Benchmarking Global Digital Technologies Adoption: Evidence-Based Lessons for the Liberian Construction Industry

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Introduction & Background

- The construction sector is vital for GDP and employment globally but faces inefficiencies, especially in developing nations.

- Digital technologies (DTs) like BIM, AI, IoT, and Digital Twins are revolutionizing construction practices.

- Liberia's construction industry remains reliant on traditional methods due to:
  - Low internet penetration (8%)
  - Limited electricity access (32.5% in 2022)
  - Skills gap (only 12% possess basic digital skills)

- Global digitalization offers Liberia a chance to leapfrog inefficiencies and align with sustainability goals.

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Aim, Objectives, and Scope

- **Aim**: To evaluate the state of digital technology adoption in Liberia's construction industry and identify barriers and opportunities.
- **Objectives**:
- Assess current adoption levels of DTs in Liberia.
- Identify key barriers to digital transformation.
- Benchmark global best practices for construction digitization.
- Recommend strategies for accelerating adoption.
- **Scope**:
- Focused on Liberia's construction sector.
- Covers 2015–2025 scholarly literature.
- Includes global comparisons and bibliometric analysis.

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Research Design and Methodology

- **DESIGN**: Quantitative bibliometric analysis.
- **DATA SOURCE**: Scopus database (2015–2025).
- **INITIAL DATASET**: 395 documents → refined to 275 using filters.
- **TOOLS USED**: VOSviewer for keyword clustering and network visualization.
- **KEYWORD STRATEGY**: Boolean operators with terms like "digital technology," "adoption," "construction."
- **ANALYSIS FOCUS**: Trends, barriers, opportunities, and global comparisons.

Results

- **Global Publication Trends**:
- Sharp rise in DT-related construction publications from 2015 (2) to 2024 (82).
- Liberia absent from global research landscape.
- **Top Publishing Countries**: South Africa, Australia, Nigeria, Malaysia, United States, China
- **Keyword Clusters Identified**:
- Digital Construction
- Smart Engineering
- Circular Construction
- Digital Information Productivity

Liberia's Challenges

- **Infrastructure Barriers**:
  - Internet access: 8%
  - Electricity access: 32.5%
- **Workforce Limitations**:
  - Only 12% possess basic digital skills.
  - SMEs lack resources for DT adoption.
- **Technological Gaps**:
  - Low use of BIM, IoT, cloud-based tools.
  - Poor integration with existing workflows.
- **Regulatory & Economic Constraints**:
  - Lack of supportive policies.
  - High cost of software/hardware.
  - Uncertainty around ROI.

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Discussions, Conclusions & Recommendations

- **Conclusions**:
- Liberia lags in DT adoption due to systemic barriers.
- Global trends show DTs improve efficiency, sustainability, and competitiveness.
- **Recommendations**:
- Expand digital infrastructure (internet, electricity).
- Launch national digital literacy programs.
- Promote BIM and cloud-based tools as entry points.
- Encourage pilot projects to demonstrate ROI.

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Discussions, Conclusions & Recommendations

- **Strategic Actions**:
- Develop financial incentives (subsidies, tax relief).
- Foster public–private partnerships for innovation.
- Align DT adoption with circular economy goals.
- Use modular and solar-powered solutions to overcome geographic barriers.
- **Long-Term Vision**:
- Build a resilient, competitive, and sustainable construction sector.
- Avoid trial-and-error by leveraging global best practices.

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