, administrators and procurement managers from different construction companies. Each construction company appointed a single representative from the list above to participate in this study. Appointments were made based on the availability and working experience of the respondents. The companies that participated in this study were those registered with Uganda National Association of Building and Civil Engineering Contractors (UNABCEC) as local civil and building engineering contractors under various classes: A-1 local, A-2, A-3, A-4 and A-5. Contractors registered with UNABCEC were classified according to their estimated annual volume of work, area of specialty and nationality.

Sampling Strategy

Stratified sampling was used because the study population comprised small strata based on the contractors' annual volume of contracts, area of specialty and nationality, which classified under different categories. The sample size of the entire population of contractors was determined using Yamane's formula to calculate the sample size of a finite population (Yamane, 1967). Yamane's formula was appropriate because the population of the LCCs registered with the UNABCEC is known. Yamane's Formula calculating sample of a finite population is:

$$n = \frac{N}{1 + N\left(e^2\right)} \qquad \text{Eq. 1}$$

where, n is the sample size, N is the population of the study and e is the level of precision. The sample size of the entire population is as follows:

$$\text{Sample size } (n) = \frac{89}{1 + 89\left(0.1^2\right)} = 47 \qquad \text{Eq. 2}$$

Owing to the nature of the study population, a sample fraction in each stratum (n_i) was determined. The proportional allocation method was used to determine sample fractions for each stratum. The formula for proportional allocation method is:

$$n_i = n\frac{N_i}{N} \quad \text{Eq. 3}$$

where, n_i is the sample fraction of i^{th} strata, n is the sample size of the entire population, N_i is the population size of i^{th} strata, and N is the population size of the study.

For instance, the researcher applied Equation 3 to class A-1 locals with a sample size of the entire population (n) of 47, population size of i^{th} strata (N_i) of 13 and population size (N) of 89, as illustrated in Equation 4.

$$\text{The sample fraction } (n_i) = 47\frac{13}{89} = 6 \quad \text{Eq. 4}$$

The same equation applies to all the other strata, as indicated in Table 1. After determining the sample fractions, systematic sampling was used to identify the contractors that formed a part of the sample fraction from each stratum.

Table 1. The sample fraction of the study population

Stratum	Class	Annual Volume of Work (UGX)	N_i	n_i
1	A-1 local	> 10 billion	13	6
2	A-2	> 5 billion but ≤ 10 billion	15	8
3	A-3	> 2.5 billion but ≤ 5 billion	9	5
4	A-4	> 500 million but ≤ 2.5 billion	22	12
5	A-5	≤ 500 million	30	16
		Total	89	47

Description of the Study Area

The study was carried out in Uganda's Greater Kampala Metropolitan Area because 96% of the sample population operated in this area.

Data Sources

Primary data collection was conducted between October 2019 and January 2020, using questionnaires and interview guides. On the other hand, secondary data collection instruments included published journals, books, published reports, online materials and company annual financial statements for three years (2016 to 2018).

Data Collection Instruments

Data on the profitability of LCCs were obtained from audited annual financial statements from year 2016 to 2018. The median was used as a statistical measure of profitability ratios because it is not skewed by a small percentage of large or small data and therefore provides a better representation of a typical value. Then, the profitability ratios of LCCs in Uganda were compared with the ratios recommended for the construction industry and those for contractors in other countries, that is, the

UAE, Indonesia and the USA, in order to compare and provide justifications for the variance in the data. Structured questionnaires and interview guides were used to collect data on factors affecting the profitability of LCCs in Uganda.

Data Quality Testing

There was a need to explicitly link the data collection instruments to the research objectives. Therefore, a pilot study was conducted to remove errors and irrelevant questions from the questionnaire so that the respondents would not experience difficulties in completing the tools. In addition, a preliminary analysis with the supervisors was also carried out to determine whether the wording and format of the questions would present difficulties when the main data were collected and analysed. This trial involved testing the wording of the questions, identifying ambiguous questions, testing the data collection procedure and measuring the effectiveness of the invitations to the respondents.

Validity of the questionnaire

Content validity was conducted to determine the feasibility of the content being supplied to the respondents if the tools answered the questionnaires and fulfilled the research objectives. Content validation was performed per objective and the results are presented in Table 2. Yusoff (2019) recommended that the acceptable values of the content validity index (CVI) should range between 0.78 and 1; the closer to 1, the better and more satisfactory. Therefore, with an average CVI of 0.983, the content in the questionnaires is believed to be valid and hence provides accurate information for the investigation.

Table 2. Content validation of the questionnaires

Parameter	CVI
Questions about factors affecting profitability of LCCs in Uganda	0.978
Evaluation of LCC's profitability	0.988
Average CVI	0.983

Reliability of the questionnaire

An internal consistency technique using Cronbach's alpha was applied to measure the reliability of the data-collection instruments. Cronbach's alpha is the coefficient of reliability that provides an unbiased estimate of data generalisability. Table 3 shows the Cronbach's alpha values for each filled section of the questionnaire. The average Cronbach's alpha value was 0.813 for the entire questionnaire, indicating good reliability of the whole questionnaire. A reliability coefficient of 0.70 or higher is considered acceptable reliability in the SPSS. Therefore, the questionnaire was considered valid and reliable and was distributed to an acceptable population sample size.

Table 3. Cronbach's alpha reliability analysis for the questionnaires

Parameter	Cronbach's Alpha
Questions about factors affecting profitability of LCCs in Uganda	0.862
Evaluation of LCC's profitability	0.763
Average	0.813

Data Analysis

A combination of MS Excel and SPSS 25 was used to analyse the quantitative data to answer the research questions. In addition, regression analysis was used to measure the relationship, strength and direction of the variables as well as to test the significance of the variables using the correlation. Tables, bar graphs and pie charts were used to present the analysed data for clarity. In addition, content analysis was used to analyse the qualitative data.

RESULTS AND DISCUSSION

Response Rate

Questionnaires were administered among 47 LCCs in Uganda. Thirty-five valid responses were received, representing a response rate of 74.3%. The recommended response rate ranges from 60% to 80% (Creswell and Creswell, 2018). Therefore, the response rate was considered acceptable.

Evaluation of the Profitability of LCCs in Uganda

Profitability of Ugandan LCCs from year 2016 to 2018

Profitability ratios were computed based on the financial data collected from the LCCs. The ratios were then compared to Peterson's median and the range recommended for the construction industry (Peterson, 2009). In addition, the ratios were compared with those of contractors in other countries such as the USA (CLA, 2018), the UAE (AlEid, 2015) and Indonesia (Pamulu, Kajewski and Betts, 2007). Profitability ratios analysed in this study include GPM, OPM, NPM, ROA and ROE, as shown in Table 4.

Table 4. Profitability of the LCCs in Uganda from year 2016 to 2018

Profitability Ratios	**2016 (%)**	**2017 (%)**	**2018 (%)**
GPM	8.45	8.31	8.12
OPM	5.60	5.58	5.53
NPM	6.93	3.63	3.70
ROA	3.02	3.65	3.46
ROE	7.27	7.66	10.27

All profitability ratios were found to be below than the range recommended by the construction industry. Additionally, they steadily decreased over the years studied, except for the ROA. The reduction in GPM suggests that contractors spent much on construction costs and acquired a lot of debt during that period, whereas a reduction in OPM suggests that LCCs do not control their direct costs effectively. In addition, this indicates that LCCs are less competitive in the sector. Therefore, LCCs need to improve their management strategies to enhance the profitability. Low NPM implies high tax rates and dependence on debt. The proposed remedy is to enable easy access to cheaper financing, improved commercial management and a reduction in taxes on LCCs. The ROE was higher than the ROA, amidst the low-profit margins reported. An ROE lower than the industry-recommended average signifies that LCCs are not able to generate reasonable and acceptable returns for their equity shareholders while a low ROA indicates that contractors do not utilise their assets well. This indicates that LCCs managed their assets inefficiently and possibly relied more on borrowed capital, which substantially affected their financial performance. The profitability of the LCCs was then compared with that of the contractors in the USA, Indonesia and the UAE. The findings show that the contractors in these countries performed better than the LCCs in Uganda. These findings concur with the assumptions of the study that the LCCs earning inadequate profitability contribute to business failures. Therefore, there is a need to develop strategies to enhance the profitability of the LCCs and minimise the business failures.

Factors affecting profitability of LCCs in Uganda

Relative importance index (RII) was used to determine the most significant factors affecting the profitability of LCCs in Uganda. The results are presented in Tables 5 to 8.

Table 5. Management factors that affect profitability

Management Factors	RII	Rank
Project cost management	0.8190	1
Project management	0.8095	2
Risk management	0.8095	2
Business strategy	0.6571	4
Profit strategy	0.6476	5
Average	0.7485	

Table 5 shows that project cost management, project management and risk management are the management factors that remarkably affected the LCCs' profitability. On the other hand, business strategy and profit strategy were considered inconsequential because their RII values were below than the average RII value of 0.7485. Otim, Nakacwa and Kyakula (2011) concurred with the findings of the study that cost control techniques are not the problem but the project cost management of the techniques that sparks all the rise in the cost overruns, resulting in low profitability.

Table 6. Project-related factors that affect profitability

Project-Related Factors	RII	Rank
Timeliness of payments	0.9810	1
Project delays	0.9048	2
Accuracy of bid estimates	0.8190	3
Change in scope	0.7619	4
Site productivity	0.7429	5
Average	0.8419	

Table 6 reveals that the timeliness of payments as the most significant project-related factor that affects the profitability of the LCCs, followed by the project delays. Qamar and Collinson (2018) supported the finding that late payment is one of the biggest challenges facing small businesses in the UK, leading to the collapse of approximately 50,000 companies per year. Similarly, Ansah (2011) found that the timeliness of payments is the most influential and significant factor affecting the contractors' profitability, as it causes several cash flow problems for contractors.

Table 7. Economic factors that affect profitability

Economic Factors	**RII**	**Rank**
Cost of finance or capital	0.9238	1
Price fluctuations	0.8952	2
Changes in tax legislation and regulatory ordinances	0.8381	3
Average	0.8857	

Table 8. Market-related factors that affect profitability

Market-Related Factors	**RII**	**Rank**
Competition	0.9333	1
Corruption tendencies	0.8667	2
Experience of the contractors	0.7810	3
Supply and demand	0.7524	4
Average	0.8334	

The results in Table 7 show that the cost of finance and price fluctuations were significant economic factors and finally, Table 8 indicates that a competitive bidding environment and corruption tendencies were significant market-related factors that affecting the LCCs' profitability. Lee (2009a) supported the findings of this study that construction contractors worldwide have been forced out of business, mostly because of a more competitive bidding environment that resulted in relatively low profitability and even significant losses. These factors require measures to mitigate low profitability and consequently, business failures.

Themes Generated from the Interviews

In analysing the interview data, three themes materialised, which will be discussed in this section. These include factors that cause divergency in targeted profitability, strategies that the LCCs have in place to minimise low profitability and recommendations made to enhance the profitability of the LCCs.

The interview data revealed that divergence in the profitability of LCCs is a recurrent problem and contractors are willing to develop strategies that will assist in minimising it. The data indicated that LCCs' profitability is affected by project delays, timeliness of payment, poor project cost management, stiff competition, poor risk management, inflation, high cost of capital and corruption tendencies. One of the respondents, Deborah (a quantity surveyor) stated that profitability is significantly affected by the project delays. She discussed this factor, "when a construction project is delayed by the contractor, the project overheads increase beyond cost targets and eventually erode the anticipated profit". Therefore, she suggested that contractors should ensure that realistic work schedules are prepared and monitored during construction to avert this problem. She also pointed out on poor project management practices, such as employing incompetent staff, changing key staff during the project and a tendency of management not to

act on recommendations made by the technical team on matters of project management. Peter (project manager), the other respondent, expressed that the timeliness of payments has a great impact on the profitability of LCCs because it affects not only their cash flow and time value for money but may also lead to an increased cost of capital when the contractor has borrowed funds to finance the project. He suggested that LCCs should ensure alternative sources of income to support their cash flow in the case of delayed payments. The factors revealed by the interviews were correlated with those identified by the questionnaires. Other factors were also revealed, such as reworks, high cost of bidding and delays in the delivery of materials. However, these can also be related to project management.

LCCs claimed to have put strategies in place to mitigate low profitability, including the use of competent project managers, proper project planning and management, cost control and management systems, motivation and skilling of labourers to improve efficiency and productivity and the formation of joint ventures to enhance their capacity. However, these efforts are curtailed by the following limitations: lack of good cash flow to support company systems and project management tools, unfavourable government policies, delayed payments and few clients who appreciate quality and corruption by government agencies.

Literature review data also revealed some recommendations to improve the profitability of LCCs, including the need to have government policies that protect LCCS from competition by international companies, reduction on taxes and statutory fees levied on local construction companies, funds put up by the government to facilitate easier access to financing at favourable interest rates, the government enforcing reservation schemes according to the prevailing procurement laws and the local content Act of 2019 and ensuring timely payments to LCCs, especially by the government, among others.

Regression Model to Enhance Profitability of LCCs in Uganda

Multiple regression analysis was used to validate the factors affecting LCCs' profitability. The significant factors were used in the model. SPSS version 25 was used to code and compute multiple regression analyses. A regression model was developed, verified and validated to quantify the confidence in the predictions produced by the model. A perfect model was extracted from SPSS, which included seven factors affecting LCCs' profitability, as shown in Table 9, with the regression equation as follows:

$$PROF = 1.660 + 0.217RM + 0.811TP + 0.749PD + 0.792CF + 0.400PF + 0.776C + 0.397CT \quad \text{Eq. 5}$$

where, PROF = Dependent variable (profitability of LCCs), RM = Risk management, TP = Timeliness of payments, PD = Project delays, CF = Cost of finance, PF = Price fluctuation, C = Competitive bidding environment and CT = Corruption tendencies.

The regression Equation 5 reveals that, by taking all factors constant (RM, C, CF, TP, PD, PF and CT), the dependent variable profitability of LCCs is 1.660. As shown in Table 9, the timeliness of payments had the most significant impact on profitability of LCCs, indicating that a unit change in TP while holding RM, PD, CF, PF, C and CT constant produces an increase in 0.811 units of profitability of LCCs. The study revealed that the timeliness of payment has the greatest impact on profitability, followed by cost of finance, competitive bidding environment, project delays, corruption tendencies and risk management.

Table 9. Predictive model of factors affecting profitability of LCCs in Uganda

Coefficients						
Model		**Unstandardised Coefficients**		**Standardised Coefficients**	***T***	**Sig.**
		Beta	**Std. Error**	**Beta**		
1	(Constant)	1.660	0.049	–	2.833	0.012
	RM	0.217	0.038	0.111	3.352	0.024
	TP	0.811	0.062	0.467	3.600	0.000
	PD	0.749	0.056	0.255	3.261	0.001
	CF	0.792	0.054	0.352	3.192	0.039
	PF	0.400	0.044	0.171	3.444	0.004
	C	0.776	0.036	0.359	3.476	0.008
	CT	0.397	0.051	0.182	3.591	0.001

Model verification

The *F*-test was used to verify the model. The goodness of fit was calculated from the *F*-value, where the table of *F*-values was compared with the SPSS computed *F*-value (Archer and Lemeshow, 2006). When the computed *F*-value > *F*-value is critical, then the model is adequate. From the *F*-value table, given a degree of freedom (df) of 7 and a specific alpha *p*-value of 0.05, as shown in Table 10, the *F*-value was 5.69. Compared with the computed *F*-value of 12.422, as shown in Table 10, the computed *F*-value is greater than the table of *F*-value of 5.69, indicating that the model is adequate and relative to a perfect model.

Table 10. ANOVA table for the model verification

ANOVA* Model Verification						
Model		**Sum of Squares**	**df**	**Mean Square**	***F***	**Sig.**
1	Regression	42.000	7	6.433	12.422	0.000**
	Residual	62.721	30	0.321		
	Total	104.721	37			

Notes: *Dependent variable: Profitability; **Predictors: (Constant), RM, TP, PD, CF, PF, C and CT.

Model fitness test

The regression equation and coefficient of determination, R^2 were evaluated. The predicted and adjusted R^2 values were assumed to be in reasonable agreement (closer to each other). Higher R^2 values are desirable. The closer the predicted and adjusted R^2 values are, the stronger the model and the better it predicts the response (Blaikie, 2003). In this model, as shown in Table 11, the value of R^2 was 0.882, which means that the variance of 88% in the profitability of LCCs is attributed to the selected factors in the study, with only 12% of the total variance not explained by

the model; which may be due to other factors that have not been incorporated in the study. The value of the adjusted R^2 is 0.800, which is also higher, further supporting the significance of the model.

Table 11. Model summary table to measure fitness of the model

Model	*R*	R^2	Adjusted R^2	Std. Error of the Estimate
1	0.728	0.882	0.800	0.082

Model validation

The developed regression model was validated using the split-sample approach. The data obtained from the questionnaires were coded in SPSS and split into 70% and 30% ratios, respectively. The model was re-run to determine its authenticity and whether it was perfect with normalised points instead of overfitted points. The study indicated a small difference between the actual and predicted R^2 values, as shown in Table 12, which is a good indication that the model had good predictive ability. Therefore, the developed model is valid, reliable and can be applied to the LCCs to enhance their profitability levels.

Table 12. Model validation table showing the difference between the actual model and the split model

Actual Model		Split Model	
Actual R^2	Predictive R^2	Actual R^2 – Predictive R^2	Remarks
0.882	0.816	0.066	Close
Actual Adj. R^2	Predictive Adj. R^2	Actual Adj. R^2 – Adj. Predictive R^2	Remarks
0.800	0.789	0.011	Very close

Application of the model

The model highlights the impact of the identified factors affecting the profitability of LCCs in Uganda. Timeliness of payments ($y1$) and project delays ($y2$) were measured in terms of days, while price fluctuations ($y3$) and cost of finance ($y4$) were measured in terms of percentages. The data derived from the regression equations is presented in Table 13.

Table 13. Impact of significant factors affecting profitability

Regression Equation	**PROF. = 1.66 + 0.811*X***	**PROF. = 1.66 + 0.749*X***	**PROF. = 1.66 + 0.792*X***	**PROF. = 1.66 + 0.4*X***
X	***y*1**	***y*2**	***y*3**	***y*4**
0	1.66	1.66	1.66	1.66
5	5.715	5.405	3.66	5.62
10	9.77	9.15	5.66	9.58
15	13.825	12.895	7.66	13.54
20	17.88	16.64	9.66	17.5
25	21.935	20.385	11.66	21.46
30	25.99	24.13	13.66	25.42

Table 13 shows that timeliness of payments has the greatest impact on the LCCs' profitability followed by cost of finance, project delays and price fluctuations. This implies that the contractors' cashflow is very critical to the financial success of a construction company. This model will help LCCs to easily identify the factors that have the most significant power in enhancing their profitability. By understanding where power lies, the model shall assist LCCs to identify their operational strengths, improve weaknesses and avoid mistakes. Also, the model will help stakeholders of the construction sector to understand the forces affecting profitability in the construction industry as well as can help them make decisions relating to whether to enter the construction industry, whether to increase capacity for the sector and developing competitive strategies to enhance profitability and survival of the LCCs.

CONCLUSION

This study evaluated the profitability of LCCs in Uganda and identified the factors affecting their profitability. It also determined the impact of these factors on profitability and developed a model for enhancing the profitability of Ugandan LCCs. According to the results, LCCs earn inadequate profitability considering the recommended construction industry profitability ratios and those of contractors in other countries. The timeliness of payments, cost of finance, project delays and competitive bidding environment have the highest RII and therefore, are the most remarkable factors affecting the profitability of LCCs in Uganda. In addition, a regression model was developed to enable contractors and industry stakeholders to identify the factors that significantly affect the profitability of LCCs and develop strategies that will help to enhance profitability and minimise business failure. We recommend that further studies be conducted to evaluate financial performance using other financial ratios, such as solvency ratios, liquidity ratios and activity ratios to understand the general financial performance of LCCs in Uganda. In addition, further research is needed to determine the impact of company size and experience on profitability. This could reveal the strategies that the big and experienced construction companies use to ensure their survival.

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REFERENCES

Abdul Rahman, A.A.A. (2017). The relationship between solvency ratios and profitability ratios: Analytical study in food industrial companies listed in analytical study in food industrial companies listed in Amman Bursa. *International Journal of Economics and Financial Issues*, 7(2): 86–93.

Abdulai, R.T. and Owusu-Ansah, A. (2014). Essential ingredients of a good research proposal for undergraduate and postgraduate students in Social Sciences. *SAGE Open*, 4(3): 1–15. https://doi.org/10.1177/2158244014548178

Alavipour, S.M.R. and Arditi, D. (2019). Maximizing expected contractor profit using an integrated model. *Engineering, Construction and Architectural Management*, 26(1): 118–138. https://doi.org/10.1108/ECAM-04-2018-0149

AlEid, A.B.M. (2015). A financial statement analysis on three major construction companies in the UAE (Arabtec Holding PJSC, Drake & Scull PJSC and Emaar Properties PJSC). MSc diss. The British University in Dubai.

Ansah, S.K. (2011). Causes and effects of delayed payments by clients on construction projects in Ghana. *Journal of Construction Project Management and Innovation*, 1(1): 27–45.

Archer, K.J. and Lemeshow, S. (2006). Goodness-of-fit test for a logistic regression model fitted using survey sample data. *The Stata Journal*, 6(1): 97–105. https://doi.org/10.1177/1536867X0600600106

Babalola, A.A. and Anifowose, O.S. (2018). Improving the profitability of construction contracting firms in Nigeria through strategic alliancing initiatives. *The International Journal of Engineering and Science*, 7(2): 61–67.

Balimwezo, R. (2009). A comparative study of local and foreign construction firms' participation in donor funded road construction projects: A case study of Uganda. Available at: http://makir.mak.ac.ug/handle/10570/3427 [Accessed on 7 July 2019].

Blaikie, N. (2003). *Analyzing Quantitative Data: From Description to Explanation*. 1st Ed. London: SAGE Publications Ltd.

Blank, L. and Tarquin, A. (2012). *Engineering Economy*. 7th Ed. New York: McGraw-Hill.

Chan, T.K. and Martek, I. (2017). Profitability of large commercial construction companies in Australia. In M. Lamb (ed.), *AUBEA 2017: Australasian Universities Building Education Association Conference 2017*. Vol. 1. Sydney: AUBEA 2017, 139–146. https://doi.org/10.29007/25c2

CLA (CliftonLarsonAllen) (2018). The 2018 CLA construction benchmark report. Available at: https://www.claconnect.com/resources/articles/2019/-/media/files/white-papers/2018-core-benchmark-report.pdf [Accessed on 15 August 2019].

Colonnelli, E. and Ntungire, N. (2018). *Construction and Public Procurement in Uganda*. WIDER working paper 2018/180. Helsinki: UNU-WIDER. https://doi.org/10.35188/UNU-WIDER/2018/622-7

Creditsafe (2018). *Watch Dog Report: A Statistical Analysis of the UK Economy. Q2 2018.* Caerphilly, UK: Creditsafe. Available at: https://www.bing.com/ck/a?!&&p=e1e89ccb758589c6JmltdHM9MTY4NTA1OTIwMCZpZ3VpZD0yNzViMmRkNS0wOWQxLTY0OWMtMWFlOC0zZjRiMDgyYzY1NjEmaW5zaWQ9NTE5Ng&ptn=3&hsh=3&fclid=275b2dd5-09d1-649c-1ae8-3f4b082c6561&psq=creditsafe-watchdog-report-q1-2018&u=a1aHR0cHM6Ly93d3cuY3JIZGI0c2FmZS5jb20vY29udGVudC9kYW0vdWsvcGRmcy93YXRjaGRvZy1y-ZXBvcnRzL1dhdGNoZG9nLVEyLTIwMTgtRnVsbC1SZXBvcnQucGRm&ntb=1 [Accessed on 2 July 2019].

Creswell, J.W. and Creswell, J.D. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* 5th Ed. Los Angeles: SAGE Publications.

Davidson, R.A. and Maguire, M.G (2003). Ten common causes of construction contractor failures. *Journal of Construction Accounting and Taxation,* 13(1): 35–37.

El-Kholy, A.M. and Akal, A.Y. (2019). Determining the stationary financial cause of contracting firms failure. *International Journal of Construction Management*, 21(8): 818–833. https://doi.org/10.1080/15623599.2019.1584836

Enshassi, A., Al-Hallaq, K. and Mohamed, S. (2006). Causes of contractor's business failure in developing countries: The case of Palestine. *Journal of Construction in Developing Countries*, 11(2): 1–14.

Fardiansyah, T., Achsani, N.A. and Juanda, B. (2016). The relationship analysis between profitability ratio and the firm size to the banking stock return after the implementation of PBI No. 14/26/PBI/2012. *Research Journal of Finance and Accounting*, 7(10): 39–50.

Halim, M.S., Jaafar, M., Osman, O. and Akbar, S. (2010). The contracting firm's failure and financial related factors: A case study of Malaysian contracting firms. *International Research Journal of Finance and Economics*, 52(1): 28–39.

Husna, N. and Desiyanti, R. (2016). The analysis of financial performance on net profit margin at the coal company. *International Journal of Management and Applied Science*, 2(4): 105–108.

Hwee, N.G. and Tiong, R.L.K. (2002). Model on cash flow forecasting and risk analysis for contracting firms. *International Journal of Project Management*, 20(5): 351–363. https://doi.org/10.1016/S0263-7863(01)00037-0

Ibn-Homaid, N.T. and Tijani, I.A. (2015). Financial analysis of a construction company in Saudi Arabia. *International Journal of Construction Engineering and Management*, 4(3): 80–86.

IMF (International Monetary Fund) (2019). *Uganda: 2019 Article IV Consultation-Press Release; Staff Report; and Statement by the Executive Director for Uganda. IMF Country Report No. 19/125*. Washington DC: IMF. https://doi.org/10.5089/9781498313667.002

Iyer, K.C. and Kumar, R. (2016). Impact of delay and escalation on cash flow and profitability in a real estate project. *Procedia Engineering*, 145: 388–395. https://doi.org/10.1016/j.proeng.2016.04.097

John, K., Gwaya, A.O. and Wanyona, G. (2019). Causes of contractors' failure in the construction industry in Rwanda. *International Journal of Innovative Science and Modern Engineering*, 5(12): 75–82.

Kikwasi, G.J. (2012). Causes and effects of delays and disruptions in construction projects in Tanzania. *Australasian Journal of Construction Economics and Building Conference Series*, 1(2): 52–59. https://doi.org/10.5130/ajceb-cs.v1i2.3166

Laryea, S. and Hughes, W. (2006). The price of risk in construction projects. In D. Boyd (ed.), *Proceedings: 22nd Annual ARCOM Conference*. Birmingham, UK: Association of Researchers in Construction Management, 553–561.

Lee, F.P. (2009a). Factors affecting the profitability of construction companies in Hong Kong. PhD diss. University of Hong Kong.

Lee, J. (2009b). Does size matter in firm performance? Evidence from US public firms. *International Journal of the Economics of Business*, 16(2): 189–203. https://doi.org/10.1080/13571510902917400

Mahamid, I. (2012). Factors affecting contractor's business failure: Contractors' perspective. *Engineering, Construction and Architectural Management*, 19(3): 269–285. https://doi.org/10.1108/09699981211219607

Mishra, A.K. and Regmi, U. (2017). Effects of price fluctuation on the financial capacity of "Class A" contractors. *International Journal of Creative Research Thoughts*, 5(4): 1920–1938.

Mohammed, I.Y. (2016). Investigation into the causes of contractors' business failure in Nigeria. *CARD International Journal of Environmental Studies and Safety Research*, 1(3): 1–14.

Monica, T. (2014). Profitability analysis (A comparative study of SAIL and TATA Steel). *Journal of Economics and Finance*, 3(2): 19–22. https://doi.org/10.9790/5933-03211922

New Vision (2018). High lending rates hampering business growth. *New Vision*, 16 July. Available at: https://www.newvision.co.ug/news/1481542/lending-rates-hampering-business-growth

Ocen, S.J., Alinaitwe, H. and Tindiwensi, D. (2011). An analysis of the competitiveness of local construction contractors in Uganda. In J.A. Mwakali and H.M. Alinaitwe (eds.), *Advances in Engineering and Technology, Contribution of Scientific Research in Development. Kampala: Macmillan,* 346–352. Available at: https://www.mak.ac.ug/documents/Makfiles/aet2011/Ocen.pdf

Oladimeji, O. and Aina, O.O. (2018). Cash flow management techniques practices of local firms in Nigeria. *International Journal of Construction Management*, 21(4): 395–403. https://doi.org/10.1080/15623599.2018.1541705

Otim, G., Nakacwa, F. and Kyakula, M. (2011). Cost control techniques used on building construction sites in Uganda. In J.A. Mwakali and H.M. Alinaitwe (eds.), *Advances in Engineering and Technology, Contribution of Scientific Research in Development*. Kampala: Macmillan, 367–373. Available at: https://www.mak.ac.ug/documents/Makfiles/aet2011/Otim-2.pdf

Pamulu, M.S., Kajewski, S.L. and Betts, M. (2007). Evaluating financial ratios in the construction industry: A case study of Indonesian firms. In W. Dewobroto, H. Hardjasaputra, M.R. Adventus, J. Widjajakusuma and F.M. Sitohang (eds.), *Proceedings: 1st International Conference of European Asian Civil Engineering Forum (EACEF)*. Jakarta: EACEF, E–158. Available at: https://www.academia.edu/546037/Evaluating_financial_ratios_in_construction_industry_a_case_study_of_Indonesian_firms

Peterson, S.J. (2009). *Construction Accounting and Financial Management*. 2nd Ed. New Jersey: Pearson Education.

Qamar, A. and Collinson, S. (2018). *Part A Carillion's Collapse: Cause. City-REDI Policy Briefing Series*. Birmingham, UK: City-REDI, University of Birmingham. Available at: https://blog.bham.ac.uk/cityredi/wp-content/uploads/sites/15/2018/03/Carillion-Policy-Brief-A-Final.pdf

Rajasekhar, R. (2017). Financial performance evaluation of construction industries. *International Journal of Scientific and Research Publications*, 7(1): 157–175. Available at: https://www.ijsrp.org/research-paper-0117/ijsrp-p6129.pdf

Segal, T. (2023). Investing, fundamental analysis. *Investopedia*, 16 March (Updated). Available at: https://www.investopedia.com/terms/f/fundamentalanalysis.asp

Strischek, D. and McIntyre, M. (2008). Red flags and warning signs of contractor failure. *The RMA Journal*, 90(1): 72–77.

Tan, Y. (2018). The impacts of competition and risk on profitability in Chinese banking: Evidence from Boone indicator and stability inefficiency. *Annals of Economics and Finance*, 19(2): 523–554. https://doi.org/10.2139/ssrn.3063943

Yamane, T. (1967). *Statistics: An Introductory Analysis*. 2nd Ed. New York: Harper and Row.

Yismalet, A.G. and Alemu, M.G. (2018). Improving project cost management practices and profitability of domestic contractors in Vadodara. *Journal of Emerging Technologies and Innovative Research*, 5(5): 1334–1342.

Yusoff, M.S.B. (2019). ABC of content validation and content validity index calculation. *Education in Medicine Journal*, 11(2): 49–54. https://doi.org/10.21315/eimj2019.11.2.6