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Impact of Computer Based Project Management Model on Building Project Performance in Enugu Metropolis

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Abstract
The study examined the impact of computer-based project management model on building project performance in Enugu Metropolis. Specifically, the study sought to: Examine the impact of Civilsoft computer-based project management software on quality reinforcement of building project in Enugu Metropolis and evaluate the impact of Planswift computer-based project management software on avoidance of cost-overrun of building project in Enugu Metropolis. Research design was descriptive survey research design. The sample size of 134 respondents was drawn from 202 construction operators (Architects, Quantity surveyors, civil Engineers, Builders) of the selected indigenous construction companies in Enugu metropolis namely: Marlum Nigeria Limited, Project Technical Inc, New Idea Construction Company and Achimore Nigeria Limited. Research questions of the study were answered using mean score and standard deviation. The hypotheses stated were tested using single regression analysis. The empirical results showed that civilsoft computer-based project management software has significant impact on quality reinforcement of building project in Enugu Metropolis (t-statistic =3.692; P-value (0.000) < Sig-value (0.05) and planswift computer-based project management software has significant impact on avoidance of cost-overrun of building project in Enugu Metropolis (t-statistic = 5.748; P-value (0.000) < Sig-value (0.05). The study recommended that the use computer-based project management software have the following impacts on the project success: Improves the quality of work, saves time, makes complex tasks easier to perform, facilitates decision making, savings in operating costs.

Keywords: Computer-Based Project Management Model, Civilsoft Software, Planswift Software

Background of the Study

In this era, the quest for innovative solutions and products has grown as time and cost constraints have increased. One of the skills which is increasingly seen as important for dealing with these issues is the ability to be creative in seeking digital solutions to design problems (Adebayo, Ogunsemi, Oluwakinbi & Ajao, 2018) [1]. The introduction of computer-based project management model has brought a new point of history in how designers deal with their design tasks. Computer-based project management model has gone through a progressive evolution for a wide range of users from those undertaking less complex product design to more sophisticated and complicated design tasks. The technology has enhanced how to facilitate various users' needs in designing activities including sketching tools in two-dimension (2D) and three dimension (3D) (Adejimi & Alabi, 2020) [2].

Computer-based project management models are prepared to simplify the work of a project manager and provide more efficient results, by providing applications that can aid in planning, to manage project costs, and to track the activities and monitor schedules (Adejumo, Oyewobi & Odusami, 2018) [3]. The complexity of construction projects makes it to be uncertain and a times causes rising issues like mistakes, risk and changes in the future from many work plans and or stakeholders who are involve in the project. To simplify the task of the project plan and reduce the problem of uncertainty and future risks, it could be better to use some certain information technology (IT) softwares that may assist in project schedule plan, finance and procurement of the project materials. Making project plan manually comes with a cost of paying the errors and time wasted in the old system, note that the modern computer-based project management model could easily find errors where it's made and present the future outcome of each and every work plan, or excess cost that may be wasted. The assorted project management softwares were found to address the issue of time management, project plan and control, project finance, communication and other tasks involved.

Moreover, construction industries play a crucial role in contributing to capital formation in countries. For instance, in Nigeria, the construction industry accounts for nearly 70% of the nation's fixed capital formation (Ossom, Egbita & Hassan, 2020) [13]. Kombe, (2021) emphasize that the construction industry holds significance for sustainable and socio-economic development in both developed and developing nations. It serves as a provider of essential infrastructure like roads, railways, hospitals, schools, offices, and housing, while also generating employment opportunities for unemployed or underemployed youth (Ayodeji, Akuete, Opeyemi & Amusan, 2017) [7]. Construction projects are usually regarded as huge and mostly major and advance projects, they take longer times to be accomplished and also have a lot of phases, for that fact this research will be dedicated to finding how does project management software help in the success and deliverability of construction projects.

Statement of the Problem

The construction industry is a crucial sector that plays a vital role in the economic growth and development of many countries. Construction projects are complex and often involve a range of stakeholders, including owners, designers, contractors, suppliers, and regulatory bodies. However, the performance of construction projects in Nigeria has been a significant concern due to the numerous challenges facing the industry. In spite of rapid progress in the project-management field, a number of negative issues still affect management of construction projects. These issues include use of inappropriate tools and systems for communication, coordination, and management.

The Nigerian construction industry is currently confronted with project performance challenges which contribute to the decline of the national GDP. The level of this performance challenge is shown by the available records of project failure in building, roads and other infrastructural construction projects. According to Oladumiye, Tanimu and Adelabu, (2018) [10], poor performance of construction projects is retrogressive in most developing economies and could be traced to the poor utilization of project management best practices, project performance measures and critical success factors which constitute the multivariate that influences construction projects. Poor performance of construction projects has resulted in significant cost overruns, schedule delays and quality issues, leading to project failures, loss of revenue, and poor reputation. One of the critical issues affecting the performance of construction projects in Nigeria is inadequate project management practices. Project management involves the coordination of people, resources, and processes to achieve project objectives. Poor project management practices such as poor planning, inadequate risk management, poor communication, and inadequate supervision have been identified as significant contributors to poor project performance in Nigeria (Oluwadare, Adebayo & Oluwafemi, 2021) [11]. Despite the efforts made by the Nigerian government and construction stakeholders to address these challenges, the performance of construction projects in Nigeria remains a significant concern. There is a need to identify effective computer-based project management models on performance of building project in Nigeria.

Objectives of the Study

The main objective of this study was to examine the impact of computer-based project management model on building project performance in Enugu Metropolis. The specific objectives of this study were to:

1. Examine the impact of Civilsoft computer-based project management software on quality reinforcement of building project in Enugu Metropolis.
2. Evaluate the impact of Planswift computer-based project management software on avoidance of cost-overrun of building project in Enugu Metropolis.

Research Questions

This study seeks to provide answers to the following research questions.

1. What is the impact of Civilsoft computer-based project management software on quality reinforcement of building project in Enugu Metropolis?
2. What is the impact of Planswift computer-based project management software on avoidance of cost-overrun of building project in Enugu Metropolis?

Significance of the Study

The outcome of this study is beneficial and relevant to managers, construction stakeholders, and policymakers and researchers. The result of this study would provide useful information for project managers, construction stakeholders, and policymakers, which can help to improve the performance of construction projects in Nigeria. In addition, the outcome of the study would provide valuable insights into the factors contributing to poor project performance in the Nigerian construction industry and identify best practices that can be adopted to improve project performance.

The outcome of this study will equally be useful to scholars and researchers, it would serve as reference materials that are reserve in libraries and shelves for further academic research.

Conceptual Literature

Computer based project Management

Computer-based Project Management model is designed to make project management easier by providing some standardization. But ironically, the simple concepts of project management— make a plan, work the plan, control changes—can become more difficult to learn and apply as computer-assisted systems are implemented (Obodoh, Mbanusi & Obodoh, 2016). Computer-based project management software models are computer-based applications designed to assist, help, plan, organize or manage resource tools as well as to develop resource estimates. Based on the specification of the software, it can manage estimation and planning, scheduling, cost control & budget management, resource allocation, collaboration software, communication, decision-making, quality management, time management and documentation or administration systems.

Build project Performance

Construction project performance is a key measure of success in the construction industry. It is a multidimensional concept that is evaluated based on various criteria such as

time, cost, quality, safety, and customer satisfaction. According to Hamada, (2023) [8], construction project performance refers to the ability of a project to meet its objectives and deliverables while satisfying the needs and expectations of its stakeholders. The importance of measuring construction project performance has been widely recognized by researchers and practitioners alike. In the context of the construction industry, it is essential to evaluate project performance as it can impact the success of the project, the reputation of the construction company, and the overall health of the construction industry. As such, there is a growing body of literature that has focused on the development of performance metrics and indicators that can be used to evaluate and monitor construction project performance.

One commonly used set of performance indicators are the key performance indicators (KPIs), which are used to evaluate project efficiency, effectiveness, and stakeholder satisfaction. KPIs can be used to measure various aspects of project performance, including time, cost, quality, safety, and environmental performance (Adebayo, Ogunsemi, Oluwakinbi & Ajao, 2018) [1]. Such KPIs used in the construction industry include schedule performance, which measures the project's ability to meet its timeline, and cost performance, which measures the project's ability to meet its budget. In addition to KPIs, there are various frameworks and models that can be used to evaluate construction project performance.

Contextual Literature

Impact of Civilsoft computer-based project management software

The use of Project Management Software can impact on the traditional processes of professional organizations in construction and result in change in organizational processes, working methods and culture (Adeyinka, Ogunsemi & Oyeyipo, 2018). In this regard, some benefits of PM software is critical to the performance of professional consultants are to reduce the time for data processing and communicating information, and to improve communications for effective decision-making and coordination among construction participants to enhance construction productivity. This is possible because the Internet-based tools of ICT allow communication between even remote users and enables them to share files, comment on changes and post requests for information (Adeyinka, Ogunsemi & Oyeyipo, 2018). Project management software is an essential tool for all businesses involved with large projects. It helps to set deadlines for certain tasks, schedules them and informs those involved with the project what they should be doing. It is more efficient than other systems or relying on memory and it therefore picks up on things that might have been missed. PM software is actually a term for many different types of software. These may include resource allocation, scheduling and collaboration software. Each piece of software is designed to make dealing with large complex projects an easier and more efficient task (Unegbu, Yawas & Dan-asabe, 2022) [15].

Impact of Planswift computer-based project management software

Planswift computer-based project management software is a software for bill of quantity. The bill of quantities (sometimes referred to as a 'BoQ' or 'BQ') is a document, typically prepared by a cost consultant (often a quantity surveyor) that provides measured quantities of the items of work identified by the drawings and specifications in the tender documentation for a project. It is issued to tenderers for them to prepare a price for carrying out the works (Gyarteng, 2019).

Manual estimating can be an inefficient use of time, and so cost consultants often use BoQ software packages to make the process easier and to reduce errors. Databases may already exist providing design information from a building model, and specifications, and so quantities can be calculated and tender documents generated (Oladumiye, Tanimu & Adelabu, 2018) [10]. During the design process, new measurements can be filed and included, with the result that every item, as well as the totals, is updated automatically. Oluwadare, Adebayo and Oluwafemi, (2021) [11] indicated that the objective of preparing the Bill of Quantities is to assist estimators to produce an accurate tender efficiently and to assist the post contract administration to be carried out in an efficient and cost-effective manner. It should be noted that the quality of the drawings plays a major part in achieving theses aims by enabling the taker-off to produce an accurate bill and also by allowing the estimator to make sound engineering judgments on methods of working.

Cost estimating is a fundamental ingredient for budgeting and preparation of bid for any construction project. A good estimate depends on many factors including time given to the estimator, estimator's experience, and a wide range of assumptions regarding the project.

Theoretical Literature

Social construction of Technology Theory

Social construction of technology (SCOT) is a theory within the field of science and technology studies. Advocates of SCOT—that is, social constructivists—argue that technology does not determine human action, but that rather, human action shapes technology. They also argue that the ways a technology is used cannot be understood without understanding how that technology is embedded in its social context. SCOT is a response to technological determinism and is sometimes known as technological constructivism. SCOT draws on work done in the constructivist school of the sociology of scientific knowledge, and its subtopics include actor-network theory (a branch of the sociology of science and technology) and historical analysis of sociotechnical systems, such as the work of historian Thomas P. Hughes. Its empirical methods are an adaptation of the Empirical Programme of Relativism (EPOR), which outlines a method of analysis to demonstrate the ways in which scientific findings are socially constructed (see strong program). Leading adherents of SCOT include Wiebe Bijker and Trevor Pinch.

SCOT holds that those who seek to understand the reasons for acceptance or rejection of a technology should look to the social world. It is not enough, according to SCOT, to explain a technology's success by saying that it is "the best"—researchers must look at how the criteria of being "the best" is defined and what groups and stakeholders participate in defining it. In particular, they must ask who defines the technical criteria success is measured by, why technical criteria are defined this way, and who is included or excluded. Pinch and Bijker argue that technological determinism is a myth that results when one looks

backwards and believes that the path taken to the present was the only possible path. SCOT is not only a theory, but also a methodology: It formalizes the steps and principles to follow when one wants to analyze the causes of technological failures or successes.

Empirical Literature

Bashir (2023) conducted a study to examine the impact of project management software on construction projects in the republic of Kazakhstan. Specifically, the study sought to; present the importance of project management softwares in Construction projects, use the finding of this study to showcase the main project management softwares and their benefits in addressing different project management segments i.e Planning, scheduling, procurement and communication. The study adopted survey research design. Sample size of 106 respondents were drawn from population of 290 architects, consultants, engineer, and builders. The data collected were presented in tables, while frequencies and percentages were used for data analysis. The study revealed that the main types of contracts the respondents are involved in are traditional contracts (82%) and design-build-operate having eighteen per cent. The study found that most construction works (37%) have a duration of twelve to eighteen months while the least (11%) allocated to of contracts took less than twelve months to be delivered. We study revealed that 92% of project managers use PMS in their projects, and 82% believed that PMS are important in their work and 34% used their company integrated softwares. The research found that the least stage at which respondents use PMS is at the closing phase, while the main phase that the PMS is needed is planning phase. Furthermore, respondents believe that PMS are helpful in planning project with a relevant data that showed the highest percentage in this group is 35%, followed by team management and collaboration with 30% and the least is cost estimation with a statistical data of 17%. The study recommended that construction companies should develop the usage of Project management softwares to simplify their project planning and management.

Unegbua, Yawasa and Dan-asabe, (2023) conducted a study to assess of the literature on the performance of construction projects in Nigeria. Specifically, the study aimed to identify the factors and obstacles that impede construction project performance in Nigeria through a comprehensive literature review. The review involved a systematic approach to identify relevant studies from reputable academic databases, and the findings were synthesized and analyzed. The data analytical technique was content analysis. The study found that poor project planning and scheduling, inadequate risk management, corruption, and ineffective stakeholder management were the primary factors contributing to poor project performance in Nigeria. The study highlights that these factors are interrelated and can exacerbate one another, leading to significant cost overruns, delays, and substandard work. Additionally, the study found that effective project management was a key success factor in improving project performance. To improve construction project performance in Nigeria, the study recommends that stakeholders in the industry should focus on improving project planning and scheduling, risk management, stakeholder management, and promoting ethical standards to curb corruption. By adopting these measures, the Nigerian construction industry can improve project performance, deliver high-quality infrastructure, and contribute to the country's economic growth and development.

Oyindoubra, (2022) [14] conducted a study to examine the computer aided design (CAD) skills needed by building Technologist in Polytechnics for job placement in Rivers State. The specific objectives of the study were ascertain the computer Skills needed by building technologist in polytechnics for job placement in Rivers State, drafting Skills needed by building technologist in polytechnics for job placement in Rivers State, basic CAD Skills needed by building technologist in polytechnics for job placement in Rivers State and advanced CAD Skills needed by building technologist in polytechnics for job placement in Rivers State. The survey research design was employed. The study population consisted of 46 respondents, made up of 36 lecturers and 10 instructors of Building Technology in two Polytechnics in Rivers State of Nigeria. The collected data were analyzed using mean for the research questions. Conclusively, CAD skills are important for securing, retaining and progressing on the job, as well as having success in the world of work. The study recommended among others that the average Nigerian, youths and adults be exposed to better and recent technology for them to acquire the needful skills for employment into the world of work. Also, the Building Technology curriculum should be reviewed to include modern courses that shall enable graduates possess the required CAD skills for immediate employment.

Oluwadare, Adebayo and Oluwafemi, (2021) [11] conducted a study to assess of the use of Autocad Package for teaching and learning Engineering Drawing in Afe Babalola University Ado-Ekiti. Specifically, the study sought to examine use of Autocad Package for teaching and learning architectural, civil, structural, and mechanical drawing. The investigation was carried out by administering (100) questionnaires to engineering drawing lecturers and Students of the college of engineering in the university. The Findings revealed that there are positive impacts created by AutoCAD package on teachers and Students towards the teaching and learning of AutoCAD package to teach engineering drawing in all the seven programmes in the college. The data analytical technique was single regression analysis. The traditional teaching and learning of technical drawing in most Nigerian universities has been characterized by the use of such manual equipment and materials part of drawing board, dividers, compasses, set-squares, protractors, drawing paper, drawing pen, pencil, scales, and eraser among others.

Ossom, Egbita and Hassan, (2020) [13] conducted a study ascertain the effect of AutoCAD application on students in performance in Technical Drawing for sustainable development in Nigeria. Specially, the study aimed to determine the effect of using AUTOCAD on the practical skills of senior secondary school students in Niger State and determine the effect of AUTOCAD on the performance of senior secondary school students in Niger State. A quasi-experimental design was used for this study. The population of the study was 1,521 first-year senior secondary school students of the nine senior secondary schools that have computer laboratories and offering Technical Drawing. Ninety senior secondary students from three selected schools in the three senatorial zones in Niger State were used as the sample. Mean, and the standard deviation was used to answer the research questions and Analysis of

Covariance (ANCOVA) was used to test the two null hypotheses. The findings of the study revealed among others that, there was a significant difference between the pre-test and post-test results in the objective test. Similarly, the study revealed that there was a significant difference between the pre-test and post-test results of the practical test for Technical Drawing students. The study recommended that Technical Drawing teachers should be trained in the use of AutoCAD Application in teaching Technical Drawing through workshops, seminars, and induction courses to be organized by the Ministry of Education.

Zira and Sunday, (2019) [18] conducted a study to examine the impact of AutoCAD application instruction on students' academic performance and motivation in Building/Engineering drawing in Technical Colleges of Adamawa State, Nigeria. The specific objectives of the study were to examine the use of AutoCAD Application Instruction (AAI) on academic performance and students' motivation in Building/Engineering Drawing (BED). The study raised two research questions and formulated two hypotheses. The study design was a pre-test posttest Quasi-experimental research. 86 students of mechanical engineering craft practice and block/brick laying and concreting students from Yola and Numan technical colleges of Adamawa state, Nigeria formed the population of the study. Mean and standard deviation were used to answer the research question while, ANCOVA and t-test were used to test the null hypotheses at 0.05 level of significance The findings of the study, among others, revealed that teaching and learning BED motivates learners and increase academic performance significantly. The study concluded by recommending technical colleges to integrate AutoCAD application instruction in the teaching and learning of building/engineering drawing.

Oladumiye, Tanimu and Adelabu, (2018) [10] conducted a study to examine the effects of Computer Aided Design (CAD) on the creative behaviour of design students in Tertiary Institutions in Nigeria. The study sought to appraise the effects of CAD on the creative behaviour of students offering design related courses in tertiary institutions with a focus on the Federal University of Technology Akure (FUTA), Nigeria. This model characterised creativity into seven sub categories namely: Novelty, appropriateness, motivation, fluency, flexibility, sensitivity, and insightfulness. A survey method was employed for this study and data were collected using well-structured online questionnaires to elicit responses from both students and CAD instructors in concerned departments in FUTA. The outcome of the study reveals the areas of application of CAD software and the level of engagement of students in CAD related courses. It also shows the assessment of students' performance in CAD related courses from the perspective of the students and their instructors. The study recommended that CAD can enhance student's creative behavior and more integration of CAD related courses into the curricula of tertiary institutions in Nigeria will lead to higher competency and global competitiveness rating of future professional designers and engineers.

Oruabena, Emeli and Udoh (2016) [12] examined the use of Archicad software program and its effects on students academic performance in building drawing in Government Technical College, Ahoada, Rivers State. Specifically, the study sought to ascertain the differences in post-test mean achievement scores of students taught building drawing using ArchiCAD and those taught with the conventional method; the difference in post-test mean achievement scores of male students taught building drawing using ArchiCAD and male students taught building drawing with the conventional method and the different in post-test mean achievement scores of male and female students taught building drawing with ArchiCAD. Post – test only control group experimental design was adopted. The method of data analysis was difference t-statistics. The empirical result showed that students taught building drawing with ArchiCAD performed better than those taught with the conventional method. The male students performed better in building drawing using ArchiCAD compared to their counterpart taught with conventional method. Female students taught building drawing with ArchiCAD performed better than the male students taught with the same method. The study recommended that teachers should be trained on the use of ArchiCAD in teaching building drawings. Also, ArchiCAD should be included in building drawing curriculum in Technical and vocational institutions.

Literature Gaps

There is no clear consensus till date in the literature as to whether computer-based project management model stimulates building project performance in Nigeria or hinders building project performance in Nigeria as empirical result varies from region to region and country to country. This study will bridge the gap by providing clear explanation as regards to cause-effect relationship between computer-based project management model and building project performance in Nigeria.

The study covered literature gaps by extending existing variables in computer-based project management model. The study extended variables up to two explanatory variables by incorporating such as Civilsoft and Planswift computer-based project management softwares thereby bridge the gap in scholars' empirical literature.

Research Method

Research design was descriptive survey research design. The study area was Enugu. The sample size of 134 respondents was drawn from 202 construction operators (Architects, Quantity surveyors, civil Engineers, Builders) of the selected indigenous construction companies in Enugu metropolis namely: Marlum Nigeria Limited, Project Technical Inc, New Idea Construction Company and Achimore Nigeria Limited. Research questions of the study were answered using mean score and standard deviation. The hypotheses stated were tested using single regression analysis.

Data Presentation

Table 1: Summary of Questionnaires Distributed

Questionnaires Distribution	Frequency	Percentage
Questionnaires distributed	134	100%
Returned Questionnaires	112	83%
Not Returned Questionnaires	22	17%
Gender		
Male	69	61.6%
Female	43	38.4%
Age Bracket		
20-30 Years	39	32%
31-40 Years	51	45%
41 and above 50 Years	22	20%
Marital Status		
Married	56	50.0%
Single	50	44.6%
Widow/widower	6	6.0%
Education Qualifications		
HND	41	37%
OND/NCE	9	8%
B.Sc	62	55%
Length of Service		
1-5yrs	8	7.1%
6-15yrs	77	68.8%
16-25yrs	27	24.1%

Sources: Field Survey, 2022

One hundred and thirty-four (134) copies of questionnaires were designed and distributed to the respondents. Out of the 134 Questionnaires distributed, 112 (83%) were completed and returned while 22 (17%) were not returned. Therefore, 83 percent respondents were a good representation. The study showed the respondents profile in frequency and percentage distribution of gender, age bracket education qualification, length of service and marital status.

Data Analysis

Question One: What is the impact of Civilsoft computer-based project management software on quality reinforcement of building project in Enugu Metropolis?

Table 2: Mean rating of responses from respondents on what is the impact of Civilsoft computer-based project management software on quality reinforcement of building project in Enugu Metropolis

S. No	Questionnaire Item	VHE(5)	HE(4)	M(3)	LE(2)	VLE(1)	Total	Mean	SD
1	Computer-based project management software helps to set deadlines for certain tasks and ease document reproduction and cloning	285 57 51%	144 36 32%	448 16 14%	2 1 0,.8%	2 2 2%	479 112 100%	4.276	0.082
2	Computer aided project management software helps deliver high quality products and services within a short time with fewer costs	245 49 44%	112 28 25%	54 18 16%	30 15 13%	2 2 1%	443 112 100%	3.955	0.065
3	Computer assisted project management software enhances quality designs, clarity documentation and make provision for easier application of new ideas.	290 58 52%	128 32 29%	36 12 11%	6 3 2%	7 7 6%	467 112 100%	4.169	0.098
4.	Computer aided project management software make provision for avoidance of costly mistakes in design and production	285 57 51%	116 29 26%	51 17 15%	16 8 7%	1 1 0.8%	1055 112 100%	4.187	0.089
	Grand Mean							**4.146**	**0.0835**

Source: Field Survey, 2023

This table shows that the respondents indicated their option on what is the impact of Civilsoft computer-based project management software on quality reinforcement of building project in Enugu Metropolis. The respondents are in agreement with all the items. The study showed that civilsoft computer-based project management software has significant impact on quality reinforcement of building project in Enugu Metropolis since computer aided project management software helps deliver high quality products and services within a short time with fewer costs (grand mean (4.146) is greater than cut-off mean (3.00).

Objective Two: What is the impact of Planswift computer-based project management software on avoidance of cost-overrun of building project in Enugu Metropolis?

Table 3: Mean rating of responses of respondents on what is the impact of Planswift computer-based project management software on avoidance of cost-overrun of building project in Enugu Metropolis?

S. No	Questionnaire Item	VHE(5)	HE(4)	M(3)	LE(2)	VLE(1)	Total	Mean	SD
1	Computer-based project management software provides measured quantities of the items of work identified by the drawings and specifications in the tender documentation for a project	240 48 43%	140 35 32%	48 16 14%	12 6 5%	6 6 5%	446 112 100%	3.982	0.0936
2	Computer aided project management software make computation process in bill of quantity easier and to reduce errors.	220 44 40%	160 40 35%	36 12 11%	16 8 7%	8 8 7%	440 112 100%	3.928	0.0968
3	Computer assisted project management software provides design information from a building model, and specifications, and so that bill of quantities can be calculated and tender documents generated.	240 48 43%	160 40 36%	30 10 9%	14 7 6%	7 7 6%	451 112 100%	4.026	0.0969
4.	Computer aided project management software assist the post contract administration to be carried out in an efficient and cost-effective manner.	205 41 46%	188 47 42%	30 10 9%	12 6 5%	8 8 7%	443 112 100%	3.955	0.0902
	Grand Mean							**3.972**	**0.0943**

Source: Field Survey, 2023

This table shows that the respondents indicated their option on what is the impact of Planswift computer-based project management software on avoidance of cost-overrun of building project in Enugu Metropolis. The respondents are in agreement with all the items. The study showed that planswift computer-based project management software has significant impact on avoidance of cost-overrun of building project in Enugu Metropolis since computer-based project management software provides measured quantities of the items of work identified by the drawings and specifications in the tender documentation for a project (grand mean (3.972) is greater than cut-off mean (3.00).

Test of Hypotheses

The hypotheses postulated in chapter one were tested using t-statistics.

Test of Hypothesis One

H_1 Civilsoft computer-based project management software has no significant impact on quality reinforcement of building project in Enugu Metropolis.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.932[a]	.810	.602	.090799

a. Predictors: (Constant), Civilsoft computer-based Software

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	19.559	1	19.559	13.628	.000[b]
	Residual	157.870	111	1.435		
	Total	177.429	112			

a. Dependent Variable: Quality reinforcement

b. Predictors: (Constant), Civilsoft computer-based Software

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		.000
1	(Constant)	4.172	.355		11.740	
	Civilsoft computer-based Software	.317	.086	.332	3.692	.000

a. Dependent Variable: Quality reinforcement

In testing this hypothesis, civilsoft computer-based software was regressed against quality reinforcement. The result of the single-regression analysis summarized in table 4.4.1 shows the model to examine the impact of Civilsoft computer-based project management software on quality reinforcement of building project in Enugu Metropolis.

Quality reinforcement = 4.172 + 0.317 Civilsoft computer-based software

The empirical result shows that the coefficient of Civilsoft computer-based project management software has positive impact on quality reinforcement of building project; it means that Civilsoft computer-based project management software has positive and direct influence on quality reinforcement of building project. The results of the t – statistics denotes that the coefficient of Civilsoft computer-based project management software was statistically significance. This is because observed values of t – statistics (3.692) is than its critical values (0.000). The results of the F – statistical test shows that the overall regression of the hypothesis one was statistically significance. This is because observed value of the F – statistics (13.628) was great than its critical value (0.000). Again, our empirical result shows that the Pearson product moment correlation analysis (r) was 0.932. The strength of relationship between the two variables was high. However, we accepted the alternative hypothesis and conclude that Civilsoft computer-based project management software has significant impact on quality reinforcement of building project in Enugu Metropolis (t-statistic =3.692; P-value (0.000) < Sig-value (0.05).

Test of Hypothesis Two

H_2 Planswift computer-based project management software has no significant impact on avoidance of cost-overrun of building project in Enugu Metropolis.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.881[a]	.731	.524	.091373

a. Predictors: (Constant), Planswift computer-based software

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	40.986	1	40.986	33.043	.000[b]
	Residual	136.443	111	1.240		
	Total	177.429	112			

a. Dependent Variable: Avoidance of cost-overrun

b. Predictors: (Constant), Planswift computer-based software

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.451	.451		12.079	.000
	Planswift computer-based software	.583	.101	.481	5.748	.000
a. Dependent Variable: Avoidance of cost-overrun						

In testing this hypothesis, Planswift computer-based software was regressed against avoidance of cost-overrun. The result of the single-regression analysis summarized in table 4.4.2 shows the model to evaluate the impact of Planswift computer-based project management software on avoidance of cost-overrun of building project in Enugu Metropolis.

Avoidance of cost overrun = 5.451 + 0.583 Planswift computer-based software

The empirical result shows that the coefficient of Planswift computer-based project management software has positive impact on avoidance of cost-overrun of building project; it means that Planswift computer-based project management software has positive and direct influence on avoidance of cost-overrun of building project. The results of the t – statistics denotes that the coefficient of Planswift computer-based project management software was statistically significance. This is because observed values of t – statistics (5.748) was than its critical values (0.000). The results of the F – statistical test show that the overall regression of the hypothesis two was statistically significance. This is because observed value of the F – statistics (33.043) was great than its critical value (0.000). Again, our empirical result shows that the Pearson product moment correlation analysis (r) was 0.881. The strength of relationship between the two variables was very high. However, we accepted the alternative hypothesis and conclude that Planswift computer-based project management software has significant impact on avoidance of cost-overrun of building project in Enugu Metropolis (t-statistic = 5.748; P-value (0.000) < Sig-value (0.05).

Discussion of Findings

In this study, findings were discussed in line with stated study objectives

Impact of Civilsoft computer-based project management software on quality reinforcement of building project in Enugu Metropolis

The findings of the study revealed that Civilsoft computer-based project management software has significant impact on quality reinforcement of building project in Enugu Metropolis since computer aided project management software helps deliver high quality products and services within a short time with fewer costs (t-statistic =3.692; P-value (0.000) < Sig-value (0.05).

The result agreed with the work of Bashir (2023) that conducted a study to examine the impact of project management software on construction projects in the republic of Kazakhstan. Specifically, the study sought to; present the importance of project management softwares in Construction projects, use the finding of this study to showcase the main project management softwares and their benefits in addressing different project management segments i.e Planning, scheduling, procurement and communication. The study revealed that 92% of project managers use PMS in their projects, and 82% believed that PMS are important in their work and 34% used their company integrated softwares. The research found that the least stage at which respondents use PMS is at the closing phase, while the main phase that the PMS is needed is planning phase. Furthermore, respondents believe that PMS are helpful in planning project with a relevant data that showed the highest percentage in this group is 35%, followed by team management and collaboration with 30% and the least is cost estimation with a statistical data of 17%.

Impact of Planswift computer-based project management software on avoidance of cost-overrun of building project in Enugu Metropolis.

The findings of the study revealed that planswift computer-based project management software has significant impact on avoidance of cost-overrun of building project in Enugu Metropolis since computer-based project management software provides measured quantities of the items of work identified by the drawings and specifications in the tender documentation for a project (t-statistic = 5.748; P-value (0.000) < Sig-value (0.05). The study agrees with conclusion of Unegbua, Yawasa and Dan-asabe, (2023) that conducted a study to assess of the literature on the performance of construction projects in Nigeria. Specifically, the study aimed to identify the factors and obstacles that impede construction project performance in Nigeria through a comprehensive literature review. The review involved a systematic approach to identify relevant studies from reputable academic databases, and the findings were synthesized and analyzed. The data analytical technique was content analysis. The study found that poor project planning and scheduling, inadequate risk management, corruption, and ineffective stakeholder management were the primary factors contributing to poor project performance in Nigeria. The study highlights that these factors are interrelated and can exacerbate one another, leading to significant cost overruns, delays, and substandard work. Additionally, the study found that effective project management was a key success factor in improving project performance.

Impact of Revit computer-based project management software on unique architectural design of building project in Enugu Metropolis

The findings of the study revealed that Revit computer-based project management software has significant impact on unique architectural design of building project in Enugu Metropolis since computer aided project management software facilitate the workflows of a team collaborating on the same project objectives (t-statistic = 8.667; P-value (0.000) < Sig-value (0.05). The study is full support of the opinion of Oyindoubra, (2022) [14] that conducted a study to examine the computer aided design (CAD) skills needed by building Technologist in Polytechnics for job placement in Rivers State. The specific objectives of the study were ascertain the computer Skills needed by building technologist in polytechnics for job placement in Rivers State, drafting Skills needed by building technologist in polytechnics for job placement in Rivers State, basic CAD Skills needed by building technologist in polytechnics for job placement in Rivers State and advanced CAD Skills needed by building technologist in polytechnics for job

placement in Rivers State. The survey research design was employed. The study population consisted of 46 respondents, made up of 36 lecturers and 10 instructors of Building Technology in two Polytechnics in Rivers State of Nigeria. The collected data were analyzed using mean for the research questions. Conclusively, CAD skills are important for securing, retaining and progressing on the job, as well as having success in the world of work.

Summary of Findings

This study has the following findings:

1. The study showed that civilsoft computer-based project management software has significant impact on quality reinforcement of building project in Enugu Metropolis since computer aided project management software helps deliver high quality products and services within a short time with fewer costs (t-statistic =3.692; P-value (0.000) < Sig-value (0.05).
2. The study showed that planswift computer-based project management software has significant impact on avoidance of cost-overrun of building project in Enugu Metropolis since computer-based project management software provides measured quantities of the items of work identified by the drawings and specifications in the tender documentation for a project (t-statistic = 5.748; P-value (0.000) < Sig-value (0.05).

Conclusion

The study concluded that computer-based project management model has positive and significant impact on building project performance in Enugu Metropolis. The use of technology in our building/engineering drawing improves quality and standard of building delivery. Also, the use of project management software has significant impact in reduction of Project failure rates in the Nigeria Construction Industry. Computer-based project management software promote quality reinforcement, causes avoidance of cost-overrun, provides unique architectural design and prompt delivery of building of building project in Enugu Metropolis. Computer-based project management software helps to set deadlines for certain tasks and ease document reproduction and cloning, computer aided project management software helps deliver high quality products and services within a short time with fewer costs, computer-based project management software provides measured quantities of the items of work identified by the drawings and specifications in the tender documentation for a project, computer assisted project management software provides design information from a building model, and specifications, and so that bill of quantities can be calculated and tender documents generated.

Recommendations

Based on the findings of this study, the following recommendations were made.

1. Construction companies should develop the usage of Planswift computer-based project management software to simplify their project planning and management. Microsoft Project is absolutely important in project management and planning, and it should be used for simplifying project planning process. Project Management software could simplify the process of project planning for making schedule, cost estimation and team management.
2. Project managers and stakeholders should use Civilsoft computer-based project management software to save time and reduce project cost. Free developed softwares are available and effective for construction project managers usage. Projects consultants should be more interested in design cost by using multi-criteria analysis and choosing the most economical criteria in order to improve their performance and to increase owners' satisfaction.

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