

2025

3RD EDITION

CONSTRUCTION BUSINESS & PROJECT MANAGEMENT CONFERENCE

23 - 25 APRIL 2025

UCT GRADUATE SCHOOL OF
BUSINESS, CONFERENCE CENTRE,
CAPE TOWN, SOUTH AFRICA

ABSTRACTS



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FOREWORD

Welcome from the Conference Chair

Professor Abimbola Windapo, University of Cape Town

On behalf of the Construction Business and Project Management Research Group, University of Cape Town and the entire Organizing Committee, it is my honour and pleasure to welcome you to the Construction Business and Project Management Conference (CBPM) 2025, taking place from April 23rd to 25th, at the UCT Graduate School of Business Conference Centre in Cape Town, South Africa, as well as online. This year's conference theme: "Advancing Multidisciplinary Approaches for Sustainable Construction and Project Management," uniquely positions us to explore innovative, cross-sectoral strategies geared towards enhancing sustainability, efficiency, and resilience within the construction industry.

CBPM 2025 has been meticulously curated to provide a platform for knowledge exchange, collaboration, and capacity building among leading academics, industry professionals, policymakers, and emerging scholars across Africa and the broader global construction community. Over the course of three days, participants will engage with the keynote address presented by the Deputy Minister, Department of Public Works and Infrastructure, South Africa – Mr. Sihle Zikalala, guest speeches by the CEO of CIDB – Mr. Bongani Dladla, Prof. Ayyoob Sharifi, Prof. Celestine Iwendi and Ms. Suma Mwaitenda, cutting-edge research presentations, panel discussions, and a workshop that address critical contemporary challenges such as public procurement reform, technological innovation including BIM-IoT integration and Artificial Intelligence, sustainable design and materials, H&S and leadership in construction.

The programme reflects an interplay between theory and practice. Day 1 opens with a workshop on procurement reform, framing the discourse with multiple stakeholder perspectives on the evolving regulatory landscape in South Africa. Days 2 and 3 expand this focus, offering insightful sessions on the use of technology for sustainability, strategic management, inclusive leadership, infrastructure development, health and safety, and the latest advancements in AI and project risk management. The diversity of topics covered will no doubt stimulate dynamic conversations and bring about new research collaborations.

A highlight of our commitment to academic integrity and quality is our rigorous three-stage blind peer review process, ensuring that only original, impactful, and methodologically sound papers are included in the conference proceedings. The efforts of our dedicated Scientific Committee, reviewers, and editorial team have been invaluable in maintaining the highest standards, with selected papers representing the forefront of scholarship and industry relevance.

I encourage all delegates to take full advantage of the networking opportunities provided, whether in-person at the scenic V&A Waterfront vicinity or through our virtual platforms. Let this gathering not only broaden your knowledge and professional networks but also inspire practical solutions for driving transformational change in construction business and project management, especially within the African context.

Thank you for your participation and contribution towards making CBPM 2025 a milestone event. I look forward to engaging with you throughout the conference.

Warm regards,

A handwritten signature in blue ink, reading "Prof. Abimbola Windapo". The signature is fluid and cursive, with the first name "Abimbola" and last name "Windapo" clearly visible.

Prof. Abimbola Windapo

CBPM 2025 Conference Chair

ENDORSEMENTS

The Construction Business and Project Management Conference is accredited by the South African Council for the Project and Construction Management Professionals (SACPCMP) for **2.1 CPD Credits**. The conference is also supported by the Journal of Construction Business and Management.



The South African Council for the Project and Construction Management Professions



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SCIENTIFIC COMMITTEE 2025

The success of the 3rd edition of the CBPM Conference is a testament to the dedication and voluntary contributions of the Scientific Committee. We are deeply grateful to its members, whose collaboration with the CBPM Committee ensured a rigorous and constructive peer-review process.

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CONFERENCE SESSION CHAIRS

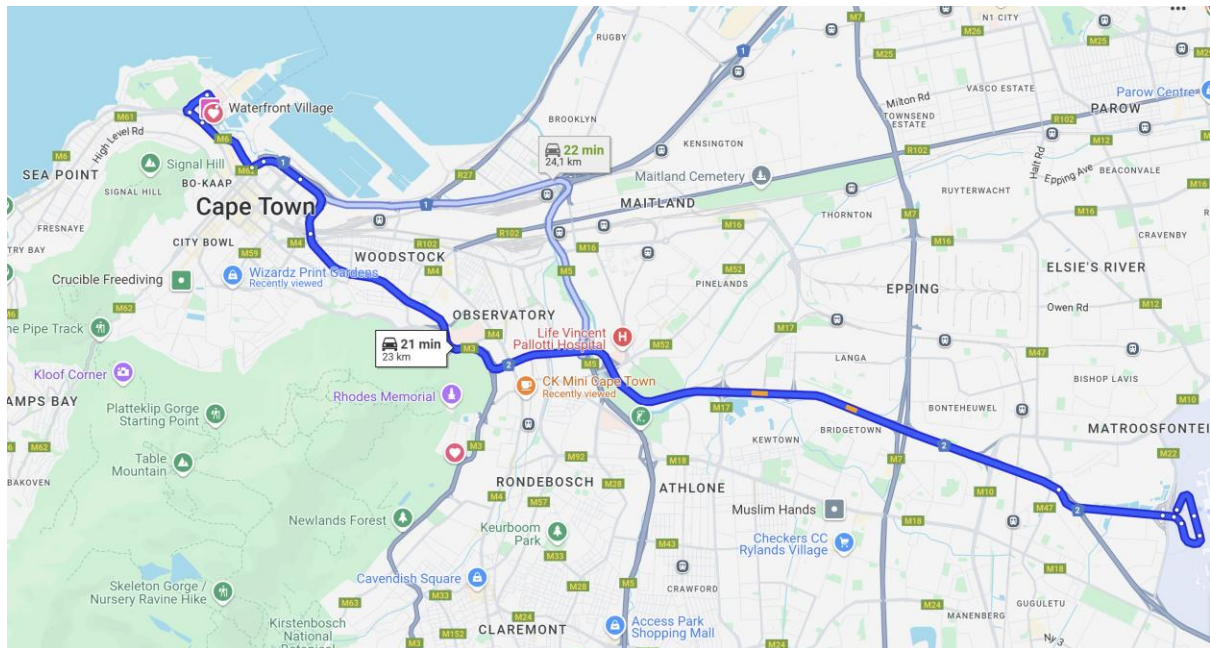
Session Chairs	Slots	Sessions	Themes
Prof. Ayodeji Aiyetan	09:30-10:50	Session 1: Day 2: Session A	Innovative Use of Technology
Dr Senator Okosun			Sustainable Design in the Construction Industry/Sustainable Material Production
Dr. Iruka Anugwo	11:10-13:10	Session 2: Day 2: Session B	Innovative use of technology
Dr. Chikezirim Okorafor			Sustainable Construction/Net-Zero in Construction
Prof. Justus Ngala Agumba	14:30-16:30	Session 3: Day 2: Session C	Strategic Management and Leadership in construction
Prof. Modupe Mewomo			Sustainability and Facility Management/SME Development
Prof. John Smallwood	09:30-11:10	Session 4: Day 3: Session A	Construction Health and Safety
Prof. Makgopa Tshehla			Construction Education/Women in Construction/ Mental Health and Wellbeing
Mr. Fabio Companie	12:00-13:20	Session 5: Day 3: Session B	Infrastructure Development
Dr. Steve Kabemba			Procurement Innovation and Transformation
Prof. Molusiwa Stephan Ramabodu	14:30-16:30	Session 6: Day 3: Session C	Contract Management/ Costing and Scheduling in the Construction Industry
Dr. Amanda Filtane			Artificial Intelligence in Construction and Project Management/Construction-related Disaster Management/Productivity

LOCAL MAP FROM CAPE TOWN INTERNATIONAL AIRPORT TO UCT GRADUATE SCHOOL OF BUSINESS CONFERENCE CENTRE

Address:

UCT Graduate School of Business, 9 Portswood Rd, Victoria & Alfred Waterfront, Cape Town, 8002

<https://g.co/kgs/Jhhe9Mb>



Directions to Protea Hotel by Marriott® Breakwater Lodge from Cape Town International Airport:

- Take the N2 from the Airport to Town
- Carry on straight passed the Southern Sun Waterfront Hotel on your left and at the second set of traffic lights, turn right into Helen Suzman Boulevard
- Take the right hand lane that leads to a small set of traffic lights leading into Portswood Road
- Turn right into Portswood Road
- The GSB Conference Basement Parking can be reached by taking the first road on one's right hand side.
- Please follow the GSB signs until you reach the security boom
- Hotel Guest Parking can be reached by taking the 2nd entrance on one's right hand side when coming down Portswood Road (towards the Waterfront)
- The UCT Academic Conference Centre Parking will be the 3rd entrance on one's right hand side.

GETTING AROUND IN CAPE TOWN

The most convenient and reliable way to get around Cape Town is by using UBER, which is widely regarded as the safest and most popular mode of transport for visitors. To make your travel easier, be sure to download the UBER app on iOS or Android before arriving in Cape Town.



MAIN ATTRACTION NEARBY THE CONFERENCE

The V&A Waterfront is a mixed-use suburb in Cape Town, South Africa. It is on the site of the oldest working harbour in the Southern Hemisphere. With Table Mountain as its backdrop, the 123-hectare neighbourhood sees millions of people visiting each year. It contains art, entrepreneurs, and sustainable design



CONFERENCE VENUES: VENUE 5 & VENUE 6

The conference venue is located inside the building. To reach Venue 5 and 6, take the elevator to Level 1. Alternatively, you can use the stairs to access the venues.



DIRECTIONS TO CONFERENCE VENUE PARKING

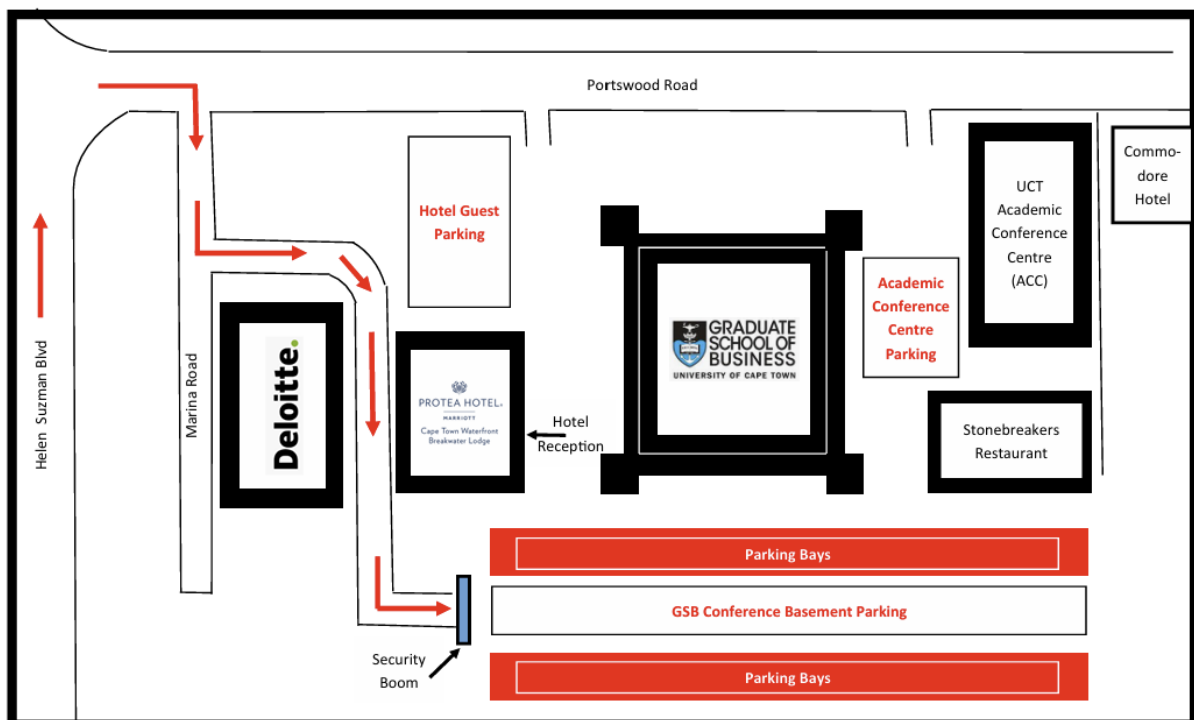


TABLE OF CONTENTS

FOREWORD	1
ENDORSEMENTS	4
CBPM 2025 LOCAL ORGANISING COMMITTEE	5
SCIENTIFIC COMMITTEE 2025	6
CONFERENCE SESSION CHAIRS	8
LOCAL MAP FROM CAPE TOWN INTERNATIONAL AIRPORT TO UCT GRADUATE SCHOOL OF BUSINESS CONFERENCE CENTRE.....	9
GETTING AROUND IN CAPE TOWN	10
MAIN ATTRACTION NEARBY THE CONFERENCE.....	10
CONFERENCE VENUES: VENUE 5 & VENUE 6	11
DIRECTIONS TO CONFERENCE VENUE PARKING.....	11
SESSION 1 & 2: INNOVATIVE USE OF TECHNOLOGY.....	18
EXPLORING THE ADVANTAGES OF BIM-IOT INTEGRATION IN ENHANCING CONSTRUCTION HEALTH AND SAFETY	
Mojtaba Amiri and Ehsan Saghatforoush and Samuel Laryea	19
KEY DRIVERS OF WEARABLE TECHNOLOGY USAGE FOR WORKER SAFETY ON CONSTRUCTION SITES IN NIGERIA	
David Ojimaajo Ebiloma and Clinton Ohis Aigbavboa.....	20
STRATEGIES FOR BLOCKCHAIN TECHNOLOGY ADOPTION IN FACILITY MANAGEMENT PRACTICES IN NIGERIA	
David Ojimaajo Ebiloma	21
A SCOPING REVIEW ON THE ROLE OF 3D PRINTING IN CONSTRUCTION: REVOLUTIONIZING DESIGN AND REDUCING WASTE	
Thalente Nkosi, Sibongile Dlamini and Ongezwa Nakin.....	22
DIGITAL SOLUTIONS FOR THE MANAGEMENT OF WASTEWATER STORAGE FOR THE MINING INDUSTRY	
Leah Ledwaba and Makgopa Tshela	23
ENERGY-EFFICIENT UPGRADES FOR EDUCATIONAL BUILDINGS: A ROADMAP TO CARBON NEUTRALITY	
Ayobami Oluwaseun Idowu, Clinton Ohis Aigbavboa, Ayodeji Emmanuel Oke, and Seyi Stephen.....	24
PORT EFFICIENCY: THE IMPLICATION OF BLOCK CHAIN TECHNOLOGY IN THE CONSTRUCTION MATERIAL SUPPLY CHAIN	
Adeola Oluwatoyin Osundiran and Tshela Makogpa.....	25

APPRAISAL OF BUILDING INFORMATION MODELLING IMPLEMENTATION ON CONSTRUCTION PROJECT PERFORMANCE IN NIGERIA	
Akinola V.O.	26
SESSION 1: SUSTAINABLE DESIGN IN THE CONSTRUCTION	
INDUSTRY/SUSTAINABLE MATERIAL PRODUCTION	27
LEVERAGING ON SUSTAINABLE BUILDING DESIGNS: EXPLORING THE DRIVERS AND SATISFACTION OF SMART LIGHTING IN STUDENT HOUSING IN GHANA	
Iruka Chijindu Anugwo, Williams Miller Appau, Elvis Attakora-Amaniampong, Frederick Simpeh	28
A REVIEW OF MODEL BUILDING BY-LAWS FOR INCORPORATING SUSTAINABLE CONSTRUCTION MATERIAL UTILISATION IN ZIMBABWE	
Cynthia Moyo, Tirivavi Moyo and Mable Vongai Mudombo	29
UNTAPPED RESOURCES: LOCALLY AVAILABLE BUILDING MATERIALS IN SOUTH-WESTERN NIGERIA	
Olugbenga Fashuyi and Amira Osman	30
A SYSTEMATIC REVIEW ON THE USE OF QUARRY DUST IN SOUTH AFRICAN CONSTRUCTION INDUSTRY	
Izuchukwu Nwokocha, Chikezirim Okorafor and Darlington Ikegwuoha	31
SESSION 2: SUSTAINABLE CONSTRUCTION/NET-ZERO IN CONSTRUCTION	32
PROMOTING THE ADOPTION OF SUSTAINABLE ENVIRONMENTAL TECHNOLOGIES IN GHANA’S CONSTRUCTION SECTOR: A QUANTITATIVE STUDY OF KEY DRIVERS	
Harold Adjarko, Iruka Anugwo and Ayodeji Aiyetan	33
QUANTITATIVE ASSESSMENT OF ENVIRONMENTAL CHALLENGES HINDERING SUSTAINABILITY IN THE GHANAIAN CONSTRUCTION INDUSTRY: IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT	
Harold Adjarko, Iruka Anugwo and Ayodeji Aiyetan	34
SUSTAINABLE CONSTRUCTION POLICY CONSTRAINTS IN NIGERIA: STAKEHOLDERS PERSPECTIVE	
Nishani Harinarain and Ayotunde Babalola	35
BARRIERS TO EFFECTIVE CONSTRUCTION WASTE REDUCTION: A STUDY OF CONTRACTORS IN THE EASTERN CAPE PROVINCE, SOUTH AFRICA	
Nontlahla Mphako, Athenkosi Sogaxa and Lance Wentzel	36
NATURE-BASED SOLUTIONS AND MATERIALS PROMOTING NET-ZERO CONSTRUCTION IN SOUTH AFRICA: TRENDS AND INSIGHTS FROM A BIBLIOMETRIC REVIEW	
Nana Akua Asabea Gyadu-Asiedu, Clinton Aigbavboa, Seyi Stephen	37

SESSION 3: STRATEGIC MANAGEMENT AND LEADERSHIP IN CONSTRUCTION.....	38
DEVELOPING AN INCLUSIVE LEADERSHIP-PSYCHOLOGICAL SAFETY RELATIONSHIP FRAMEWORK TO FOSTER CREATIVE PERFORMANCE IN THE NIGERIAN BUILT ENVIRONMENT	
Tosin Emmanuel Oladele, Modupe Cecilia Mewomo, and Jacob Ikotun	39
UNVEILING THE KEY DRIVERS OF SUCCESSFUL OPERATIONS MANAGEMENT IN CONSTRUCTION SUBCONTRACTING	
Henok Asfaw Hailu and Tshehla, Makgopa	40
THE EFFECTIVENESS OF SUPPLY CHAIN MANAGEMENT IN ENHANCING PROJECT MANAGEMENT OUTCOMES	Jey
Difference Nyalungu, Sizwe Vincent Mbona, Sijuwade Adedayo Ogunsola and Venus Sibuyi	41
ADAPTING MARKETING STRATEGIES IN A POST-PANDEMIC DIGITAL LANDSCAPE: INSIGHTS FROM PROJECT MANAGERS	
Nishani Harinarain.....	42
BARRIERS TO THE ADOPTION OF EMERGING TECHNOLOGIES FOR QUALITY MANAGEMENT IN CONSTRUCTION PROJECTS IN NIGERIA	
Innocent Chigozie Osuizugbo, Chikezirim Okorafor and Victor Olukayode Iyanda	43
SMME COLLABORATION DYNAMICS IN INTERNATIONAL CONSTRUCTION JOINT VENTURES IN HARARE, ZIMBABWE	
Pride Ndlovu, Malcolm Weaich, Lionel Bvute, Prisca Simbanegavi and Faranani Gethe.....	44
SESSION 3: SUSTAINABILITY AND FACILITY MANAGEMENT/ SME DEVELOPMENT.....	45
READINESS OF FACILITIES MANAGEMENT ORGANISATIONS FOR BIM ADOPTION IN FACILITIES MANAGEMENT FUNCTIONS	
Brent Cloete, Justus Ngala Agumba, Oluseyi Julius Adebawale and Chris Meyer	46
AN EXPLORATORY EVALUATION OF THE FACTORS THAT IMPACT THE ADOPTION OF INNOVATIVE SUSTAINABLE BUILDING MATERIALS IN HOUSING CONSTRUCTION ACROSS SOCIO-ECONOMIC CONTEXTS	
Kabemba S. Ngoy, Esona Daweti, Relebohile Molise, Darmarajan Chinasamy and Abimbola Windapo	47
FACTORS INFLUENCING THE ADOPTION OF SUSTAINABLE PRACTICES IN FACILITY MANAGEMENT	
Chioma Okoro	48
GROWTH CONSTRAINTS OF DOMESTIC CONSTRUCTION FIRMS IN EMERGING ECONOMIES	
Henok Asfaw Hailu and Tshehla Makgopa	49

SESSION 4: CONSTRUCTION HEALTH AND SAFETY.....	50
EXPLORING SHAME IN CONSTRUCTION HEALTH AND SAFETY IN SOUTH AFRICA	
Clinton Aigbavboa, John Aliu, Douglas Aghimien, and Bankole Awuzie	51
DEVELOPING A SAFETY COMPETENCE EVALUATION FRAMEWORK FOR ARTISANS IN THE NIGERIAN CONSTRUCTION INDUSTRY	
Mubarak Reme Ibrahim, Usman Sulaiman Jibril and Mu’awiya Abubakar	52
ASSESSMENT OF FACTORS AFFECTING WORKERS’ HAZARD RECOGNITION IN CONSTRUCTION	
Mu’awiya Abubakar, Yahaya Makarfi Ibrahim, Kabiru Bala, Ahmed Doko Ibrahim and Muhammad Aliyu Yamusa.....	53
IMPACT OF BARRIERS TO IMPLEMENTING HEALTH AND SAFETY PRACTICES FOR CONSTRUCTION WORKERS' PRODUCTIVITY IN SMMES	
Nomaswazi Nyeleti Malumbete, Justus Ngala Agumba, Oluseyi Julius Adebawale Nazeem Ansary	54
WHY I REGISTERED FOR CONSTRUCTION MANAGEMENT	
John Smallwood.....	55
SESSION 4: CONSTRUCTION EDUCATION/WOMEN IN CONSTRUCTION/ MENTAL HEALTH AND WELLBEING	56
ASSESSING THE BARRIERS TO ONLINE LEARNING IN BUILT ENVIRONMENT PROGRAMMES	
Abdulfatah S, Ahmadu H.A, Abdulrahman R.S, Bashir A.S, and Yamusa M.A	57
ENHANCING GENDER EQUALITY POLICIES FOR PROMOTING WOMEN’S PARTICIPATION IN THE ZIMBABWEAN CONSTRUCTION SECTOR	
Modesta Mupondi, Tirivavi Moyo and Cynthia Moyo	58
INITIATIVES FOR PHYSICAL WELL-BEING IMPROVEMENT FOR CONSTRUCTION WORKERS IN ZIMBABWE	
Cynthia Moyo, Tirivavi Moyo and Wedzerai Mateza.....	59
THE CHALLENGES TO WOMEN PROGRESSION IN THE CONSTRUCTION INDUSTRY: AN INVESTIGATIVE STUDY	
Abimbola Windapo, Olugbenga Oladinrin, João Alencastro, Dineo Mbekwa, Christiana Ekpo, Muhammad Rana and Amanda Filtane	60
SESSION 5: INFRASTRUCTURE DEVELOPMENT.....	61
INSTITUTIONAL CHALLENGES IN THE DELIVERY OF PUBLIC-SCHOOL INFRASTRUCTURE IN KWAZULU-NATAL	
Sibongile P. Dlamini and Thalente Nkosi.....	62
INVESTIGATING UNDERUTILIZATION OF THE MUNICIPAL WATER INFRASTRUCTURE GRANT (MWIG) IN LEEKWA-TEEMANE LOCAL	

MUNICIPALITY (LTLM)	
Faranani Gethe, Karabo Zwelithin Ramaleba, Sandiso Thandwefika Mgcodo and Thetshelesani Makhuvha	63
CRITICAL REVIEW OF THE CHALLENGES OF FINANCING RENEWABLE ENERGY DEVELOPMENT IN SUB-SAHARAN AFRICA	
Sam Wamuziri	64
NAVIGATING FORMAL LAND ACQUISITION CHANNELS FOR CONSTRUCTION PROJECTS IN LAGOS: ISSUES AND CHALLENGES	
Daramola Thompson Olapade, Justus Ngala Agumba, and Rudzani Glen Muthelo .	65
SESSION 5: PROCUREMENT INNOVATION AND TRANSFORMATION	66
CLIENT AND CONSTRUCTION MACHINERY RELATED FACTORS INFLUENCING THE SELECTION OF CONTRACT PROCUREMENT METHOD IN KWAZULU NATAL PROVINCE IN SOUTH AFRICA	
A.O. Aiyetan & B. Ayodabo	67
AN APPRAISAL OF PROCUREMENT CHALLENGES FACING EMERGING CONTRACTORS IN PUBLIC SECTOR PROJECTS IN SOUTH AFRICA	
Sibabalo Edmond Bangani, Modupe Cecilia Mewomo , Cyril Chinonso Ejidike, and Bondinuba K. Francis and Collins Ameyaw.....	68
EVALUATING THE CURRENT TENDER ADJUDICATION IN THE WESTERN CAPE PROVINCE, SOUTH AFRICA	
Damba B, Nghona X, Bikitsha L, Sogaxa A and Okosun S.E.....	69
PREDICTIVE ANALYTICS AND STOCHASTIC PROGRAMMING FOR CONSTRUCTION RESOURCE OPTIMIZATION IN DEVELOPING AFRICAN ECONOMIES	
Frédéric Mirindi and Derrick Mirindi	70
SESSION 6: CONTRACT MANAGEMENT/ COSTING AND SCHEDULING IN THE CONSTRUCTION INDUSTRY	71
A CONCEPTUAL FRAMEWORK FOR MANAGING EMPLOYER’S CLAIMS IN MEGA CONSTRUCTION PROJECTS	
Makgopa Tshehla	72
THE CAUSES AND IMPACT OF LATE PAYMENTS IN THE CONSTRUCTION INDUSTRY	
Ayabulela Bongco and John Smallwood	73
EFFECTIVENESS OF EXISTING INSURANCE FRAMEWORKS IN ADDRESSING THE RISKS OF CONTRACTORS	
Sarpong O.S, Mewomo M.C, Bondinuba F.K, Nansie A, and Dery B. A	74
DEVELOPING A COST ESTIMATING CONCEPTUAL FRAMEWORK THAT LEVERAGES ON KNOWLEDGE	
Bashir A.S, Kolo B.A, Abdulrazaq M, Ahmadu H.A and Bello A.S	75

INFLATION AND QUALITY ATTRIBUTES IN CONSTRUCTION PROJECTS IN CITIES: AN EMPIRICAL ANALYSIS OF THE FEDERAL CAPITAL TERRITORY (FCT) ABUJA, NIGERIA	
Daniel A, Okosun S.E, Athenkosi Sogaxa, Okosun K.O and Idoko O	76
DISPUTES ON CONSTRUCTION PROJECTS: THE ROLE OF PROCUREMENT METHODS AND PAYMENT STRATEGIES	
Abimbola Windapo and Muhammad Limalia.....	77
SESSION 6: ARTIFICIAL INTELLIGENCE IN CONSTRUCTION AND PROJECT MANAGEMENT/CONSTRUCTION-RELATED DISASTER MANAGEMENT/PRODUCTIVITY	78
EXPLORING INTEGRATION OF ARTIFICIAL INTELLIGENCE IN CONSTRUCTION BID AUTOMATION	
Oscar Kwame Kwasafu, Samuel Laryea, and Neil Govender	79
DIGITAL TRANSFORMATION OF CONSTRUCTION AND PROJECT MANAGEMENT THROUGH ARTIFICIAL INTELLIGENCE	
Aju Omojokun Gabriel and Mokgohloa Kgabo	80
A SYSTEMATIC REVIEW OF THE CURRENT STATE OF ARTIFICIAL INTELLIGENCE ADOPTION IN SOUTH AFRICA’S AEC SECTOR	
Desiree Elizabeth Naidu and Dr Zakheeya Armoed and Prof Modupe Mewomo.....	81
BRINGING CHANGE IN CONSTRUCTION: ANALYSING STRATEGIES FOR MANAGING CYBERSECURITY DISASTERS IN THE SOUTH AFRICAN CONSTRUCTION INDUSTRY	Seyi
Segun Stephen, Clinton Ohis Aigbavboa, Jummai Okikiola Bello, and Ayodeji Emmanuel Oke	82
A SYSTEMATIC LITERATURE REVIEW ON EMERGENCY RESPONSE SYSTEMS AND THEIR IMPACT ON INFRASTRUCTURE RESILIENCE	
Abudu Haruna Domanamwin, Mewomo Cecilia Modupe, Adjei Kofi Owusu and Bondinuba Francis Kwesi	83
A LITERATURE REVIEW OF CONSTRUCTION LABOUR PRODUCTIVITY: A 30-YEAR GLOBAL PERSPECTIVE	
R.Suresh kumar, Oluseyi Julius Adebawale, Justus Ngala Agumba, L.Krishnaraj...	84

SESSION 1 & 2: INNOVATIVE USE OF TECHNOLOGY

EXPLORING THE ADVANTAGES OF BIM-IOT INTEGRATION IN ENHANCING CONSTRUCTION HEALTH AND SAFETY

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Abstract

The construction industry faces significant workplace safety related challenges, with a high rate of accidents and injuries. The use of advanced technologies such as Building Information Modelling (BIM) and Internet of Things (IoT) has reduced the number of such challenges. The objective of this research is to explore the integration of BIM and IoT technologies to improve Occupational Safety and Health (OSH) management in construction industry. Given the limited research on the practical advantages of BIM-IoT integration for safety purposes, this study aims to address this gap by identifying and analysing these advantages. A Systematic Literature Review (SLR) is conducted, analyzing articles published between 2010 and 2025 to identify the advantages of BIM-IoT integration in construction safety management. The findings highlight several key advantages of BIM-IoT integration, including enhanced safety monitoring, real-time decision-making, and improved hazard identification and risk assessment. Furthermore, the integration supports proactive safety measures, such as eliminating hazards during the design phase and improving workers' safety awareness. However, the study highlights the need for further research on regulatory compliance and cost-effectiveness, as well as design-phase hazard prevention, AI-driven safety monitoring, and standardized compliance frameworks to enhance BIM-IoT's impact on construction safety.

Keywords: Advantages, BIM, Construction Safety, IOT, Integration

KEY DRIVERS OF WEARABLE TECHNOLOGY USAGE FOR WORKER SAFETY ON CONSTRUCTION SITES IN NIGERIA

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Abstract

Despite significant advancements in wearable technology, the construction industry faces high rates of accidents, injuries, and fatalities. Hence, this study aims to evaluate the key drivers of wearable technology in Nigeria's construction sites to foster the health and safety of workers and other stakeholders in building projects. A post-positivist philosophical approach guided a quantitative research methodology employing a questionnaire survey for this study. The population comprises professionals with health and safety certifications who interact with safety protocols and wearable technology on construction sites within Lagos state. Using snowball sampling, 360 questionnaires were distributed online and physically; 164 copies were retrieved, screened, and analysed using descriptive analysis. The ranking of drivers reveals that enhanced safety outcomes, regulatory compliance, and potential cost savings are the primary motivations for adopting wearable technology. The standard deviation results showed that the responses from the survey were consistent and uniform since all their values were less than one (1). Based on the findings of this research, it is recommended that government bodies introduce policies that incentivise the adoption of wearable technology through subsidies or tax benefits. Regulatory frameworks should also be established to standardise the use of these technologies across the industry. The outcome of this study points to the need for further exploration into the long-term sustainability and cost-effectiveness of wearable technology in the construction industry. Additionally, it opens the door for research into how these technologies could be integrated into safety protocols in other regions or sectors within Nigeria.

Keywords: Wearable Technologies, Health and Safety, Construction Sites, Drivers, Nigeria.

STRATEGIES FOR BLOCKCHAIN TECHNOLOGY ADOPTION IN FACILITY MANAGEMENT PRACTICES IN NIGERIA

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Abstract

The digitalisation in Nigeria's facility management sector is inadequate, leading to inefficient and complex procurement processes. As an aftermath of the COVID-19 pandemic, the blockchain technology could handle the challenges within the sector. Hence, this study aims to determine blockchain technology adoption strategies in Nigeria's facility management practices. A post-positivist philosophical approach guided a quantitative research methodology employing a questionnaire survey for this study. The population comprised builders, civil engineers, estate managers, and facility managers selected from professional institutes and associations within Lagos state. Using the random sampling technique, 389 questionnaires were distributed online and physically; 195 copies were retrieved, screened, and analysed using descriptive analysis, while Cronbach's Alpha tested the reliability. Results revealed that organisational culture, leadership, and stakeholder engagement were particularly important. While technological advancements, data security, and cost-effective solutions are also valued, the role of government policy, partnerships, and the development of skilled professionals are viewed as moderately significant, with a need for broader awareness and training to drive adoption further. The wide range of standard deviations across responses indicates that while general agreement exists on these strategies, the degree to which they are prioritised varies significantly among different respondents. The findings of this study provide invaluable insights that will enhance the effectiveness and efficiency of facility management practices through blockchain technology. The transition towards blockchain adoption requires concerted efforts from all stakeholders, including government agencies, educational institutions, and industry professionals, to create an enabling environment that fosters innovation, collaboration, and continuous learning in facility management.

Keywords: Blockchain, Contractual Arrangements, Facilities Management, Innovation, Nigeria, Stakeholders.

A SCOPING REVIEW ON THE ROLE OF 3D PRINTING IN CONSTRUCTION: REVOLUTIONIZING DESIGN AND REDUCING WASTE

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Abstract

This scoping review explores the role of 3D printing technology in the construction industry, focusing on its impact on design innovation and waste reduction. Covering research published between 2010–2024, this study systematically maps existing literature to identify key trends and assess the practical implications of 3D printing in addressing material waste and design limitations. The review synthesizes findings from peer-reviewed articles, industry reports, and case studies retrieved from database such as Scopus. Expected findings include significant advancements in design flexibility and sustainability while also identifying research gaps and future directions. The insights provided will be valuable for construction professionals, researchers, and policymakers seeking to leverage 3D printing for improved construction practices.

Keywords: Construction innovation, Design flexibility, Waste reduction, 3D Printing

DIGITAL SOLUTIONS FOR THE MANAGEMENT OF WASTEWATER STORAGE FOR THE MINING INDUSTRY

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Abstract

Managing wastewater in the mining sector presents considerable issues, with extensive ramifications for operations. This study seeks to provide a comprehensive digital solution to improve the effective management of wastewater storage, with a particular emphasis on Platinum Group Metals mining. Mining is a significant danger to water safety in arid places such as South Africa, necessitating new solutions. This study adopted qualitative methodologies to discern emergent themes. The findings indicate that technologies like big data and artificial intelligence may significantly enhance the efficiency of wastewater management. Significantly, technological failures often stem from fundamental difficulties like organisational and cultural obstacles, rather than the solutions themselves. Legal and regulatory compliance exacerbates treatment procedures. This study presents a conceptual framework that amalgamates digital technology with pragmatic solutions to tackle these difficulties. The framework improves management and compliance in wastewater operations via a systematic approach, encouraging the implementation of digital technologies in the mining industry to address present and future requirements.

Keywords: compliance, digital technologies, operational efficiency, sustainability, wastewater storage management

ENERGY-EFFICIENT UPGRADES FOR EDUCATIONAL BUILDINGS: A ROADMAP TO CARBON NEUTRALITY

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Abstract

Educational buildings consume significant energy, leading to high costs and carbon emissions. Upgrading these buildings with energy-efficient solutions can reduce their environmental impact and move them toward carbon neutrality. This study outlines practical strategies, including improved insulation, energy-efficient lighting, smart heating and cooling systems, and renewable energy integration. By following these steps, schools and universities can create healthier learning environments while cutting energy use. A survey research design was employed for this study, where questionnaires were administered among key stakeholders in the built environment. 160 questionnaires were distributed, and 102 were returned and considered fit for analysis. The data was analyzed using descriptive statistics, mean score, and standard deviation. Findings reveal that improvements such as insulation upgrades, LED lighting, smart HVAC systems, and renewable energy adoption significantly reduce energy use and operational costs. The study concludes that a structured approach to energy efficiency accelerates carbon neutrality in educational institutions. This is a practical tool for institutions aiming to achieve carbon neutrality through smart, cost-effective upgrades. The study, therefore, recommends policy incentives, financial support, and stakeholder engagement to enhance implementation and long-term sustainability.

Keywords: carbon neutrality, educational buildings, energy efficiency, energy-efficient upgrade, sustainability

PORT EFFICIENCY: THE IMPLICATION OF BLOCK CHAIN TECHNOLOGY IN THE CONSTRUCTION MATERIAL SUPPLY CHAIN

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Abstract

The Port of Durban has recently been experiencing operational delays that are affecting its performance. Delays at the port adversely affect the timely completion of projects in the construction sector of South Africa. This exploratory research focuses on identifying through literature the application and implication of blockchain technology in facilitating the supply chain of construction materials. Furthermore, the drivers of port productivity for the Port of Durban are compared with that of the Port of Rotterdam. This research adopts a Quantitative Research Approach. For Data analysis, The Data Envelopment Analysis is a non-parametric tool used to evaluate port efficiency. The Malmquist Productivity Index will be used to determine the drivers of Port Productivity for the selected Ports from 2017-2023. The heterogeneity of the port cases limits the generalization of findings. The implication of this study is that it informs policymakers, project managers, investment planners, and operational practitioners about the possibilities of blockchain technology in enhancing the supply chain of construction materials. Technology is a major driver of port productivity for the port of Rotterdam. The application of various customized and specific technologies has improved the productivity of the Port of Rotterdam. The application of smart contracts in Blockchain technology will assist in improving the construction material supply chain.

Keywords: Block Chain, Construction Material Supply Chain Management, Efficiency, Port Congestion, South African Ports

APPRAISAL OF BUILDING INFORMATION MODELLING IMPLEMENTATION ON CONSTRUCTION PROJECT PERFORMANCE IN NIGERIA

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Abstract

The Nigerian construction industry continues to face challenges related to project inefficiencies, cost overruns, time delays, and low productivity. Despite the global advancement of Building Information Modelling (BIM) as a tool for improving construction project performance, its adoption and implementation in Nigeria remain limited. This study investigates BIM impact on construction project performance in Nigeria, addressing a significant gap in empirical research within the local context. To achieve the objective, a quantitative survey method was adopted following a pilot study to refine the research instrument. The study population comprised 85 key professionals, including principal partners, project quantity surveyors, architects, engineers, and project supervisors drawn from both private and public construction and consultancy firms. A census sampling technique was employed, and 63 valid responses were retrieved, yielding a response rate of 74.12%. Data were analyzed using Mean Item Score (MIS) and Relative Importance Index (RII) to rank the impact of BIM on various performance indicators. The results reveal that BIM significantly enhances project performance, with safety, labour productivity, customer satisfaction, and time management ranking highest in impact (RII = 0.86, 0.81, 0.76, and 0.75 respectively). Cost efficiency, supply chain management, sustainability, risk management, and quality control followed, with RII values ranging from 0.74 to 0.68. The study concludes that stakeholders generally perceive BIM positively, acknowledging its transformative potential for the Nigerian construction industry to what the study reveals, which is same as finding. It recommends that construction firms actively embrace BIM technologies and practices, as doing so would significantly enhance project outcomes, reduce inefficiencies, and promote sustainable development.

Keywords: Building, BIM, Construction Professionals, Project Performance, Stakeholders.

**SESSION 1: SUSTAINABLE DESIGN IN THE
CONSTRUCTION INDUSTRY/SUSTAINABLE
MATERIAL PRODUCTION**

LEVERAGING ON SUSTAINABLE BUILDING DESIGNS: EXPLORING THE DRIVERS AND SATISFACTION OF SMART LIGHTING IN STUDENT HOUSING IN GHANA

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Abstract

Smart lighting continues to emerge in student housing in Africa. This study assesses the drivers and satisfaction of smart lighting in university housing in Southern Ghana. The study surveyed 334 student residents and interviewed 10 housing managers across 5 purpose-built student housing facilities at 5 selected public universities in Southern Ghana. Relative Importance Index and thematic analysis were data analytical techniques used. The findings reveal that smart lighting in student housing was primarily driven by accommodation needs. The satisfaction levels of smart lighting were limited to lighting controls in lavatories, bedrooms, study areas, kitchen, and common areas. However, dissatisfaction with lighting was associated with adjustment to minimum light intensity and control of artificial lighting. Technically, the limited influence of facilities management factors in adopting smart lighting poses a significant risk to energy sustainability if left unaddressed. Interviews reveal that students' lack of knowledge impacts their satisfaction with and usage of smart lighting systems. At best, student housing managers and students would need education on smart lighting.

Keywords: Energy sustainability, smart lighting, sustainable design, student housing, Technology Acceptance Model,

A REVIEW OF MODEL BUILDING BY-LAWS FOR INCORPORATING SUSTAINABLE CONSTRUCTION MATERIAL UTILISATION IN ZIMBABWE

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Abstract

Environmental challenges associated with the use of traditional construction materials are widespread in Zimbabwe. Despite the existence of sustainable construction materials, the failure to migrate from a traditional Model Buildings by-law of 1977 has stymied the promotion of strategic interventions. Hence, the study determined pertinent modifications to the Model building by-laws that could allow for the utilisation of sustainable construction materials. The interpretivist philosophy employed the deployment of semi-structured interviews. Purposive sampling was applied to solicit views from construction professionals, academics, and relevant local government officials with sustainable construction experience. Suggested modifications include the generation of modern by-laws with relevant, sustainable material specifications, design-related and adopting green building principles or methodologies. A comprehensive stakeholder engagement was recommended to ensure that any modifications are practical and implementable. Using sustainable construction materials requires a policy intervention incorporating a comprehensive stakeholder support framework from manufacture to material disposal. The paper highlights modifications required to the Model building by-laws for integrating sustainable construction material utilisation in Zimbabwe. This is valuable to all stakeholders in the construction industry as it aligns with the sustainability development goals of climate action and responsible production and consumption. The main limitation was the exclusive use of a qualitative approach. However, the exploratory nature of the study supported the approach.

Keywords: Building regulations, Model building by-laws, Sustainable construction materials, Zimbabwe.

UNTAPPED RESOURCES: LOCALLY AVAILABLE BUILDING MATERIALS IN SOUTH-WESTERN NIGERIA

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Abstract

Despite that Nigeria is endowed with a plethora of local building materials that have low carbon prints and are environment friendly, the materials remain largely untapped. Instead, the nation's construction industry is fraught with high-cost imported materials, most of which are non-eco-friendly, heighten environmental degradation, and undesirable in local climate and culture. Against this backdrop, this study examined reasons for the underutilization of the local building materials resources which should have positively impacted the nation's construction industry. The research method is quantitative using primary data from community members and stakeholders in the construction industry. The data were collected through online survey questionnaires and analyzed for descriptive statistics across the six (6) southwestern states. The sample size was calculated from selected urban districts of the study area taking the acceptable error 'e' to be 0.05, and 'z' the standard variate at 95% as 1.96. Members of the construction industry were sought through the faculties of built-environment and engineering in university communities in the 6 states. Responses were downloaded and analyzed into tables and charts with Microsoft Excel. The study showed that despite the abundance of local building resources in south-western Nigeria, they are not readily available in usable form and that users' perception of them has adversely impacted their use. The study however showed that the materials are affordable and require only limited skills for construction. In this way, it is envisaged that policy interventions and discussion can enhance the use of the local building materials to promote housing development.

Keywords: Local building materials, south-western Nigeria, untapped, perception, bamboo

A SYSTEMATIC REVIEW ON THE USE OF QUARRY DUST IN SOUTH AFRICAN CONSTRUCTION INDUSTRY

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Abstract

The construction industry's environmental impact has led to growing interest in alternative materials, and this paper reviews quarry dust by evaluating its effectiveness in concrete, road construction, and other applications while addressing its enabling factors within the South African construction industry. A systematic review of literature was conducted by analysing relevant publications from four databases (Academia, ResearchGate, ScienceDirect, and Springer Link) published between 2015 and 2024. The research is limited to the complexities of using quarry dust in South Africa, and the findings aim to inform the feasibility of adopting similar materials in other regions. The review highlights the effectiveness of quarry dust in construction applications, emphasizing its significant contribution to both economic and environmental sustainability as a viable alternative material. Quarry dust not only enhances concrete strength and durability as a fine aggregate replacement but also stabilizes soil in road construction, improving road durability. Additionally, it reduces the carbon footprint by replacing cement and traditional aggregates, helping to lower construction costs, and offering an eco-friendly and readily available solution. However, it is important to note that there is an optimal replacement ratio for quarry dust in various studies, beyond which further increases may adversely affect concrete performance. Policy support and the establishment of standards could further promote its adoption in South Africa, unlocking its full potential in the construction industry. This study provides actionable insights for policymakers, construction professionals, and researchers, promoting the sustainable use of quarry dust and fostering environmentally friendly construction practices in South Africa.

Keywords: Construction industry, Construction materials, Policy support, Quarry dust, South Africa, Sustainability, Systematic Literature Review.

**SESSION 2: SUSTAINABLE
CONSTRUCTION/NET-ZERO IN
CONSTRUCTION**

PROMOTING THE ADOPTION OF SUSTAINABLE ENVIRONMENTAL TECHNOLOGIES IN GHANA'S CONSTRUCTION SECTOR: A QUANTITATIVE STUDY OF KEY DRIVERS

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Abstract

Purpose: This study aims to quantitatively assess the key drivers influencing the adoption of sustainable environmental construction technologies (ECTs) in Ghana's construction sector. **Design:** A structured survey was conducted with 275 professionals from the Ghana Real Estate Developers Association (GREDA), the Ghana Institution of Engineering (GhIE), the Institution of Engineering and Technology (IET), and the Architects Registration Council (ARC). A five-point Likert scale was used in the evaluation. Data was analyzed using descriptive statistics and correlation analyses to identify key enablers of ECT adoption. **Research Limitations and Implications:** The study is constrained geographically, and future research should incorporate a wider variety of stakeholders and geographic regions to enhance the generalizability of the findings. **Findings:** The correlation analysis revealed strong associations between energy efficiency and regulatory policies ($\rho = 0.678$, $p < 0.01$) and between financial incentives and technological advancements ($\rho = 0.521$, $p < 0.01$), highlighting the critical role of policy and financial mechanisms in driving sustainable technology adoption. **Practical Implications:** The study recommends the creation of stronger financial incentives and clearer regulatory and policy frameworks to promote ECT adoption. Enhancing awareness campaigns on the economic and environmental benefits of these technologies is essential for aligning the sector with national and global sustainability goals. Future research should incorporate a wider variety of stakeholders and geographic regions to enhance the generalizability of the findings.

Keywords: Sustainability, Environmental Technologies, construction sector, Technology Adoption, Ghana

QUANTITATIVE ASSESSMENT OF ENVIRONMENTAL CHALLENGES HINDERING SUSTAINABILITY IN THE GHANAIAN CONSTRUCTION INDUSTRY: IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT

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Abstract

Environmental challenges in the construction sector pose significant obstacles to achieving sustainability in Ghana. This study quantitatively assesses these challenges, identifying systemic barriers that hinder environmental management practices. A structured survey was conducted with 275 industry stakeholders, including developers, bankers, environmental managers, and government agencies. Using a five-point Likert scale, responses were analyzed through descriptive statistics, Spearman's correlation, and exploratory factor analysis (EFA) to categorize key challenges. The findings reveal four dominant challenge constructs: (1) Financial Barriers, (2) Regulatory Deficiencies, (3) Knowledge and Awareness Gaps, and (4) Infrastructure Constraints. Among these, financial barriers emerged as the most critical obstacle (mean = 4.5, SD = 0.5), with high costs of green technologies and limited access to financing deterring sustainability adoption. Weak regulatory enforcement ($r = 0.65$) further exacerbates non-compliance, while inadequate expertise ($r = 0.57$) hinders effective implementation. The study contributes to Institutional Theory by demonstrating that regulatory frameworks alone are insufficient, necessitating complementary financial and educational interventions. Policy recommendations include tax incentives, public-private partnerships for financing, mandatory sustainability training, and improved green infrastructure investments. These findings have broad implications for developing economies facing similar sustainability challenges. Future research should explore policy effectiveness and cross-country comparisons to benchmark Ghana's progress against global best practices.

Keywords: Sustainability, Real Estate, Environmental Challenges, Sustainable Development, Ghana

SUSTAINABLE CONSTRUCTION POLICY CONSTRAINTS IN NIGERIA: STAKEHOLDERS PERSPECTIVE

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Abstract

This study aimed to understand the policy challenges stakeholders face in implementing sustainable construction practices in the Nigerian construction industry. The research aim was achieved through the literature review and semi-structured interviews conducted among eleven built environment professionals in both Lagos and Abuja cities. Thematic analysis was done using Nvivo 14, which resulted in seven themes. The findings reveal that there is a need for improved regulatory policy for sustainable construction with strict implementation. Adequate awareness before enforcement of this policy is stressed. Results also advise that to obtain the maximum result in the application, the government, policymakers and professionals should effectively synergise on innovation and improved policy adaptation mechanisms for the industry. The study is of value to researchers within the built environment as it provides insights into the Nigerian construction industry's policy formation and implementation challenges, especially in relation to sustainable construction practice.

Keywords: Policy implementation, professionals, stakeholders, sustainable construction

BARRIERS TO EFFECTIVE CONSTRUCTION WASTE REDUCTION: A STUDY OF CONTRACTORS IN THE EASTERN CAPE PROVINCE, SOUTH AFRICA

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Abstract

In the Eastern Cape Province, construction projects generate massive amounts of solid waste that pose a threat to environmental sustainability and resource efficiency. This study aims to identify the obstacles Eastern Cape Province contractors have in effectively cutting construction waste. The study employed a quantitative research approach, and a questionnaire survey was used to examine the challenges of minimizing construction waste. Descriptive and inferential statistics were applied in data analysis. Principal factor analysis indicated that there are seven significant factors with eigenvalues greater than one that affect contractors' capacity to minimize waste: insufficient communication for waste reduction, poor access to recycling facilities, inappropriate on-site reusing of materials, no zero-waste philosophy, failure to identify near-on-site recycling facilities, inadequate waste management equipment, and inability to trace on-site-produced waste. The findings offer valuable insights into the challenges faced by contractors in the Eastern Cape in reducing construction waste. These findings will help industry professionals, policymakers, and contractors develop targeted solutions, design effective training programmes, and adopt best practices to promote sustainable construction, reduce waste, and lower costs. The primary aim of this research is to span the knowledge gap in understanding the waste minimization problems faced by contractors in the Eastern Cape, a province with unique socioeconomic and infrastructure challenges.

Keywords: Construction waste, Waste reduction plans, Recycling facilities, Waste management, Sustainable procurement strategies.

NATURE-BASED SOLUTIONS AND MATERIALS PROMOTING NET-ZERO CONSTRUCTION IN SOUTH AFRICA: TRENDS AND INSIGHTS FROM A BIBLIOMETRIC REVIEW

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Abstract:

Buildings contribute 40% of global greenhouse gas emissions, with materials like cement, steel, and aluminium significantly adding to the carbon footprint. The worldwide goal to achieve net zero emissions from the built environment can be achieved through Nature-based Solutions. NbS leverage ecosystems and their innate services to tackle pressing sustainability challenges, including climate change, energy consumption, energy poverty, and decarbonisation. This study examines the role of NbS and sustainable materials in advancing net-zero construction, emphasising their potential to reshape the industry's traditional approach to environmental and societal challenges. This bibliometric study, conducted using Elsevier Scopus, retrieved 51 documents, and later filtered to 30 relevant studies, using the keywords "nature OR based AND solutions AND materials AND net AND zero AND construction." VOS viewer text-mining tool was employed to analyse the data, through cluster analysis identified key themes such as "Innovative Strategies for Decarbonisation and Circular Economy," "Sustainable Building Materials and Carbon Management," "Energy Efficiency and Decision-Making in Sustainable Architectural Design," "Zero-Carbon Strategies in Construction and Housing," and "Embodied Carbon and Sustainability in Construction Supply Chains." The analysis revealed the critical role of nature-based solutions in reducing carbon emissions, optimising supply chains, and enhancing energy efficiency. However, gaps persist in integrating life cycle analysis with nature-based materials and addressing regional disparities in adoption. Limitations include reliance on the Scopus database and quantitative data, excluding qualitative insights for a comprehensive research perspective. This study provides a foundation for advancing sustainable practices and contributes to the growing discourse on environmentally conscious construction strategies.

Keywords: Carbon Footprint, Nature-based Solutions (NbS), Net-Zero Construction, Sustainable Materials, Sustainability.

SESSION 3: STRATEGIC MANAGEMENT AND LEADERSHIP IN CONSTRUCTION

DEVELOPING AN INCLUSIVE LEADERSHIP- PSYCHOLOGICAL SAFETY RELATIONSHIP FRAMEWORK TO FOSTER CREATIVE PERFORMANCE IN THE NIGERIAN BUILT ENVIRONMENT

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Abstract

Construction employees over the years have been exposed to risky, complex and uncertain workplace environment due to the multitasking nature of construction works. Thus, innovative ideas are needed in a leader-member relationship on construction projects, in order to improve productivity. However, managers are often faced with challenges of developing high level of inclusiveness and how to incorporate members' creative ideas, which could eventually jeopardize psychological safety, with consequent low productivity at workplace. In light of this, this paper attempts to develop an inclusive leadership-psychological safety relationship framework to enhance creative behavior in the built environment. Using a conceptual approach, the study reviewed literature on inclusive leadership, psychological safety, and the attributes of inclusive leadership-psychological safety relationship in promoting employee creative behavior. By reviewing 39 articles and citing 18 secondary sources, the key features/elements of inclusive leadership and psychological safety relationship were extracted to developed the framework. The study established that key elements of inclusive leadership-psychological safety such as inclusion, openness, commitment to diversity, awareness to bias, learning culture, supportive feedback, trust and respect among others are essential in achieving belongingness, and supportive climate in the construction workplace. This framework provides direction in fostering creative behavior within construction workforce, thereby improving organizational productivity.

Keywords: Construction, Creativity, Inclusive Leadership, Nigeria, Psychological Safety,

UNVEILING THE KEY DRIVERS OF SUCCESSFUL OPERATIONS MANAGEMENT IN CONSTRUCTION SUBCONTRACTING

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Abstract

A significant portion of construction work is executed through subcontracting (SC). If not managed properly, SC can contribute to poor project performance. Failures in subcontracting can arise in various phases, including subcontractor selection, operations, and monitoring. This study aimed to identify and prioritize the key drivers of successful operations management in construction subcontracting. A systematic literature review (SLR) was conducted to examine the available scholarly literature from Scopus, Web of Science, and ProQuest databases on the focus area of the study. From the databases, 31 studies were screened for further detailed review. A thematic content analysis, done with ATLAS.ti25, was done to identify eleven drivers of successful operations management in construction subcontracting. The findings ranked mutual trust and fairness; long-term partnership; adherence to quality standards and specifications; coordination of subcontractors; and timely payment as the top five critical drivers.

Keywords: Construction industry; drivers; operations; systematic literature review; subcontracting

THE EFFECTIVENESS OF SUPPLY CHAIN MANAGEMENT IN ENHANCING PROJECT MANAGEMENT OUTCOMES

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Abstract

Supply Chain Management (SCM) plays a critical role in improving the efficiency and effectiveness of project management across various industries. This paper explores the effectiveness of SCM on project management outcomes in local municipalities, focusing on key performance indicators such as cost reduction, time management, risk mitigation, and quality control. Effective SCM integration within project management frameworks minimizes delays, optimizes resource allocation, and improves overall project performance. The research highlights how the SCM strategies such as just-in-time (JIT) delivery, and risk mitigation contribute to enhanced project execution. By streamlining supply chain processes, organizations can mitigate uncertainties, minimize waste, and improve collaboration among stakeholders. This paper also examines case studies where efficient SCM has led to successful project completion and identifies challenges such as supply chain disruptions, vendor management issues, and compliance risks. The findings suggest that companies that prioritize robust SCM practices achieve better project outcomes in terms of cost efficiency, quality assurance, and stakeholder satisfaction. Additionally, integrating SCM principles into project management enhances operational efficiency and resilience, making it a vital component for achieving strategic project goals. Future research should explore advanced digital technologies and sustainable SCM practices to further optimize project success. A mixed method approach has been adopted, grounded in a pragmatic research philosophy. Data was analyzed by employing SPSS version 29.2. The findings suggest that integrating SCM principles into project management not only streamline processes but also increases the likelihood of meeting project goals, particularly in large-scale and complex projects.

Keywords: supply chain management, project management, key performance indicators, resource allocation, quality

ADAPTING MARKETING STRATEGIES IN A POST-PANDEMIC DIGITAL LANDSCAPE: INSIGHTS FROM PROJECT MANAGERS

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Abstract

The COVID-19 pandemic has significantly transformed business operations, particularly in marketing and consumer engagement strategies. As industries adapt to evolving market conditions, project managers play a crucial role in navigating these challenges. This study explores how project managers adapted their marketing approaches to maintain business resilience and consumer trust during and after the pandemic in KwaZulu-Natal, South Africa. The study aimed to investigate the impact of the COVID-19 crisis on project managers' marketing strategies, focusing on digital transformation, corporate social responsibility (CSR) initiatives, and consumer engagement tactics. A qualitative research approach was adopted, utilising semi-structured interviews with eight purposively selected project managers. Thematic analysis was conducted to identify key patterns and insights from the collected data. The findings reveal that project managers rapidly increased their digital marketing efforts, shifting towards online platforms, social media, and targeted digital advertising to sustain client engagement. Additionally, the need for agility and flexibility in marketing strategies was emphasised, as project managers continuously adjusted campaigns to align with shifting client behaviours and regulatory changes. Despite these adaptive efforts, challenges such as digital fatigue, budget constraints, and consumer scepticism toward CSR initiatives were identified. The study contributes to the growing body of knowledge on crisis-driven marketing adaptations, offering insights into how project managers can leverage digital tools and CSR to enhance resilience in volatile market conditions. These findings have practical implications for businesses seeking to develop robust marketing strategies that are responsive to future disruptions.

Keywords: consumer trust, corporate social responsibility, COVID-19, digital transformation, marketing strategies.

BARRIERS TO THE ADOPTION OF EMERGING TECHNOLOGIES FOR QUALITY MANAGEMENT IN CONSTRUCTION PROJECTS IN NIGERIA

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Abstract

The aim of this study is to examine the barriers to the adoption of emerging technologies for quality management in construction projects. A questionnaire was designed to examine the barriers to the adoption of emerging technologies for quality management in construction projects. Questionnaires were distributed, and 127 valid responses were elicited. Thereafter, data were analysed using descriptive and inferential statistics. The study was limited to barriers to the adoption of emerging technologies in construction quality management in Nigeria utilising a quantitative research method. The study's findings can serve as a model for tackling similar barriers in other countries in the global south. The results from the study revealed that cost (high costs of software and hardware), resistance to change, and risk of technology obsolescence were the top most three barriers to the adoption of emerging technologies in construction quality management in Nigeria. From a practical viewpoint, overcoming these barriers to adoption of emerging technologies for quality management will lead to broader spread adoption of emerging technologies for quality management, enhancing project efficiency and outcomes.

Keywords: Adoption, Barriers, Construction projects, Emerging technologies, Quality management

SMME COLLABORATION DYNAMICS IN INTERNATIONAL CONSTRUCTION JOINT VENTURES IN HARARE, ZIMBABWE

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Abstract

This study explores the **collaboration dynamics** of local contractors, particularly small, medium, and micro enterprises (SMMEs), involved in international construction joint ventures (ICJVs) in Zimbabwe. It seeks to investigate the experiences, challenges, and opportunities faced by local contractors collaborating with international firms. The paper aims to identify and analyze the key obstacles that hinder their performance, as well as the strategies or practices that enhance their ability to thrive within these joint ventures. Using empirical data, the study identified success factors and potential barriers limiting SMME's in ICJV's. A qualitative approach was adopted using a semi-structured interview schedule to collect empirical data. A purposive sample of 20 Zimbabwean SMMEs that have been involved in ICJV's were interviewed. The findings revealed the primary challenges local SMMEs face in ICJVs. It also revealed strategies that have enabled some SMMEs to successfully navigate these joint ventures and achieve favourable outcomes. The limitation of this study was the potential for response bias, as participants' accounts may not reflect a broader context. Furthermore, the size of the sample restricts generalizability of the findings to the broader population.

Keywords: International construction joint ventures, small medium micro enterprises (SMME's), economic development, Zimbabwe

SESSION 3: SUSTAINABILITY AND FACILITY MANAGEMENT/ SME DEVELOPMENT

READINESS OF FACILITIES MANAGEMENT ORGANISATIONS FOR BIM ADOPTION IN FACILITIES MANAGEMENT FUNCTIONS

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Abstract:

The adoption of Building Information Modeling (BIM) in Facilities Management (FM) has the potential to transform asset management, improving operational efficiency, reducing lifecycle costs, and enhancing sustainability through better information management and visualization. However, BIM adoption in South Africa's FM sector remains limited despite these recognised benefits. This study explores the technological readiness of Facilities Management Organizations (FMOs) in South Africa to implement BIM in their maintenance functions, using the Technology Readiness Index (TRI) framework. The research evaluates FMOs' attitudes towards BIM, focusing on optimism, innovativeness, discomfort, and insecurity. A structured survey was conducted with 150 respondents from 64 organisations, yielding a 34% response rate. Findings indicate that optimism (0.98) and innovativeness (0.83) are high, while discomfort (0.66) and insecurity (0.70) pose significant barriers. The overall TRI score of 3.15 reflects a medium readiness level for BIM adoption. The study proposes a framework for enhancing readiness by addressing key drivers in technology, processes, personnel, and management. These findings offer practical interventions for overcoming adoption barriers and facilitating BIM integration into FM operations, contributing to the advancement of facilities management in South Africa.

Keywords: Adoption, Building Information Modeling, Optimism, Psychological Factors, Technology Readiness Index

AN EXPLORATORY EVALUATION OF THE FACTORS THAT IMPACT THE ADOPTION OF INNOVATIVE SUSTAINABLE BUILDING MATERIALS IN HOUSING CONSTRUCTION ACROSS SOCIO-ECONOMIC CONTEXTS

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Abstract

This research evaluates the adoption patterns and the key factors affecting the adoption of innovative sustainable building materials in housing construction across socio-economic contexts in Cape Town, South Africa. In South Africa, adopting sustainable building practices is impeded by socio-economic constraints, technological limitations, economic barriers, and insufficient awareness. Despite notable advancements in sustainable building practices, various factors contribute to uneven adoption patterns, hindering widespread implementation. A mixed methods approach was used to collect data using semi-structured interviews and a survey questionnaire randomly distributed to Cape Town residents and purposively selected professionals working on housing construction projects. Further, the data collected was analyzed using descriptive, thematic, and inferential statistical techniques. The study found that most respondents from both classes were aware of sustainable building technology and materials and perceived that environmentally friendly building materials help lessen the impact of construction on the environment. They also indicate that compared to middle-high-class respondents, most low-class respondents lack access to resources such as government assistance and financial resources, and both groups utilize recycled materials more often than not. The study found no significant difference in the main variables influencing respondents' choices regarding sustainable building materials across middle-high-class and lower-class groups. In conclusion, this study advances knowledge of how socioeconomic circumstances affect the use of sustainable building materials and technology in housing construction at different levels. The study recommends that governments and financial institutions create initiatives through training and financial incentives to equip stakeholders with the necessary information to improve the likelihood of adopting sustainable practices.

Keywords: Environmental Impact, Housing, Income Level, South Africa, Sustainable building materials

FACTORS INFLUENCING THE ADOPTION OF SUSTAINABLE PRACTICES IN FACILITY MANAGEMENT

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Abstract

Minimising environmental impacts and maximising economic and social benefits are critical in facilities management (FM). This study identified factors affecting the adoption of sustainable practices in FM. A quantitative approach was adopted for the study using a questionnaire survey administered to FM professionals selected using purposive and convenience sampling. Respondents were approached at three recent Africa FM conferences. The amassed data from 89 respondents were analysed using descriptive statistics including frequencies, percentages, mean item scores. Findings revealed that awareness of sustainability practices, finance, relevant knowledge to adopt sustainable practices, competencies and skills, and management support are critical adoption factors. The study can contribute to advancing the adoption of sustainable practices in FM and developing support initiatives with an understanding of these identified influences. The study presents an essential knowledge base for further FM research, training and policymaking.

Keywords: Facility management, organisations, sustainability, sustainable development goals, sustainable practices.

GROWTH CONSTRAINTS OF DOMESTIC CONSTRUCTION FIRMS IN EMERGING ECONOMIES

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Abstract

Domestic construction firms in emerging economies face multiple constraints that hinder their growth. This study aimed to explore the major constraints that impede the growth of local construction firms working in the prevalent fierce construction market. The theoretical underpinnings of the study were institutional and resource-based view theories. A systematic literature review was the preferred research approach for the study. Out of 435 initially identified documents from Scopus, Web of Science, and ProQuest, databases, 18 were selected through a rigorous screening process for in-depth analysis. Using thematic analysis, ATLAS.ti25, five major categories of constraints were explored from the screened publications, including financial; market/competitiveness; workforce and skills; institutional and regulatory; and management and operational. Addressing these constraints through targeted policies and strategic interventions is crucial for enhancing the competitiveness and sustainability of domestic construction firms in emerging economies.

Keywords: Constraints, Construction firms, Emerging Economies, Growth, Systematic literature Review

SESSION 4: CONSTRUCTION HEALTH AND SAFETY

EXPLORING SHAME IN CONSTRUCTION HEALTH AND SAFETY IN SOUTH AFRICA

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Abstract

This study examines the role of shame as an emotional and ethical factor influencing health and safety practices in the South African construction industry. Using a literature review methodology, the research synthesises existing studies on emotional responses, construction health and safety, and ethics to analyse how shame impacts professional behaviour and decision-making in the construction industry. The study focuses on the unique challenges of health and safety in South Africa, including high rates of workplace accidents, non-compliance with safety standards, and ethical lapses that compromise worker well-being. Shame often arises when construction professionals fail to uphold health and safety standards, leading to potential reputational damage and emotional distress. This response can act as a driver for improved accountability and adherence to safety protocols but may also result in defensiveness or avoidance behaviours that hinder progress. The research findings highlight the cultural dimensions of shame in South Africa, where collectivist values and community-focused approaches influence how shame is experienced and addressed. The study also emphasises the critical role of education and training in promoting ethical awareness and emotional intelligence among construction professionals. By addressing shame constructively, the industry can enhance compliance with health and safety regulations, promote worker well-being, and contribute to a culture of ethical responsibility. This study offers insights into leveraging emotional dynamics to improve health and safety outcomes, with implications for policy development and professional practice in the South African construction industry.

Keywords: Shame, Health and Safety, Construction Industry, South Africa, Ethical Accountability

DEVELOPING A SAFETY COMPETENCE EVALUATION FRAMEWORK FOR ARTISANS IN THE NIGERIAN CONSTRUCTION INDUSTRY

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Abstract

The construction industry is recognised worldwide as one of the most dangerous industries related to accidents, especially in developing countries. This is because the artisans, who play a crucial role in construction activities, have inadequate safety competencies, thereby contributing significantly to these unsatisfactory safety outcomes. However, despite considerable efforts to improve the safety competencies of construction artisans, initiatives aimed at evaluating safety-related competencies remain limited. Consequently, this research aims to address this deficiency by developing a safety competence assessment framework specifically for artisans in the Nigerian construction industry. A cross-sectional survey approach was used, to gather data from 470 safety managers and supervisors, followed by exploratory factor analysis to identify factors influencing safety competence regarding knowledge and practical skills. The findings emphasise the complex nature of safety competence, providing insights into practical safety skills, decision-making, and the interpersonal and communication dimensions of safety competence. In addition, the framework presents a visual-based method for assessing competencies across the corresponding dimensions. The framework must be tailored to enhance safety outcomes on construction sites. Consequently, the study offers theoretical insights for improving artisan training, which would ultimately reduce the incidence of accidents, along with practical applications that would benefit safety managers significantly.

Keywords: Artisans, Competence Evaluation Framework, Construction Industry, Safety, Safety Competence

ASSESSMENT OF FACTORS AFFECTING WORKERS' HAZARD RECOGNITION IN CONSTRUCTION

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Abstract

The construction safety management process relies greatly on the hazard recognition of construction workers. This is due to the insistence of poor safety practices recorded within the construction industry, which is correlated with construction workers' inability of effective work hazard recognition and management. This study therefore assesses the factors affecting the hazard recognition ability of construction workers. A questionnaire survey was employed, where questionnaires were distributed to construction workers (both professionals and artisans) in Nigeria. Data was analysed using Mean, Standard Deviation, and a normality test. Kruskal-Wallis H-test was then employed to determine the hazard recognition capability level the workers based on their various characteristics. 52 out of the 53 identified factors were significant. The study then found significant differences in the hazard recognition ability of the workers based on their years of experience and level of education. On the other hand, job type, designation and profession of the workers do not affect their hazard recognition ability factors. The paper recommends the development of the capacity of construction workers in their experience and education for hazard recognition.

Keywords: Construction workers, hazard recognition, safety management

IMPACT OF BARRIERS TO IMPLEMENTING HEALTH AND SAFETY PRACTICES FOR CONSTRUCTION WORKERS' PRODUCTIVITY IN SMMEs

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Abstract

Health and safety (H&S) practices play a crucial role in improving efficiency, reducing costs, and ensuring the success of construction projects. However, small, medium, and micro enterprises (SMMEs) often experience low worker productivity, partly due to barriers to implementing H&S practices. This study investigates the barriers to H&S practices implementation affecting workers' productivity in construction SMMEs, addressing a research gap in construction management. A quantitative research approach was adopted, employing a structured questionnaire distributed to 530 Construction Industry Development Board (CIDB) contractors registered from grades 1-6 as general building contractors and civil engineering contractors in Gauteng Province. Descriptive statistics was applied for data analysis and interpretation. The findings indicate that barriers to implementing H&S practices are not widely perceived as major factors affecting workers' productivity in the study area. This challenges the prevailing assumption that such barriers significantly impact workers' productivity. The study highlights the need for policymakers and industry stakeholders in the study area to explore additional H&S barriers and their implications for worker productivity. This research provides new insights and lays the foundation for further investigation into broader barriers to H&S implementation and their potential effects on construction workers' productivity.

Keywords: Construction sector, contractors, health and safety practices, SMMEs, workers' productivity

WHY I REGISTERED FOR CONSTRUCTION MANAGEMENT

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Abstract

The aim of this research was to determine the reasons BSc undergraduate construction management (CM) students registered at Nelson Mandela University (NMU), including related issues, in an endeavour to improve career promotion interventions, and increase registrations for the programme. The quantitative method was adopted, and the data was collected through the distribution of a structured questionnaire to BSc undergraduate CM students at NMU. The data was analysed using MS Excel to generate descriptive statistics in the form of frequencies and means. The study is based on a sample from a single university, which may affect the generalisation of the findings. Potential students consider a range of programmes and apply to several universities; however, both the programme and university are important factors in terms of their final decision. The CM programme is attractive due it being a vocational qualification, a business qualification, and the potential job opportunities. Although, there is a general interest in the built environment on the part of potential students, registered students envisage a career primarily in Construction Project Management and contracting in the capacity as CMs. CM programmes compete primarily with Construction Economics and Civil Engineering programmes, and therefore the difference between the programmes should be made clear. A multi-pronged approach is required in terms of promoting CM programmes, and a range of stakeholders need to contribute. The achievements of CM graduates and their career paths should be used by a university to promote its CM programme(s).

Keywords: Career, Construction Management, Registration

**SESSION 4: CONSTRUCTION
EDUCATION/WOMEN IN CONSTRUCTION/
MENTAL HEALTH AND WELLBEING**

ASSESSING THE BARRIERS TO ONLINE LEARNING IN BUILT ENVIRONMENT PROGRAMMES

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Abstract

The rapid and constant growth of technology, hardware, and software have greatly influenced and improved online education. Universities all over the world are investing huge sums of money in online courses and degree programs. Some universities are offering these programs at all levels of study, from bachelor to doctorate degree. However, despite the rapid growth and adoption of online learning, there is a lack of understanding of the unique challenges faced by students in these disciplines. Therefore, this study seeks to outline barriers to online learning in a built environment. A quantitative research approach was adopted, which informed the use of questionnaire surveys administered to 115 postgraduate students from the departments Quantity Surveying, Architecture, Building, and Engineering. Descriptive statistics, including the calculation of mean and standard deviation, was used to analyze the collected data. Findings show that the most commonly agreed upon barriers include lack of time to study, financial constraints, and resistance to change. This study offers a valuable contribution by identifying these key factors; however, further research can explore the drivers to online learning among undergraduate students and professionals undertaking continuing education.

Keywords: Barriers, Online, learning, Education

ENHANCING GENDER EQUALITY POLICIES FOR PROMOTING WOMEN'S PARTICIPATION IN THE ZIMBABWEAN CONSTRUCTION SECTOR

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Abstract

Gender equality is a fundamental human right woven within the Sustainable Developmental Goals as a blueprint for progress across all areas of life. However, sectors such as the construction industry remain segregated and characterised by unequal opportunities for women. Therefore, the study explored how gender equality policies can be enhanced in the construction sector to improve the participation of women. The concomitant objective was to identify the key strategies that be incorporated in policies that promote women's participation in the Zimbabwean construction sector. Through an interpretive philosophy, qualitative data was collected through in-depth interviews of purposively sampled key informants from construction consultancy firms, government departments and construction professional bodies. Thematic analysis of data was instituted to expose the prominent strategies for improving gender equality policies. The findings include the need to promulgate construction-specific legislation through improved and well-resourced quota systems for women, effective gender protection policies, and support of work-life balance policies for women. Although adequate policies may be in place, their implementation is lacklustre. A top-down approach may be a significant step towards promoting women's participation in the construction industry. The determined policy enhancement strategies, through analysing views of key professionals and informants, for enhancing gender equality are a significant step in promoting women's participation. A limitation of the study was the exclusion of most female construction professionals and operatives, yet they have experience and perspectives of work in the construction sector.

Keywords: Construction sector, Gender equality policy, Women, Workplace diversity, Zimbabwe

INITIATIVES FOR PHYSICAL WELL-BEING IMPROVEMENT FOR CONSTRUCTION WORKERS IN ZIMBABWE

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Abstract

The hazardous working conditions associated with the construction industry have led to increased poor health and work disability among construction workers. Although implementing workplace physical health promotion programs for construction workers exists in developed countries, developing countries still need to determine applicable programs. Therefore, this study sought to uncover initiatives to improve the physical well-being of construction workers in Zimbabwe. Quantitative data were collected from project/site managers and skilled workers through Google Forms and interviewer-administered questionnaires, respectively. Statistical analysis was applied using the relative importance index and the T-test. The findings indicate that exercise programs, health risk assessments, nutrition education, weight loss programs, and Safety, Health and Environment (SHE) workshops are critical in improving the physical well-being of skilled construction workers in Zimbabwe. There is consensus between both respondent groups on the initiatives required. The study recommends that employers and other stakeholders invest in proactive and preventative measures for physical well-being and health promotion that include exercise equipment and nutritionists to assist with meal planning. Also, workers should be encouraged to participate in workshops on Safety, Health, and Environment promotion programs that internal or external organisations offer. The main limitation of the study was the inclusion of only five residential and commercial construction sites for the skilled workers. The inclusion of civil construction sites could reveal more insights. Identifying physical well-being initiatives is important for the improvement of the health and safety of construction workers. This paper is valuable for improving human-centred occupational health and safety policies within the construction industry.

Keywords: Construction, Construction skilled workers, Initiatives, Physical well-being, Zimbabwe

THE CHALLENGES TO WOMEN PROGRESSION IN THE CONSTRUCTION INDUSTRY: AN INVESTIGATIVE STUDY

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Abstract

The construction industry, a traditionally male-dominated sector, has seen gradual changes in female representation over recent decades. However, substantial barriers persist, influencing the rate and degree of women's career progression. This paper investigates the challenges to women's progression and trends in the construction industry, focusing on the South African context. This study employed a mixed-methods approach, combining quantitative data from a questionnaire survey and qualitative insights from focus group discussions in obtaining the data required to answer the research objective. The questionnaire was emailed/self-administered to 259 randomly selected construction workers and professionals listed in the Professional Construction Register, Housing Development Association, and Informal Builders Group. A total of 199 completed questionnaires were collected yielding a response rate of approximately 77%. The data collected was analysed using descriptive and thematic analysis. The study found that the key challenges to women progression in the construction industry include the cost of education, gender bias and few female mentors. Based on these findings, the study concludes that positive changes in the organisational culture of construction companies, educational support, mentorship, and networking will bring about an equitable work environment that enables women to thrive and contribute effectively to the construction industry. The study recommends that construction companies implement policies that close gender pay gaps and introduce quotas for women in leadership positions.

Keywords: Career Progression, Diversity, Gender Equality, Mentorship, Organizational Culture

SESSION 5: INFRASTRUCTURE DEVELOPMENT

INSTITUTIONAL CHALLENGES IN THE DELIVERY OF PUBLIC-SCHOOL INFRASTRUCTURE IN KWAZULU-NATAL

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Abstract

Purpose: One of the primary service delivery challenges experienced in South Africa relates to the inability of the National and Provincial Departments of Education to address the backlog of provision of adequate public school infrastructure. This study presents an examination of how institutional challenges within the KwaZulu- Natal (KZN) province impact on unsatisfactory, delayed and incomplete delivery of public school infrastructure. Little is known about how the institutional arrangement of public infrastructural delivery influences school infrastructural delivery backlogs. **Context:** Though its mandate is not binding on other client departments, the recognition of the concurrent function of KZN Department of Public Works (KZN DPW) has resulted in an executive decision for the KZN DPW to be the province implementing agency of preference for all health and education infrastructural needs. Through a fairly complex set of institutional arrangements, the KZN DPW has found itself reliant on the decisions of these client departments to fulfil their infrastructure needs. KZN DPW has increasingly struggled to meet provincial school infrastructure needs, resulting in backlogs, unexpended resources and costly litigations. **Design:** Using a qualitative research method, purposive sampling was adopted to draw a sample comprising KZN Department of Education (KZN DoE) officials (46% of study participants) responsible for school infrastructure delivery, as the commissioning client department, and construction project managers and other built environment professionals at KZN DPW (54% of study participants) as the implementing department. **Findings & Practical Implications:** The findings of the study raise the common challenges for the backlog in school infrastructure as delays in budget transfers and payments from KZN DoE to KZN DPW; burdensome procurement processes of contractors by KZN DPW, problems with contractors, profiteering, shortages of building materials and limited project management expertise. These challenges are also, in large part, a cause of the decline or lack of allocation of the Equitable Share by provinces in general and in KZN in this case, and the diverse number of infrastructural delivery systems in place that lack integration. The study findings point to a need to review the legislative mandate of Public Works.

Keywords: Concurrent Mandate, Infrastructure backlog, School Infrastructural Delivery, KwaZulu-Natal

INVESTIGATING UNDERUTILIZATION OF THE MUNICIPAL WATER INFRASTRUCTURE GRANT (MWIG) IN LEEKWA-TEEMANE LOCAL MUNICIPALITY (LTLM)

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Abstract

Access to potable water and sanitation remains a pressing issue in South Africa, where 3 million people lack clean water and 14 million lack adequate sanitation. Informal settlements and rural areas are disproportionately affected due to aging infrastructure, insufficient investment, and poor governance. This study aims to investigate the challenges hindering Leekwa Teemane Local Municipality (LTLM) from leveraging the Municipal water infrastructure Grant (MWIG) to address water infrastructure backlogs. Using a qualitative methodology, the research analyses documents, conducts stakeholder semi-structured interviews, and explores case study to identify institutional, financial, and operational constraints. Interviews were conducted with key stakeholders, who are involved in infrastructure grant spending, with questions addressing expenditure, rate of project completion, and other major challenges faced by the municipality. The findings indicate that inadequate planning, limited technical capacity, and complex grant application processes as the primary obstacles faced by LTLM. The study concludes with actionable recommendations to streamline grant processes by enhancing technical capacity and improving on accountability mechanisms. These insights provide strategies for LTLM and similar municipalities to overcome barriers, ensuring the delivery of essential water infrastructure.

Keywords: Basic services, Government, Infrastructure Funding, Municipal Grants, Service delivery

CRITICAL REVIEW OF THE CHALLENGES OF FINANCING RENEWABLE ENERGY DEVELOPMENT IN SUB-SAHARAN AFRICA

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Abstract

There is acute shortage of electricity supply in Sub-Saharan Africa (SSA) and electricity blackouts are a common occurrence. Climate change and carbon dioxide gas emissions from conventional power generating systems are also of great concern. Africa has vast renewable energy resources including hydropower, solar, wind, biomass and geothermal which are relatively unexploited. Based on a literature review, this study aims to identify the factors that hinder investment in renewable energy development in SSA. The review finds that barriers to renewable energy development include fragmented electricity markets, utilities with poor balance sheets and low credit ratings, high energy transmission losses, political risks, high initial capital costs, poorly directed subsidies, insufficiently developed money markets, and a poor regulatory framework. The study also finds that the global utility-scale levelized costs of electricity from renewable energy resources compare favourably with that of conventional sources. Countries in SSA need to draw up a clear policy framework with legally binding targets for the contribution of renewable energy to the energy supply portfolio. In addition, subsidies currently enjoyed by conventional energy generators need to be restructured to target low-income groups. SSA countries should identify pipelines of suitable renewable energy projects, complete feasibility studies and invite potential developers. Risks faced by international investors in renewable energy projects including political, commercial and financial risks are insurable. An important consequence of this work is it is possible to accelerate innovative financing solutions to rump-up investment to deliver energy for all.

Keywords: Finance, Renewable Energy Development, Risk Management.

NAVIGATING FORMAL LAND ACQUISITION CHANNELS FOR CONSTRUCTION PROJECTS IN LAGOS: ISSUES AND CHALLENGES

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Abstract

Construction projects like other activities take place on land, thereby making land acquisition a crucial factor in construction venture. This is because land acquisition is one of the important decision that make or mar a construction venture as other activities depends on getting a suitable site for the project. This paper examined the process of land acquisition from the various formal land delivery channels of Lagos, Nigeria. Primary and secondary data were employed for the study. Secondary data on the procedure of land allocation in the various channels of land delivery collected from Government Offices Providing Land Administration Services (GOPLAS) were analysed in addition to interviews with 19 senior official of the GOPLDS. The result revealed that there were five different formal land delivery channels in the study area which include Site and Service Scheme, Private Sector Developers' Programme, and Excision. Others included Regularisation and Joint Venture. The land delivery process in all the channels is a multi-stage procedure between 2 to 14 months to complete. Also, challenges such as lack of necessary infrastructure in some of the scheme, clientelistic practises, and the encroachment of land by indigenous landholding families and other bureaucratic challenges associated with GOPLAS make acquiring land through the formal land delivery channels problematic. The inefficiencies and delays in the formal land delivery process can deter investment and slow down urban development.

Keywords: land governance, land accessibility, project management, construction projects, Land acquisition

SESSION 5: PROCUREMENT INNOVATION AND TRANSFORMATION

CLIENT AND CONSTRUCTION MACHINERY RELATED FACTORS INFLUENCING THE SELECTION OF CONTRACT PROCUREMENT METHOD IN KWAZULU NATAL PROVINCE IN SOUTH AFRICA

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Abstract

The study aims to find the adequate client and construction machinery related factor influencing the selection of contract procurement method in Kwazulu Natal province in South Africa. The study population consists of Architects, Project managers, Quantity surveyors, and Builders. Simple random sampling techniques were used to select respondents. All in all, sixty-five professionals were surveyed, and data was analyzed using descriptive statistics. The Cronbach alpha value were greater than 0.70. Findings for this study are: Client's emphasis on timely project delivery, low construction cost, type of client's funding, poor maintenance of tools and machinery, and difficulties in hiring construction tools and machinery are the client and construction machinery related factors influencing the selection of contract procurement method. The study recommends that amongst the factors to be considered for the selection of a contract procurement method, timely project delivery, low construction cost, type of client's funding, poor maintenance and difficulty in hiring construction tools and machinery should be foremost.

Keywords: Contract procurement, Machinery management, Procurement, Project delivery, Project management

AN APPRAISAL OF PROCUREMENT CHALLENGES FACING EMERGING CONTRACTORS IN PUBLIC SECTOR PROJECTS IN SOUTH AFRICA

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Abstract

In South Africa and around the world, economic development cannot be discussed without small businesses and the impact of the construction industry on the economy. Emerging contractors' underperformance in public procurement of construction projects is a cause for concern as small businesses underpin economic growth in South Africa. Despite limited capital and financial resources, small and medium enterprises are inventing new goods and technologies to rejuvenate and advance the industry by contributing to innovation, poverty reduction, and job creation. This paper examines the challenges in South Africa's public sector procurement for emerging contractors. A quantitative approach was employed with a well-structured questionnaire survey amongst the Construction Industry Development Board (CIDB levels 4 and 5) as General Builders and Civil Engineering (CE) emerging contractors on procurement challenges. The study used a random sampling technique. Seventy-five responses were received from the Participants for the analysis of the study. The result shows that late payments by the state government, political interference, and poorly managed cash flows are among the challenges faced by emerging contractors in the South African construction industry, hindering their growth in the procurement of public projects. This study assesses the challenges faced by emerging contractors in the procurement process, identifies the key challenges that need to be addressed to help emerging contractors operate efficiently in the construction sector and provides a systematic insight into the procurement challenges faced by emerging contractors and how this affects their performance in the construction industry.

Keywords: Challenges, Emerging Contractors, Procurement, Small businesses, South Africa.

EVALUATING THE CURRENT TENDER ADJUDICATION IN THE WESTERN CAPE PROVINCE, SOUTH AFRICA

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Abstract

This article investigates the effectiveness of the tender adjudication process in the construction industry in the Western Cape Province, South Africa. Currently, the construction industry has shortcomings such as delays, a lack of transparency, variations in criterion application, and concerns about corruption, all of which significantly impact the process's effectiveness. Using an online questionnaire survey (48) and online structured interviews (3), the study employs a mixed method research technique. Descriptive statistics (mean, standard deviation, and ranks) are used to analyse the data. The study adopted a content analysis for the qualitative data. The findings revealed the perceptions of stakeholders on the effectiveness of tender adjudication comprising the Supply Chain Management (SCM) team involved in the tender adjudication, the current performance of the tender adjudication method and the capabilities of many contractors selected under the current tender adjudication method. The qualitative findings reveal that contractors' price estimate, contractors' experience, government budget, functionality, formal education and training, and collaboration as the most effective tender adjudication used. In the re-allocation process, the respondents noted that functionality, price, and points for employing youth are significant in the tender adjudication process. Regarding an alternative tender adjudication process, price, functionality, gender, knowledge, education, and training were noted in the qualitative findings. The findings from this research could have several impactful implications, particularly in the context of construction project efficiency, policy refinement, and stakeholder satisfaction. The study's conclusions could lead to a restructuring of the Western Cape Province's tender adjudication procedure, which would increase openness, reduce delays, and ensure fairness. These reforms would raise stakeholder trust, reduce legal issues, and boost the construction industry's competitiveness.

Keywords: Fairness and Accountability, Procurement Efficiency, Tender Adjudication, Transparency in Procurement, and Western Cape Province

PREDICTIVE ANALYTICS AND STOCHASTIC PROGRAMMING FOR CONSTRUCTION RESOURCE OPTIMIZATION IN DEVELOPING AFRICAN ECONOMIES

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Abstract

This research investigates the application of AI-driven predictive models for optimizing resource allocation and mitigating economic risks in large-scale construction projects across developing African economies. Through the development of sophisticated mathematical frameworks, including linear programming for resource optimization, multivariate failure prediction models, and stochastic programming for supply chain management, we present a comprehensive approach to addressing the complex challenges facing the African construction sector. The study demonstrates significant improvements in project outcomes, with the predictive maintenance model achieving 91.5% accuracy in equipment failure prediction and the cost estimation framework explaining 81.3% of cost variance. However, implementation challenges including data scarcity, infrastructure limitations, and the need for local expertise development must be carefully addressed. The research provides valuable insights for construction project managers, policymakers, and researchers, contributing to more efficient and sustainable infrastructure development across Africa.

Keywords: Artificial Intelligence, Construction Project Management, Resource Optimization, Risk Mitigation, African Infrastructure Development

**SESSION 6: CONTRACT MANAGEMENT/
COSTING AND SCHEDULING IN THE
CONSTRUCTION INDUSTRY**

A CONCEPTUAL FRAMEWORK FOR MANAGING EMPLOYER’S CLAIMS IN MEGA CONSTRUCTION PROJECTS

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Abstract

Mega construction projects are often associated with high-cost overruns. Most of these costs are associated with construction claims. These claims are mostly submitted by the contractors against the employer. Contractors can successfully defend their claims. Some of these claims are supposed to be apportioned between the two parties. However, in most of the cases, the Employer’s claims are not submitted. The purpose of this study was to determine the effect of employer’s claims on the reduction of construction cost overruns. The study employed a quantitative research approach. The study adopted a purposive sampling technique with a sample size of 50 respondents. Data was collected with a survey questionnaire from professionals involved in the design and execution of projects within the construction industry, based in Gauteng province in South Africa. The respondents include Construction Project Managers and Quantity Surveyors. Results of the survey were analysed using the relative importance index statistical method, which resulted in the identification of the cost overruns factors that could lead to construction claims for a multi-contractor construction project. These factors include contract management, constructability, access to the site, coordination of the work of the contractors, incompetence of contracts managers responsible for claims and poor planning. The findings of the study reveal that there is a lack of effort from the employer’s side to mitigate risk associated with the identified cost overrun factors. The study recommends that construction management companies should work together with the employer to develop practices to manage construction activities to avoid claims.

Keywords: Employer’s claims, Constructability, Construction claims, Contracts management

THE CAUSES AND IMPACT OF LATE PAYMENTS IN THE CONSTRUCTION INDUSTRY

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Abstract

Given that the South African construction industry is prone to late payments, and contractors experience a high level of late payment, non-payment, and insolvency, a study was conducted to investigate the causes of late payment, non-payment, negative cash flow, and payment disputes that arise during construction, and evolve a framework of interventions to mitigate same. The quantitative method was adopted due to the nature of the data required, and an 'introductory' letter was e-mailed to medium to large general contractor members of the East Cape Master Builders Association (ECMBA), which included the online survey questionnaire URL. Given the sample size of 67 and the 20 responses, which equates to a response rate of 30.0%, the findings cannot be deemed generalisable, but indicative. The salient findings are: late payment is a significant issue; factors such as inadequate client's finance, and inadequate client capacity for processing payments contribute to late payment; delay in completion of activities, and negative cash flow occur due to late and non-payment, non-payment by clients result in payment disputes; clients' poor financial management and clients' withholding of payments contribute to non-payment, and blockchain technology with a smart contract has the potential to mitigate payment problems. Conclusions include: the extent to which factors result in late payments indicates that it is a multi-stakeholder issue in addition to being attributable to clients, and although blockchain technology and the use of smart contracts can mitigate payment problems as they enable every transaction, payment, and business interaction to be followed, they cannot be viewed as the panacea for all payment related problems. Recommendations include consideration of say a 'project payment charter', which charter clearly indicates the role of all project stakeholders, and their commitment in the form of signatures to the charter.

Keywords: Blockchain, Late payment, Non-payment, Payment disputes

EFFECTIVENESS OF EXISTING INSURANCE FRAMEWORKS IN ADDRESSING THE RISKS OF CONTRACTORS

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Abstract

The construction industry is inherently risky and involves risks of project delay and cost overruns, safety issues, and contractual disputes. Therefore, these risks require insurance frameworks to address the unique challenges contractors face. This study used a critical analysis to show how existing insurance frameworks mitigate risks associated with construction projects. The study employed a mixed method approach and used 100 contractors with 15 industry experts for the qualitative study by purposive sampling. The study reveals significant gaps in the adaptability and inclusiveness of existing insurance products, particularly in addressing emerging risks such as cyber threats and environmental liabilities. The results indicate that the effectiveness of existing insurance frameworks in addressing contractor risks varies significantly across different policy types. Cyber Liability Insurance for Construction Firms and Environmental Liability Insurance rank among the most effective, reflecting the industry's growing awareness of digital threats and environmental risks. The qualitative analysis revealed that many contractors face financial challenges due to limited coverage options for specific risks, such as delays or project-specific liabilities. Future research was recommended to explore contractors' specific challenges in accessing and utilising insurance coverage, particularly for policies with lower effectiveness ratings, such as Employers' Liability Insurance and Group Personal Accident Insurance.

Keywords: Contractors Risk, Insurance frameworks, Risk management, Industry Challenges and Collaborative Approaches.

DEVELOPING A COST ESTIMATING CONCEPTUAL FRAMEWORK THAT LEVERAGES ON KNOWLEDGE

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Abstract

Literature on the accuracy of cost estimates in construction projects has reported that attempts to improve accuracy were focused on the methods, tools/techniques, and the factors affecting accuracy. This confirmed attempts at addressing these inaccuracies were based on reductionism. To avert these inaccuracies, there is a need to go beyond reductionism and adopt a multi-theoretical approach such as leveraging knowledge. This paper reports the effort made to incorporate different and relevant theories to develop a framework that would be used to improve accuracy. A systematic literature review was used to identify and examine factors that affect leveraging knowledge within the cost estimating process. The factors include: cost estimating process models, factors affecting accuracy, information and knowledge required for estimating. Relevant theories were then used to underpin the concepts and finally develop the conceptual framework. The paper is one step in a larger study aimed at developing a knowledge-based cost estimating process model for construction projects. The developed framework will bridge the gap between research and practice, it provides a structured approach to cost estimating and improves estimates' accuracy. The framework will enhance research rigor, foster advancements in cost estimating methodologies, and inform industry best practices.

Keywords: Accuracy, Cost Estimates, Conceptual Framework, Knowledge and Projects

INFLATION AND QUALITY ATTRIBUTES IN CONSTRUCTION PROJECTS IN CITIES: AN EMPIRICAL ANALYSIS OF THE FEDERAL CAPITAL TERRITORY (FCT) ABUJA, NIGERIA

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Abstract

In view of the current inflationary effects in the country, this study examines the nexus between inflation on the quality attributes in construction projects in FCT, Abuja with a view to enhancing real estate construction and mitigating the effects of inflation on construction in Nigeria. An exploratory research design was adopted using both primary and secondary sources of data. Two sets of questionnaires were administered, one to the property owners and the other to the Real Estate Developers. Using stratified sampling techniques, structured questionnaires were administered to the respondents, while 95 (63.33) and 210 (52.50) copies were retrieved from the Real Estate Developers and Private Landowners, respectively. Key findings from the study indicate that the rate of inflation increased from 11.40% in 2019 to 26.31 in 2024. These consequently affected the prices of building materials within the said periods, as the major quality attributes identified were sustainability, strength, and performance of structures, ranked 1st and 2nd respectively, with mean scores of 4.7368, For suitability attributes among Real Estate Developers, meeting requirements topped the list (4.6737), followed by proper handling (2nd, 4.4947) and desirability/demand (3rd, 4.3474). Results showed significant differences in the opinion of the respondents based on the nature of project qualities. It was concluded that, for Nigerian economy to improve, policy formulations, intervention strategies such as the use of local building materials, appropriate budgeting inflation reduction measures amongst other are essential in a bid to mitigating the effects of inflation and enhancing real estate development in the country.

Keywords: Construction, FCT Abuja, Inflation, Nigerian Economy, Quality Attributes

DISPUTES ON CONSTRUCTION PROJECTS: THE ROLE OF PROCUREMENT METHODS AND PAYMENT STRATEGIES

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Abstract

This study examines the interplay between procurement methods, payment strategies and the occurrence of disputes in construction projects within South Africa. The construction sector plays a critical role in economic development; understanding these relationships is essential for improving project outcomes. The study employed a quantitative approach, utilizing questionnaire surveys to gather data from 56 construction professionals. It was found that traditional procurement methods and unit price payment strategies are associated with a higher frequency of disputes, particularly in projects related to education, water and sanitation, and power and energy sectors. The study found that 60% of respondents experienced cost overruns due to disputes, while 70% reported time overruns. Key themes identified include the impact of external factors, scope creep, and the importance of positive stakeholder relationships. Based on these findings, the study concludes that payment strategies and procurement methods indirectly impact disputes, and the more flexible the procurement method, the lesser the project disputes. Therefore, the study recommends that stakeholders adopt collaborative procurement methods, implement transparent payment strategies, enhance communication among project participants to mitigate conflict and bring about positive project performance. Further research is recommended using a larger sample size to validate the findings.

Keywords: Construction Management, Dispute Resolution, Design and Build, Traditional Procurement, Unit Price

**SESSION 6: ARTIFICIAL INTELLIGENCE IN
CONSTRUCTION AND PROJECT
MANAGEMENT/CONSTRUCTION-RELATED
DISASTER MANAGEMENT/PRODUCTIVITY**

EXPLORING INTEGRATION OF ARTIFICIAL INTELLIGENCE IN CONSTRUCTION BID AUTOMATION

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Abstract

This paper explores artificial intelligence (AI) integration in construction bid automation. The literature review suggests that currently, construction firms generally rely extensively on manual processes to produce their technical and commercial bid proposals. The problem with this current practice in many firms is that it often requires extensive manual inputs and resources to execute most of the activities in the process. However, there is often a relatively short bidding time frame, poor quality information, loss of organizational knowledge from staff turnover, and limitations to human ability. A literature review of 21 purposively selected relevant articles was carried out to explore AI applications, automation strategies, and digitalization efforts within the bidding process and to propose an AI-based theoretical bid automation model. The findings reveal that while AI has been applied to specific tasks such as cost estimation, risk assessment, and document analysis, no unified AI-driven framework exists for automating the bid preparation process. The main contribution of the study to current knowledge and practice is the development of a theoretical bid automation model designed to minimize human input in the bid preparation process, which could serve as a blueprint for informing the actual development process of the model/tool. Such a model/tool will be handy in times/seasons when firms have a high volume of bids to prepare within short bidding timeframes, with limited human resources, and it is beneficial to draw on historical information from previous projects.

Keywords: artificial intelligence, bid automation, construction bid automation, theoretical model

DIGITAL TRANSFORMATION OF CONSTRUCTION AND PROJECT MANAGEMENT THROUGH ARTIFICIAL INTELLIGENCE

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Abstract

Artificial intelligence (AI) is increasingly recognised as a transformative force in construction and project management, automating tasks traditionally dependent on human intelligence. It has emerged as a game-changing tool, enhancing operational efficiency, proactively managing risks, and improving project outcomes. This study explored the application of AI in the construction industry and its associated benefits using systematic literature review approach. Despite these advantages, the industry faces significant challenges integrating AI with existing construction and project management systems. The study analysed approximately 75 relevant articles using a systematic literature review approach. Based on the findings, a comprehensive AI implementation strategy was developed to maximise its benefits while addressing potential risks and challenges.

Keywords: Application, Challenges, Construction, Implementation, Strategy

A SYSTEMATIC REVIEW OF THE CURRENT STATE OF ARTIFICIAL INTELLIGENCE ADOPTION IN SOUTH AFRICA'S AEC SECTOR

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Abstract

This study investigates the current state of artificial intelligence (AI) adoption within South Africa's Architecture, Engineering, and Construction (AEC) sector, with a focus on its implementation, associated barriers, and enabling factors. While AI holds significant potential to boost productivity, reduce costs, and drive innovation, its adoption remains limited due to financial constraints, inadequate digital infrastructure, and a shortage of skilled professionals. To ensure a comprehensive assessment of AI adoption trends, a systematic review was conducted using the PRISMA methodology to refine relevant literature. Additionally, bibliometric analysis was performed using VOSviewer to explore citation networks, key authors, and research clusters. The study also employed keyword co-occurrence analysis to map prominent themes related to AI integration. Findings reveal that AI use is largely limited to machine learning and predictive analytics, with advanced applications such as robotics and natural language processing significantly underutilized. The study highlights the urgent need for policy reforms, enhanced digital infrastructure, and targeted training initiatives to promote widespread AI adoption and improve competitiveness across South Africa's AEC industry.

Keywords: Artificial Intelligence, South Africa, Construction Industry, AI Integration, AEC

BRINGING CHANGE IN CONSTRUCTION: ANALYSING STRATEGIES FOR MANAGING CYBERSECURITY DISASTERS IN THE SOUTH AFRICAN CONSTRUCTION INDUSTRY

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Abstract

This study explored strategies for managing cybersecurity risks in the South African construction industry. Using a quantitative research methodology, the study targeted construction professionals and cybersecurity experts in Gauteng province through structured questionnaires, of which 150 were distributed and 90 were retrieved. The data was analysed using descriptive statistics, exploratory factor analysis (EFA), and correlation techniques to identify key cybersecurity risks and evaluate the effectiveness of existing strategies using Statistical Package for the Social Sciences (SPSS) software. The findings showed that companies prioritise adopting new technology and responding to cyber threats but struggle to integrate cybersecurity into overall business strategies. Many firms focus on either strategic planning or cybersecurity, rarely balancing both due to resource limitations. The study concludes that bringing change requires a combined approach where cybersecurity measures align with strategic goals. Practical implications suggest that construction firms must invest in cybersecurity training, adopt stronger security policies, and use advanced technologies like AI and encryption. Companies should also improve stakeholder involvement to ensure cybersecurity is key to project management. Future research should explore specific challenges preventing firms from fully implementing security measures and how government policies can support better cybersecurity practices. This study highlights the urgent need for a balanced approach to cybersecurity and strategic planning in the construction industry.

Keywords: Construction security, Technology adoption, Cyber threats, Risk management, Strategic planning

A SYSTEMATIC LITERATURE REVIEW ON EMERGENCY RESPONSE SYSTEMS AND THEIR IMPACT ON INFRASTRUCTURE RESILIENCE

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Abstract

Purpose: This literature review assesses the impact of emergency response systems on infrastructure resilience, identifying optimal methodologies and highlighting obstacles in emergency response that affect stability during emergencies.

Design: The literature review uses 30 peer-reviewed English-language articles published between 2015 and January 2025 to analyse global trends and expert opinions on emergency response infrastructure, identifying best practices and knowledge gaps. Articles addressing emergency response systems and impact issues were given extra consideration.

Research Limitations: Potential research limitations include bias towards developed countries and potential outdatedness due to rapid advancements in emergency response technologies.

Findings: The review examines the state of emergency response infrastructure and its economic and socio-political impacts. The identified key infrastructure includes early warning, situational awareness, technology and infrastructure, response efficiency, resources and capabilities, strategic framework, community engagement, preparedness and knowledge, and institutional communication. The impact includes global economic consequences, human and property loss, infrastructure deficiencies, and displacement issues. The socio-political impact includes demographic and urban challenges, infrastructure gaps, vulnerability, and economic stability.

Practical Implication: The review emphasises the importance of decision-makers prioritising emergency preparedness and uniform agency procedures. It emphasises the need for coordinated response plans, community involvement, and strengthening infrastructure against future crises.

Keywords: Emergency, Emergency response, Impact, Infrastructure resilience, Natural hazard.

A LITERATURE REVIEW OF CONSTRUCTION LABOUR PRODUCTIVITY: A 30-YEAR GLOBAL PERSPECTIVE

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Abstract

Construction labour productivity (CLP) is a critical determinant of project success, influencing cost, time, and overall efficiency in the construction industry. Despite extensive research, significant productivity variations persist due to diverse influencing factors. This scientometric review analyses the evolution of CLP research using bibliometric techniques to identify key trends, influential authors, prominent publications, and emerging themes. By utilising the Scopus and Web of Science databases, the study maps the intellectual structure of CLP research, employing VOSviewer and Biblioshiny for co-occurrence analysis, citation mapping, and network visualisation. The findings highlight an increasing focus on automation, digitalisation, and sustainable practices as key drivers of productivity enhancement. Additionally, the study identifies research gaps, including the need for interdisciplinary approaches, integration of advanced data analytics, and region-specific labour productivity assessments. The insights will aid researchers, policymakers, and industry professionals in developing strategies to enhance workforce efficiency and address productivity constraints. By synthesising current knowledge, this study provides a roadmap for future research and underscores the value of scientometric tools in advancing CLP.

Keywords: Bibliometric review, Construction labour productivity, Digitalization, Lean construction, Scientometric analysis