Original Research Article

Assessing the Impacts of Technology Adoption on Construction Business Profitability

Abstract

This study examined the impacts of technology adoption on the profitability of construction businesses. Atheoretical approach was used to identifyvarious construction companies that have adopted different technologies.The qualitative component of the survey research method was employed to collect data from published literature, focusing on current trends in construction business profitability research, particularly in developing countries. Articles were sourced from open research corpora such as Google Scholar, ResearchGate, and Academia. Relevant references were then exported to an Excel file, including details like the author's name, publication year, work title, abstract, and date.Data collection involved document analysis, including examining financial reports, technology adoption records, and business plans. The literature review covered discussions on technology adoption, exploring the process, reasons, challenges, decision-making, and the impact on profitability.Thematic analysis was employed to analyze the documents, identifying patterns, themes, and connections related to technology adoption and profitability.The findings of this study can empower construction businesses to overcome challenges and foster organic growth through the strategic adoption of technology. By embracing technological advancements, construction firms can enhance their competitiveness, achieve sustainable growth, and ultimately thrive in a rapidly evolving industry landscape.

Keywords:Technology adoption, Profitability, Construction businesses, Qualitative research, Literature review, Thematic analysis, Developing countries, Cost reduction, Efficiency,Customer satisfaction.

1.Introduction

The adoption of technology in the construction industry can significantly impact the profitability of construction businesses, as technology has had on other sectors of the economy. However, the construction industry has been relatively slow in adopting and integrating technology into its operations compared to other sectors. This lag in technology adoption has hindered the industry's ability to fully capitalize on the benefits of technological advancements, including improved profitability(Olakada, Adewale, George, & Yasiru, 2024).Traditionally, the construction industry has relied on manual processes, paper-based documentation, and outdated communication methods, leading to inefficiencies, cost overruns, and delays in project completion(Fobiri, Musonda, & Muleya, 2022). However, with the rapid advancement of technology in recent years, there is a growing recognition of its potential impact on transforming the construction industry and enhancing business profitability(Chen et al., 2022).The adoption of technology in the construction sector presents a range of opportunities to streamline operations, improve project management, enhance collaboration, and optimize resource allocation(Matveeva & Filatov, 2022).These advancements can ultimately lead to increased profitability for construction

businesses. By effectively leveraging technology, companies can reduce costs, improve productivity, minimize rework, and enhance project outcomes(Rane, 2023).

Technology solutions such as construction management software, Building Information Modeling (BIM), drones, robotics, and IoT sensors can revolutionize construction (Srivastava et al., 2022). These tools enable better project planning, scheduling, communication, data analysis, and automation, improving efficiency and cost savings(Oke, 2022). Moreover, technology adoption can contribute to better construction risk management and safety practices. Wearable devices, real-time monitoring systems, and advanced analytics can help identify and mitigate potential risks, reducing accidents and associated costs. Construction businesses can protect their workforce, reputation, and bottom line by prioritizing safety and mitigating risks(Singh, Kumar, Verma, & Ramtiyal, 2023).While technology adoption in construction is gaining traction, there are still challenges to overcome. These challenges include limited awareness and understanding of available technologies, resistance to change, concerns about costs and return on investment, fragmented industry structure, skill gaps, and integration issues(Hwang, Ngo, & Teo, 2022). Addressing these challenges and promoting a culture of innovation and technology adoption withinthe construction industry is crucial to realizing the potential benefits and improving profitability fully(Regona, Yigitcanlar, Xia, & Li, 2022).The construction industry has been a late implementer of technology and technological advances to improve processes and efficiency. Recently, however, technological advancements have significantly influenced the way construction businesses operate, creating a competitive advantage for users and widening the adoption gap for non-participating organizations in the construction industry(Al-Hashimy, 2022). With recent management technologies such as lean management, value engineering and building information modelling, the focus of the construction industry now is to eliminate waste and inefficiency to improve quality and profitability(Ratnasabapathy, Alashwal, & Perera, 2021).The adoption of technology in construction has the potential to improve efficiency, productivity, and overall profitability.Therefore, the study provides valuable insights into how construction companies can leverage technology to enhance their profitability and remain competitive in the evolving marketplace. The main contributions include:

1. 1 Main Contribution

1. It provides guidance and direction for harnessing technology's potential to enhance profitability and drive positive change in the construction sector.

2. It provides specific areas where technology can be effectively integrated and the potential benefits that can be achieved.

3. It provides a reference for further research and academic studies exploring the impacts of technology on construction business profitability.

2. Methodology

2.1 Research Design

The proposed approach for this study is qualitative research of an exploratory and descriptive nature. We used case study methods and literature analysis to gain insights into technology adoption and its impact on the overall productivity of construction businesses(Umoh et al., 2024). The construction companies considered for this study are small-scale construction companies with revenues of only about one million dollars. Considered factors include company

size, type of technology, geographic location and profitability are the determining factors in the selection of companies to be examined. With regard to case selection, referenced and published articles that could be used for this study will be selected through a detailed review of the published and recent literature as well as research studies, related reports and assessments. Google Scholar database and other available databases.

2.2 Data Collection and Analysis

Data was collected through document analysis through the collection of relevant documents, such as financial reports, technology adoption records, and business plans.Discussing technology adoption, exploring the process of technology adoption, reasons, challenges, and decision-making and the impact on profitability, inquiry about perceived impacts on cost reduction, efficiency, project timelines, customer satisfaction, and overall profitability which are the strategic parts of this study have been covered in the literature part(Pidgeon & Dawood, 2023).Analysis of documents using thematic analysis to identify patterns, themes, and connections related to technology adoption and profitability. The coding process shall use open coding to generate initial codes, followed by pattern identification and theme development. The study's rigor and credibility will be ensured through prolonged engagement, triangulation, and member checking to ensure that the influence of reflexivity and biases are reduced on the study.

2.3 Research Strategy and Techniques

Researchstrategydescribesaspecificcourseofactionforresearchdesign(Wang et al., 2022).Thepreferredresearchmethodforthisreportissurveyresearch.Eriksson and Kovalainen (2015)assertthatsurveyresearchprevailsinbusinessresearchbecauseitincludesthecollectionofquantitative,qualitativeandmixeddatafordifferentresearchquestions.Inthisstudy,thequalitativecomponentofthesurveyresearchmethodwillbeusedtocollectthenecessarydatafromthepublishedliterature.
Thedataforthisstudyweregatheredfromadetailedreviewofcurrenttrendsinconstructionbusinessprofitabilityresearch,particularlyinthecontextofdevelopingcountries. A thoroughliteraturereviewofrelevantandrecentlypublishedarticlesiscarriedoutinasystematicmanner andensuresthattheyhighlighttheresearchobjectives,rationaleforthestudy,andresearchobjectives were achieved(Creswell & Creswell, 2017).Afteradetailedreviewoftheliterature,importantfactorsrelevanttothestudywereidentified,synthesized,andtabulatedfromtheexistingliterature.

2.4 Searched Databases

We conducted the search by utilising Boolean operators to locate specific key phrases, which were then subjected to further filtering based on my inclusion criteria; for example, Use "AND" to narrow down your search by requiring all specified terms to appear in the search results. For example, if you're looking for articles on "Profitability", "Construction businesses," and "technology adoption", you can search for "Technology adoption AND construction business profitability" This will retrieve articles that mention both key phrases. I was able to limit my search to articles from open research corpuses such as Google Scholar, Research Gate and Academia through this method. All relevant references were then exported to an Excel file that contained vital details, including the author's name, publication year, title of the work, an abstract, and the date. Finally, duplicates were eliminated from the file.

2.5 Data Extraction

Ina systematic review, the researcher analyses the included studies and gathers any pertinent data regarding the characteristics and conclusions of the studies using a procedure known as data extraction, according to Muka et al. (2020) . Each systematic review has a distinct set of criteria for data extraction since the review question dictates what those criteria should be.Tawfik et al. (2019), opined that the data extraction form should take the review question and the type of analysis the researcher chooses to take into account.. A standardized data extraction form was produced using Microsoft Excel (Details in appendix 1). After a comprehensive text screening to ensure uniformity and reduce bias, data from the chosen papers were compiled using the form. A systematic content analysis was then performed using the outcomes of the cleaning and selection process to answer the study's research questions.

3. Data Interpretation and Analysis

3.1 Introduction

This sectionpresents a synthesis of the document analysis. Twelve documents that were minimum of scopus-rated, peer reviewed and published within the last five years on the subject of technology adoption on construction business profitability. A reflective synthesis of the papers will now be performed.

3.2 Breakdown of analysis of journals

Table 1: Document analysis of relevant documents

Author	Study Design and Focus	Time Frame and Sample	Key Findings
Ali, Khan, and Khan (2023) Dividend Policy Attributes and Its Impact on Firm Profitability *Sarhad Journal of Management Sciences, 9*(1).	Analyze the impact of dividend policy on firm profitability in three sectors of cement, automobiles and sugar from 2010-2020 *Quantitative study.*	*Out of 74 companies (Dividend paying firms) in the three sectors, only 33 were selected for which data was available* *Hypotheses were developed and tested*	Both attributes of dividend policy (DPR & DY) have a significant effect on the identified three proxies of firm profitability (ROA, ROE, EPS) except for DPR impacts on EPS which is positive but not exactly significant.
Asuquo and Ogbu (2023), Perspective of Nigerian Building and Civil Engineering Contractors on the Determinants of Firm Profitability. *Journal of Surveying, Construction and*	This study investigated the factors affecting the profitability of construction contractors in Akwa Ibom State, Nigeria. It also determined if there are differences in the perspectives of building and civil engineering contractors on the important factors affecting profitability. *Quantitative Study*	Data were collected with the aid of a well-structured questionnaire and were analysed using mean score and Mann-Whitney U test. A total of 173 adequately completed questionnaires were analysed. *Time frame- 12 months*	Turnover or volume of sale of the contracting firm is considered as the most important factor influencing contractors' profitability, while other key factors include low profit margin of projects, contractor's productivity and shortage of working capital or liquidity issue. Findings also revealed that there is a difference in the perception of building and

Property, *14*(1), pp.27-39			civil engineering construction contractors on most of the factors affecting profitability of contracting firms. recommended that that construction contractor should create a work bank or increase the amount of construction work at hand in order to keep turnover flowing steady
Enholm, Papagiannidis, Mikalef, and Krogstie (2022), Artificial intelligence and business value: A literature review. *Information Systems Frontiers*, *24*(5), 1709-1734.	Organizations are still struggling to adopt and leverage AI in their operations. The lack of a coherent understanding of how AI technologies create business value, and what type of Business value is expected, therefore necessitates a holistic understanding. Qualitative study	This study provides a systematic literature review that attempts to explain how organizations can leverage AI technologies in their operations and elucidate the value generating Mechanisms.	The paper concludes with an identification of the gaps in the literature and develops a research agenda that identifies areas that need to be addressed by future studies.
Fonseca, Guedes, and da Conceição Gonçalves (2022) Profitability and size of newly established firms. *International Entrepreneurship and Management Journal*, pp.1-18.	Does size matter for new firms and do they need to be large to be profitable? In this way, profitability can be the most adequate measure to analyse whether or not the firm is operating in an efficient way.	The data cover the firms that started their activity between 2010 and 2018, and cover 19 industries. After these adjustments, the final sample of this study consisted of 13,750 observations, with a total of 3818 new firms.	Overall, the results show that size has a positive impact on the profitability of new firms. In particular, increases in the Number of employees have a positive effect on the return on assets that indicates that being small is a liability for new firms.
KrausKraus et al. (2022) Digital transformation in business and management research: An overview of the current status quo. *International Journal of Information Management*, *63*, p.102466.	Although Industry 4.0 is part of digitalization, DT goes far beyond Industry 4.0, and includes transforming physical products into digital services. The aim of the paper is twofold. First, map the thematic evolution of the DT research in the areas of business and management, because existing research in these areas to date has been limited to certain domains.	To achieve this, articles were identified and reviewed that were published in the Chartered Association of Business Schools' (ABS) ≥ 2-star journals. Based on these findings, the second objective of this paper will be to propose a synergistic framework that relates existing research on DT to the areas of business and	The paper concludes with an identification of the gaps in the literature and develops a research agenda that identifies areas that need to be addressed by future studies. The study recommended that construction firms should make marketing to new clients and establishing a bond with existing clients a core job function while putting more efforts on

	The second objective of this paper will be to propose a synergistic framework that relates existing research on DT to the areas of business and management, which will help form the evolutionary perspective taken in this paper.	management, which will help form the evolutionary perspective taken in this paper.	understanding methods of optimally utilizing their existing workforce and eliminating staff redundancies
Lee, Azmi, Hanaysha, Alzoubi, and Alshurideh (2022) The effect of digital supply chain on organizational performance: An empirical study in Malaysia manufacturing industry. *Uncertain Supply Chain Management*, *10*(2), pp.495-510.	This study investigates the effect of the digital supply chain on the supply chain and organization performance in the Malaysia manufacturing industry. This paper also further assesses the mediating effect of supply chain performance in the relationship between the digital supply chain and the organizational performance in the Malaysia manufacturing industry	The objectives are achieved via quantitative research design. The researchers emailed the online survey questionnaire to 1160 manufacturing companies directory via stratified sampling technique and received 63 responses and 56 usable responses representing 5.43% of the response rate used for data analysis	The data was analyzed by using the Partial Least Square Structural Equation Modeling (PLS-SEM). Three hypotheses are not supported and seven hypotheses are supported, which includes all the hypotheses of moderating effect.
Ninan, Sergeeva, and Winch (2022) Narrative shapes innovation: a study on multiple innovations in the UK construction industry. *Construction management and economics*, *40*(11-12), pp.884-902.	This research aims to explore the role of narratives in shaping innovation, as these provide a way to manage the tensions prevalent in the industry.	The study took 133 innovations across different construction projects in the UK and seek to understand the role of narratives in motivating these innovations. For instance, "innovations that enable project completion," "innovations that improve productivity," "innovations in health and safety" and "innovations in sustainability" are discussed. Whilst we acknowledge that factors such as incentives and rewards can motivate innovation, we argue that narratives shape or guide innovation in a particular direction.	Since construction projects are inter-organizational and multileveled, the industry-level narratives need to be adopted by firms to enable innovations at project sites. Innovators actively look for areas where they can intervene, and narratives improve the visibility of some areas thereby guiding innovations to them.

Obeidat and Jawabri (2016). The impact of working capital management on the profitability of construction equipment firms: Evidence from listed construction equipment firms in Abu Dhabi stock exchange. *Journal of Accounting and Finance*, *16*(8), p.135.	The study objects for investigating whether the management of WC affects the profitability of listed construction equipment firms in Abu Dhabi Securities Exchange. It takes into consideration the management of inventory, receivables, and payables. Profit generation is the main purpose of investment, whatever the amount or nature of that investment.	Simple linear regression is the statistical method used in analyzing the individual impact of the three elements of WC, while multiple linear regression method is used to measure the overall impact of these three elements on profitability	The study finds a significant effect of WC capital Management on profitability of these firms. Moreover, the study finds that inventory management has a significant effect on profitability, whereas it finds neither individual significant effect of receivables management, nor payables management on profitability
Oe, Yamaoka, and Duda (2022) How to Sustain Businesses in the Post-COVID-19 Era: A Focus on Innovation, Sustainability and Leadership. essuir.sumdu.edu.ua	This study aims to discuss the universal and important theme of how innovation supports the growth of global firms, relying on two issues: technology adoption and sustainability in the global marketplace. The main goal of this research is to show how global innovation management can respond to difficult market conditions and maintain sustainability of businesses through problem solving	This study takes the approach of expressing viewpoints through exploratory desk research discussions. A literature study was conducted to clarify and visualize issues and agendas that will contribute to further discussion by identifying discussion points	The contribution of this study is to build on previous knowledge and academic discussions in the field of innovation, to analyze the cases of successful realization of sustainable business through innovative actions in response to unprecedented difficulties created by the recent COVID-19 pandemic, as well as to present a practical discussion agenda that will contribute to future debates.
You (2021) The Effect of Working Capital Management on Profitability: Evidence from Malaysian Construction Firms. *UNIMAS Review of Accounting and Finance*, *5*(1), pp.81-100.	The main objective of this research is to investigate the effect of working capital management on profitability. Working capital is a vital part of business investment which is essential for continuous business operations. It is required by a firm to maintain its liquidity, solvency and profitability.	The regression analysis was carried out on a panel sample of 30 construction firms listed on Bursa Malaysia over a five-year period from 2015 to 2019.	Thus, firms can maximise their profitability by maintaining higher inventory level and paying off creditors in a shorter time frame.
Ahmed Ahmed, Sharif, Ali, and Hágen (2023) Effect of Firm Size on the Association between Capital Structure and	This paper examines the association between capital structure and firm profitability through the moderating effect of firm size. The analysis of financing choice and firm profitability in developing countries is	This research utilized secondary data obtained from the published annual financial statements of 156 manufacturing companies listed on the Tehran Stock Exchange (TSE) over	The primary contributions of these findings illustrate how firm size in an emerging economy, has a significant influence on controlling the relationship between capital structure choice and improving profitability.

Profitability. *Sustainability*, *15*(14), p.11196.	interesting because of the differences between the characteristics of their firms and those of companies in advanced economies	the period 2011–2019.	The results indicate that, by improving the effect of capital structure decisions on optimizing firm profitability, big firms, such as industrial firms, have an immense value through improving total assets. When firms boost their value, they can increase the possibility of utilizing debt or other financing strategies that are more ideal.
Tiffany and Sufiyati (2023) The Analysis of Factors Affecting Profitability. *International Journal of Application on Economics and Business*, *1*(1), pp.603-612.	Every company would want a good company performance in order to get maximum profit. The purpose of this study was to determine and identify the impact of company size, quick ratio, leverage, and asset turnover and asset structure on profitability. The study covers all listed companies listed on the Indonesian Stock Exchange from 2017 to 2020.	The testing in this study was carried out using the Eviews version 12 software and by taking samples using a purposive sampling technique with certain Criteria. This study used secondary data and used multiple regression analysis to test hypotheses	The results of the study partially show that the firm size and debt to equity ratio variables have no negative effect on profitability. Quick ratio and asset structure have a negative effect on profitability. The asset turnover has no positive effect on profitability.

4. Result and Discussion

AliAli et al. (2023)analyzed the impacts of dividend policy on firm profitability, focusing on three sectors of the Pakistani economy. With thirty-three out of 74 listed companies on the stock exchange selected, with six hypotheses formulated and tested, reveal that both attributes of dividend policy, which are dividend payout ratio and dividend yield, DPR and DY, respectively, have a significant effect on the identified proxies of firms profitability, with the three proxies being return on assets, return on equities and earning per share. A company's dividend policy can have variouseffects on acompany's profitability, and this relationship is an important consideration for money managers and investors.For context, funds areconvertedtodividends; for example, when a company pays dividends to its shareholders, it will use part of its profits for these payments. This means that themoneycannotbereinvested in the business. In the caseofa company with profitable investment opportunities, paying high dividends can lead to missed growth prospects, whichcanaffect long-term profitability. A steadyand consistent dividend history can signal investors that a company is ina healthy financialposition and generates reliable income. This can attract more investors, lead to higher stock prices and increase market capitalization, improvingreturns.Shareprice and cost of capital dividend policy can affecta company's share price. A higher share price can leadto a lower cost of capital when a company needs to raise capital through ashareissue. Reducing the cost of capital can improve profitabilityby lowering the cost of funding new projects or investments. Companies with a policy of buying back shares instead of paying dividends can improve their profitability by reducing the number of outstanding shares. This can increase earnings per share (EPS), potentially boost stock prices,attractinvestors, and positively impactearnings.

Tax implications tax treatment of dividends can affect profits. In some jurisdictions, dividend income is taxed differently than capital gains. Companies can choose atax-efficient dividend policy for shareholders, potentially influencing investor decisions and stock performance. Investors may have different expectations regarding dividend payments. If a company deviates significantly from these expectations, it canleadto a negative reaction from investors, affecting the stock price and, thus,thebottomline. Financial flexibility for companies, maintaining a policy of withholdingprofits (not paying dividends) can give a company financial flexibility. Thecompany can use these retained earnings for various purposes, such as acquisitions, debt relief, or capital expenditures, potentially leading to improved profitability over time.Competitive positioning a company's dividend policy can affect its competitive position in the market. In populardividend-payingindustries,failuretopay dividends can be seen as a weakness. Incontrast, not paying dividends may be the norm in growth sectors, and paying dividends may signal a lack of growth opportunities. A company's dividend policy may affect its relationship with its shareholders. Companies prioritizingpaying regular dividendscanbuild stronger relationships with income-seeking investors, potentially attracting long-term shareholders. Itis important to pointout that the impact of the dividend policy on corporateearnings is not uniform across all firms and allsectors. The right dividend policy depends on the company's financial condition, growth prospects, industry dynamics, and shareholderpreferences. Financial managers should carefully consider these factors when determining the optimal dividend strategy for their organization.

Similarly, Asuquo and Ogbu (2023), in their study titled: Perspective of Nigerian Building and Civil Engineering Contractors on the Determinants of Firm Profitability published in the *Journal of Surveying, Construction and Property*, *14*(1), pp.27-39,investigated the factors affecting the profitability of construction contractors in Nigeria, the study also determined if there are differences in the perspectives of building and civil engineering contractors on the important factors affecting profitability. As a quantitative study, data was collected with a well-structured questionnaire and analyzed using the mean score and Mann-Whitney U test. A total of 173 adequately completed questionnaires were analyzed. Results revealed that turnover or volume of sales of the contracting firm is considered the most important factor influencing contractors' profitability. In contrast, other key factors include low-profit margin of projects, contractor's productivity and shortage of working capital or liquidity issues. Findings also revealed a difference in the perception of building and civil engineering construction contractors on most of the factors affecting the profitability of contracting firms. The study further recommended that construction contractors should create a work bank or increase the amount of construction work at hand to keep turnover flowing steadily. Revenue or sales volume represents the total revenue the contracting company generates through its construction projects. Higher revenuemeans the companytakes on and completesmore projects, directly resultingin higher earnings. Higher turnover often allows entrepreneurs to benefit from economies of scale. This means they can negotiate better deals with suppliers, reduce costsperproject, and optimize resource allocation, which inturn can improve profitability.

Enholm et al. (2022), in the review titled Artificial Intelligence and Business Value, published in Information Systems Frontiers, 24(5), pages 1709-1734, noted that firms and organizations are still struggling to adopt and leverage AI in their operations. The lack of a coherent understanding of how AI technologies create business value and what type of business value is expected necessitates a holistic understanding from all industry stakeholders. Being a qualitative study and systematic literature, the study attempts to explain how organizations can leverage AI

technologies in their operations and elucidate the value-generating mechanisms. Areas identified include the challenges organizations face when effectively adopting and leveraging artificial intelligence (AI) in their operations. Several factors contribute to these ongoing struggles which include the fact that decision-makers in organizations may not fully understand the power of AI and its potential benefits. This lack of understanding can make it difficult to identify relevant use cases and allocate resources for AI initiatives. Similarly, AI algorithms require large, high-quality data sets for training and continuous improvement. Organizations often face data integration, quality, andprivacy issues that can hinder AI adoption. There is a shortage of AI talent, including data scientists, machine learning engineers, and AI researchers. Hiring and keeping qualified professionals can be difficult and expensive.Implementing AI solutions can be expensive, and organizations can worry about return on investment (ROI). Proving the tangible benefits of AI projects can be difficult, especially in the short term. Many organizations have legacy IT systems that are not easily compatible with AI technology. Integrating AI into existing workflows can be a complex and time-consuming process.Adopting AI often requires changes in organizational culture and work processes. Resistance to change by employees and stakeholders can slow implementation.Also, AI systems can be vulnerable to attacks and exploits. Ensuring the security of AI systems and their data is a major concern. Maintaining and managing AI models and infrastructure can become complex as AI projects grow. Organizations need a strategy to ensure their long-term sustainability, by choosing the right AI solution or vendor can be difficult. There are many options and organizations should weigh their options carefully.To address these challenges, construction organizations can take several steps, which include Education and training. Invest in educating leaders and employees about the potential and limitations of AI; this is critical for skill development for construction professionals and helps to develop a robust data strategy that includes data governance, data quality improvement, and data security measures for the firm.After the initial paradigm shift, subsequent investment in training and developing existing employees in AI-related roles will not be very expensive.Partnerships with AI experts, research institutes, or other organizations to leverage expertise and resources are quite important for the construction firm to develop ways of using technology to improve profitability. Training can start small and scale up: Start with smaller AI projects to demonstrate ROI and gain experience before scaling. Prioritizing strong cybersecurity measures to protect AI systems and data. In continuous rating, the firm must continually monitor and evaluate AI projects to ensure they align with organizational goals and adapt to changing circumstances.

In relation to technology adoption and digitalization,Kraus et al. (2022)a paper titled Digital transformation in business and management research: An overview of the current status quo, peer-reviewed and published in the International Journal of Information Management, 63, p.102466,explained that digital transformation. Although Industry 4.0 is part of digitalization, digital transformation goes far beyond Industry 4.0. It includes transforming physical products into digital services and assets that can yield investments and sustained profits for the firm. Thepaper aims to map the thematic evolution of the DT research in business and management because existing research in these areas to date has been limited to certain domains. Also, it proposes a synergistic framework that relates existing research on DT to the areas of business and management, which will help form the evolutionary perspective taken in this paper. To achieve this, rated articles were identified and reviewed that were published in a methodological system like the current study. The paper concludes with an identification of the gaps in the literature and develops a research agenda that identifies areas that need to be addressed by future

studies. The study recommended that construction firms should make marketing to new clients and establishing a bond with existing clients a core job function while putting more effort into understanding methods of optimally utilizing their existing workforce and eliminating staff redundancies. When implemented strategically, digitalization and digital transformation can significantly impact the profitability of construction firms. Digitalization involves adopting digital tools, technologies, and processes to streamline various aspects of construction operations. It can have a direct impact on profitability in several ways.

FonsecaFonseca et al. (2022) in the paper "Profitability and size of newly established firms." Published in the *International Entrepreneurship and Management Journal*, pp.1-18 sought to inquire the impact of size of new construction firms on profitability. Reasoning from the perspective that profitability can be the most adequate measure to analyse whether or not the firm is operating in an efficient way, the research question states that "does size matter for new firms, and do they need to be large to be profitable. The study team went ahead to gather the data cover the firms that started their activity between 2010 and 2018, and covered 19 industries. After these adjustments, the final sample of this study consisted of 13,750 observations, with a total of 3818 new firms. Being an empirical study, hypotheses were formulated and tested. It was observed that the results show that size has a positive impact on the profitability of new firms and increases in the number of employees positively affect the return on assets, indicating that being small is a liability for new firms. Similarly, "as new firms increase their size, they also benefit from economies of scale and scope that result from the efficiency that arises as they become better at making decisions. In this way, new firms develop their production capacity in such an efficient way that allows them to sell more quantities at a higher price while benefiting from a reduction in their costs.

NinanNinan et al. (2022)in the article "Narrative shapes innovation: a study on multiple innovations in the UK construction industry" peer-reviewed and published in *Construction management and economics*, *40* (11-12), pp.884-902 investigates the impacts of both process innovations and product innovations on profitability of construction firms especially in the United Kingdom. The study intended to explore the role of narratives in shaping innovation, as these provide a way to manage the tensions prevalent in the industry. Taking 133 innovations across different construction projects in the UK while seeking to understand the role of narratives in motivating these innovations, The authors classified for instance, "innovations that enable project completion," "innovations that improve productivity," "innovations in health and safety" and "innovations in sustainability" are discussed. Notably, whilst the authors acknowledge that factors such as incentives and rewards can motivate innovation, the study argued that narratives shape or guide innovation in a particular direction. The study realized that since construction projects are inter-organizational and multileveled, the industry-level narratives need to be adopted by firms to enable innovations at project sites. Innovators actively look for areas where they can intervene, and narratives improve the visibility of some areas, thereby guiding innovations to them.

Conclusively, Tiffany and Sufiyati (2023)the article The Analysis of Factors Affecting Profitability published in the International Journal of Application on Economics and Business, 1(1), pp.603-612, notes that in philosophy, every company aspires to be the best in terms of performance and profitability. This study sought to determine and identify the impact of company size, quick ratio, leverage, asset turnover and asset structure on profitability. Being a quantitative study, however, the study was done utilizing econometric software E-views with

purposive sampling, secondary data and multiple regression to test the hypotheses. Results partially indicate that the firm size and debt-to-equity ratio variables have no negative effect on profitability. Quick ratio and asset structure have a negative effect on profitability. The asset turnover has no positive effect on profitability.

4.1Discussion of findings

From this study, empirical and qualitative data explain varied and different perspectives on the impact of technology adoption on the business performance of construction business organizations, especially in the context of developing countries. Tax, firm size, revenue, working capital, dividend policy, lack of automation/ technology adoption (in AI and DT) etc. are identified as the majorfactors worth considering. In summary, revenue is animportant factor in theprofitabilityof a contracting company, as it directly affects revenue and can lead to economies of scale. However, this is not the onlydeterminingfactor. Other factors, such as project margins, productivity, and working capital, also play animportantrole in determining a contractor's overall profitability. Successful entrepreneursmust carefully manage all these factors to maintain a healthy and sustainable business. Addressing related challenges requires combining technical expertise, cultural change, and a strategic approach to AI adoption. Organizations that successfully overcome these obstacles can unleash the full potential of AI in their operations and thus target improved profitability.

5. Conclusion

In conclusion, this study has delved into the intricate relationship between technology adoption and the profitability of construction businesses, recognizing profitability as a crucial determinant of long-term sustainability in this sector. By exploring the various dimensions of profitability and identifying technologies that can significantly enhance business profits, this study has contributed valuable insights to the field.The methodology adopted, which focused on qualitative analysis, allowed for a thorough examination of relevant literature and the extraction of insights pertinent to the study's objectives. Through document content analysis, the study has shed light on the impact of technology adoption on construction business profitability, addressing its stated objectives effectively.Moving forward, it is evident that technology adoption holds immense potential for improving the profitability of construction firms. Recommendations and strategies for leveraging technology to enhance profitability should be further explored and implemented by industry stakeholders.Future studies could delve deeper into specific technologies and their direct impact on profitability, as well as explore the challenges and opportunities associated with technology adoption in the construction industry.

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