TERRA CO2

Market Report, 2024

The Path to Green Construction Beyond Incentives and Hype

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01 How can green construction materials compete without relying on incentives?

The reliance on government incentives for adopting green construction materials poses a **significant risk of volatility** due to policy changes. This report explores strategies for these materials to compete on their own merits in the market. Additionally, it examines the historical precedence of successful industry innovations and highlights the importance of natural industry acceptance.

The construction industry is at a pivotal point where sustainable practices are no longer just a novelty but a necessity: increasing environmental challenges need a shift towards materials and methods that reduce the ecological footprint. Additionally, increasing regulatory pressures and a global emphasis on sustainability require the industry to adopt green practices no longer as an option but now as a standard. The shift toward sustainability in the construction industry is reinforced by the economic realities of resource scarcity, such as in core ingredients for concrete (from fly ash and slag), which make adopting more efficient and sustainable construction practices imperative for long-term viability.

However, the current dependency on government incentives to drive the adoption of green construction materials creates a “Dependency Dilemma.” If the political landscape of the industry shifts, this reliance is detrimental as it could undermine the industry’s confidence in the long-term viability of green construction materials.

The Dependency Dilemma

Incentives can be advantageous in the initial stages to **stimulate the launch of new technologies.** However, an over-reliance on said incentives makes the green construction sector vulnerable to policy changes amidst fluctuating governmental priorities and risks, creating a business model that cannot compete on its own. This volatility and overdependence can prevent investors and companies from fully committing to sustainable green materials, especially if they expect a sudden reduction in green incentives of support that would result in reduced investment returns over the several-decade time scales for which financial viability is assessed for capital projects.

One example is solar energy. In its early days, solar power heavily depended on rebates and tax incentives to motivate businesses and residential property owners to install solar. In the earlier days of solar adoption, solar panels and inverters were expensive, especially compared to electricity off the grid. Incentives and tax breaks were essential to early adoption, and it almost killed the industry when some of **these incentives disappeared.** Over time, the costs for solar panels have come down dramatically and are cost-competitive with electricity off the grid. However, solar incentives continued longer than necessary, resulting in the industry not “growing up” as fast as it might have to become profitable without incentives. Additionally, solar companies that became dependent on incentives versus working to become more cost-competitive have **gone out of business.** Said another way, solar’s road to cost competitiveness might have been quicker with fewer incentives.

Actual Industry Change

For green construction materials to be competitive without incentives, they must be cost-effective and perform as well as, if not better, than their traditional counterparts. When materials meet these criteria, they are naturally adopted by the industry. This adoption is crucial because market-driven solutions have proven more resilient and sustainable. They thrive on merit, as their adoption is based on tangible performance metrics rather than reliance on policy mandates.

Historical Precedence

History has shown that special treatment is not a prerequisite for an innovation's success. For instance, the surge of energy-efficient **LED lighting** gained traction in the market as the cost per bulb decreased and superior performance was evident. In another example, the uptake of photovoltaic (solar) technology in various markets happened due to **reduced costs and increased efficiency** as incentives decreased. These examples show how true technological breakthroughs often make their own path to dominance through advantages independent of preferential support or policy interventions.

Pathways to Competitiveness

To establish green construction materials as mainstream in the building industry, exploring various pathways to make them competitive is imperative. In doing so, it's critical to note that it is not just about aligning with current industry standards set by their traditional counterparts; it's about exceeding them. Each of the following pathways is critical in guiding the market toward a sustainable future, ensuring that green materials stand on their own merits and become the only logical choice in construction:

Improving Cost-Efficiency: Research and development must focus on reducing the production costs of green materials across the entire logistics chain, which goes beyond just making the materials but also includes how far they must be transported and where raw materials are sourced, among other drivers. Solutions that are more cost-competitive than traditional materials will naturally scale faster. Being green should not cost more!

Streamlining Permits: Federal, state, and local governments need to create permitting express lanes to move climate tech projects to the top of the queue. This is not an attempt to reduce regulatory requirements for new climate tech but solely about finding pathways to accelerate the permitting process. Time is not a friend in delivering the technology needed to achieve climate goals, and government regulators who control the permitting process need to get on board to help accelerate deployment.

Enhancing Performance: Green materials should offer additional benefits, such as improved durability or maintenance savings.

Consumer Awareness: Educating consumers and businesses about the long-term benefits and potential savings of green materials can drive demand.

Independent Certification: Specifying agencies must continue to move with a higher sense of urgency to performance-based specifications to provide a pathway to a fair playing field for new technologies. Prescriptive specifications will materially delay the deployment of desperately needed climate tech solutions. Prescriptive specifications should go the way of the dinosaur in many cases.

In order to compete in the market without relying on incentives, green construction materials gain their edge by proving their cost-effectiveness and performance superiority. A strategic approach combining technological innovation, market education, and independent validation can promote a natural transition toward sustainable building practices.

02

What made Portland cement dominate, and how can new tech replicate this?

Portland cement's prominence in the construction industry cannot be confined to one metric - its success is rooted in its cost-effectiveness, consistent quality, and the abundance of its primary raw material, limestone. This article explores the historical factors that have contributed to the dominance of Portland cement and presents a pathway for new technologies to replicate its success by addressing scalability, application diversity, and environmental sustainability.

Historical Insights

There's evidence of cement as a construction material **dating back to 5600 BC.** Yet, the transformative period that made cement mainstream globally began with the Industrial Revolution, which saw an increased focus on building materials as alternatives to wood and stone. Innovations in cement production, particularly the introduction of rotary kilns in the 19th century, allowed for the mass production of Portland cement with less fuel, leading to its dominance over other types of cement.

Scalability Matters

Portland cement's success can largely be attributed to its scalability. It can be produced in vast quantities due to the straightforward and cost-effective manufacturing process. The economic viability of Portland cement was further enhanced by the availability of limestone and the adoption of energy-efficient rotary kilns, which enabled a dramatic increase in production capacity. For new technologies to replicate Portland cement's success, they must demonstrate the ability to scale production efficiently and economically.

Diverse Application

Portland cement's versatility has been a significant factor in its widespread use. It is a critical component of concrete and mortar used in various structures, including buildings, bridges, and roads. Its adaptability to different environmental conditions and regional needs has been crucial to its adoption across the globe. New materials must match Portland cement's adaptability to perform in diverse climates and geographical regions to achieve mainstream acceptance.

Global Demand and Environmental Impacts

As the demand for cement continues to rise, especially in developing countries, the industry faces the challenge of meeting demand without sacrificing sustainability. Concrete production (of which cement is a critical component) accounts for **approximately 8%** of all human-made CO2 emissions. In order to curb CO2 emissions and combat climate change, companies are being forced to explore alternative environmentally sustainable materials, such as low or negative-carbon types of cement, to **address this issue.** Current alternatives under development include cements that sequester CO2 during the setting process or do not require limestone in their production. Though development is still underway, these innovations could revolutionize and shift the industry toward a more sustainable future.

Recommendations

As the global demand for construction materials grows, the cement industry must evolve faster to meet the new environmental standards. New technologies aiming to supplement and replace Portland cement must mimic its cost-effectiveness, performance, and scalability and address the significant environmental concerns associated with its production. Now, more than ever, stakeholders should invest rapidly in accelerating the development of today's supplementary cementitious materials and, in time, full alternative cement replacements that reduce CO2 emissions while maintaining the same functional benefits that made Portland cement the industry standard. The cement industry must innovate and race toward more sustainable practices to remain relevant and account for environmental impact.

03 How vital is scalable and cost-effective raw material availability for new cements?

The global cement industry stands at a crossroads where the urgency to decarbonize is an environmental necessity and a strategic economic concern. Transitioning to low-carbon supplements and alternatives is critical because cement production contributes approximately 8% to global greenhouse gas emissions. Over 4 billion tons of cement are produced annually worldwide. This chapter covers the transformative role of scalable and cost-effective raw material availability in successfully adopting new, greener cement technologies.

Raw Material Dynamics in Cement Innovation

Raw materials are the cornerstone of the cement industry. Their consistent and affordable supply is crucial for the sector's sustainability transformation and is one reason Portland cement became the global standard for concrete production. The emergence of low-carbon cement, which may offer a less expensive route to decarbonization than carbon capture and storage, **relies on the availability of these materials.** Here, scalability is essential as it requires raw materials that are abundant, economically viable, and compatible with existing supply chains and production equipment.

Economic Implications

The cost of feedstock directly impacts the final product's price. New supplementary and full alternative cementitious materials heavily depend on low-cost raw material feedstocks. Traditional Supplementary Cementitious Materials (SCMs) face a challenge as these materials become less available due to the decarbonization of power generation (fly ash supply) and changes in steelmaking processes (blast furnace slag) . However, the role of permitting timelines is crucial, both for building new plants and for accessing raw materials. These regulatory processes significantly influence the feasibility and speed of bringing low-carbon cement to market, as reported in the DOE's report on **Pathways to Commercial Liftoff for Low-Carbon Cement.**

Environmental and Logistical Concerns

In terms of significance, environmental considerations hold the same weight as economic factors today. A significant point of concern is transportation. Solutions must consider the entire logistic supply chain. By their nature, most construction materials are heavy and modestly priced, restricting economic transportation distance to perhaps 100 miles or so. Every mile transported increases cost and carbon footprint. The process of mining and transporting raw materials can lead to increased ecological damage. Opening new mines versus working with existing mine supplies avoids inherent delays and risks associated with new mine development. New types of cement must consider raw materials that mitigate or eliminate these concerns, such as industrial by-products or low-value materials sourced from existing mines requiring less carbon-intensive production processes, mainly if these can be sourced from mines or quarries close to the market where they will be used.

Industry Challenges and Opportunities

The development of new sources of quality SCMs or alternative cement compositions must consider the use of materials with broader availability that could make these alternatives cost-competitive and scalable. The availability of scalable and cost-effective raw materials is undeniably vital for developing new types of cement.

A major challenge for established players in the construction materials industry, including capital providers, is navigating the myriad of startup technologies. Most of these technologies will not achieve commercial viability. There is considerable hype in the marketplace surrounding many of these technologies, which reduces clarity in identifying the ones that truly meet all necessary criteria. This is no easy task for industry players. No doubt, the emerging cementitious sector will soon undergo a "weeding out period." This is crucial, as selecting priority technologies for deployment is now imperative if the industry hopes to make a meaningful contribution towards achieving GHG goals set for 2030 and 2050.

04 How can we optimize transporting heavy materials to reduce costs and carbon footprint?

In the construction industry, the shipping of materials from the point of origin to the building site encompasses a complex interplay of economic, environmental, and infrastructural factors. In this section of our market report, we'll explore the relationship between the logistics of transporting construction materials and its implications. From the economic ramifications of transportation costs to the ecological footprint of logistical operations and the wear on infrastructure, transportation influences the industry's bottom line and its **environmental and societal impact.**

Economic Impact

Transportation costs are a significant factor in the pricing of construction materials. Due to their heavy weight and large size, these materials require extensive logistical planning - making transport cost a crucial component in their overall economic impact. With costs increasing with each additional mile, companies must optimize delivery routes and consolidate shipments to make transportation efficient. This side of the industry impacts the suppliers' bottom line and the end-users' affordability. Therefore, achieving efficiency in transportation is not just an operational goal but a competitive necessity, influencing market dynamics and shaping the economic landscape of the construction sector.

Environmental Concerns

Transporting construction materials over long distances significantly affects the environment, especially considering longer distances result in larger carbon emissions. The carbon emissions from transporting construction materials often clash with sustainability principles and can undermine the environmental advantages of using eco-friendly materials. As the industry progresses towards environmentally conscious practices, it becomes crucial to reassess transportation strategies to ensure that the ecological advantages of sustainable materials are not undermined by the emissions generated in their delivery. Reducing transit lengths and improving logistics efficiency are vital steps toward diminishing the environmental repercussions associated with the transportation of construction materials.

Infrastructure and Safety

The extensive transportation of construction materials places significant stress on infrastructure. The frequent movement of heavy trucks accelerates the deterioration of roadways, bridges, and highways, leading to increased maintenance costs and potential disruptions. Moreover, the density of heavy truck traffic correlates with heightened safety risks, including traffic accidents and road congestion. Addressing these issues requires a holistic approach to transport logistics that prioritizes efficiency and cost-effectiveness, the long-term sustainability of infrastructure, and the safety of all road users.

Mitigating these challenges requires a multi-faceted approach integrating economic efficiency with environmental stewardship. The following strategies serve as a blueprint for optimizing the transport of heavy materials:

- **Locality of Materials:** Prioritizing the use of local materials reduces transportation distances, thereby cutting costs and emissions. This shift can be facilitated by fostering local industries and incentivizing the use of local materials.
- **Vehicle Technology:** Investing in fuel-efficient or alternative fuel vehicles substantially reduces carbon emissions. The evolution towards electric and hydrogen fuel cell trucks, although in its early stages, promises a greener future for transportation.
- **Consolidation Centers:** Establishing consolidation centers closer to major construction markets can streamline the flow of materials, reducing the need for long-haul trips. This approach also aids in managing inventory more effectively, reducing waste and excess production.

- **Policy Interventions:** Government policies can play a pivotal role by subsidizing the switch to greener transport options, incentivizing the use of local materials in projects, and penalizing high-emission transport methods. This includes tax breaks for low-emission vehicles, benefits for projects using local (and therefore short-haul), environmentally friendly materials, and penalties for long-distance transport.

05

What role does customer or industry commitment play in adopting green materials?

Customers, the industry, and the government have a multifaceted role in adopting green materials. The synergy between consumer expectations, government mandates, specifiers, and industry leadership catalyzes the integration of green materials, steering the global market toward a more sustainable future. Government involvement is particularly pivotal; governments can significantly accelerate the shift towards sustainability by requiring green materials in government-funded projects and writing specifications that mandate certain levels of sustainable material use. When industries align on this path—incorporating regulations and specifying agencies—the collective effort often results in collaborative research and partnerships, accelerating problem-solving, technological advancements, and faster deployment of new eco-friendly materials to the market.

Demand Dynamics

The need for change in adopting green materials begins with demand. Customers **increasingly commit to sustainability in construction**, signaling a shift in consumer preferences and expectations. This is an evolution in the purchasing paradigm that shows trust in and readiness for sustainable solutions, as confirmed by a **Boston Consulting Group (BCG)** survey on consumer readiness to embrace sustainable products. Industries and manufacturers are listening to these signals; they understand that surviving in the market is increasingly tied to their ability to meet this green demand.

In response to this emerging trend, industry players are motivated to adopt new technologies that align with the sustainability goals of their customer base. This adoption rate is accelerated when industries demonstrate a commitment to green materials, much like the increased consumer spending on 'home nesting' and **sustainable products during the pandemic.** The signal of a long-term demand trend encourages investments in research and development of sustainable materials, ensuring that the market's supply side is ready to meet the evolving demands. Research and development are well-established in many companies, and while they must be sustained, the goal now is to accelerate the time to market. This requires efficient access to capital, as many effective solutions are capital-intensive. This dynamic, reinforced by regulatory changes that shape consumer and company actions toward greener choices, is a catalyst, moving the widespread adoption of green technologies forward faster.

Collaborative Innovation

An industry-wide commitment to green materials must unite different organizations, governments, governments at local, state, and federal levels, and broader stakeholder groups toward a common purpose, laying the groundwork for collaborations and partnerships. The challenge lies in aligning these varied levels of government, which are often not in sync with private sector initiatives. This alignment is crucial for facilitating private-public sector collaboration and overcoming the hurdles posed by disparate regulations and policies. In doing so, companies could join forces on a foundation of mutual interests, pooling resources and knowledge that otherwise would remain siloed. Collaborative efforts can lead to faster commercial deployment of innovation as diverse perspectives and expertise come together to address the challenges of developing and implementing green technologies.

These partnerships must extend beyond dialogue; they involve more than shared research and require a deep commitment to developing "express lanes" that will speed climate tech solutions to the market. The industry can effectively navigate the complexities of sustainable material adoption by merging the strengths of various players—manufacturers, suppliers, specifiers, researchers, or end-users. This cooperative approach speeds up the innovation cycle. But the time for lengthy debate and discussion must come to an end, and the focus must transition to how to clear the path for rapid market deployment. As a result, the industry can move forward faster, reducing the time to results that might take decades to achieve if players act in isolation.

Overcoming Industry Skepticism

Skepticism with the industry itself is a significant challenge in industries that are traditionally resistant to change, especially when it requires a change of materials and procedures used for decades. Often, there is an **inherent skepticism** from the industry stakeholders about the feasibility, cost, and performance of new, sustainable alternatives. This reluctance can come from many concerns, ranging from the inertia of established practices to uncertainty about the return on investment in green technologies. However, when critical players within the industry step forward with a visible commitment to sustainable practices, it can serve as a powerful push to the viability and need for change.

Industry leaders can play a critical role in changing perceptions by demonstrating the successful integration of green materials into their operations and products. Their endorsement and concrete examples provide tangible evidence that alleviates doubts and showcases the practical benefits of green materials. As more successes are publicized and the advantages become apparent, the initial resistance gives way to a broader acceptance, encouraging other stakeholders to follow suit. This shift in mindset is crucial for creating a ripple effect that can transform an entire industry's approach to sustainability.

Adopting green materials in the industry is not merely a function of innovation and availability but, more crucially, of the collective will and commitment of customers, regulators, and industry leaders. Customer and shareholder demands act as a catalyst for change, prompting industries to pivot toward sustainable practices with an eye toward long-term trends. The synergy from collaborative efforts across organizations amplifies this impact, driving innovation and problem-solving at an accelerated rate. Moreover, the visible commitment from key industry players is a powerful antidote to skepticism, paving the way for a broader acceptance and integration of green materials. In conclusion, the forces of customer, industry, and shareholder commitment are essential for steering the course toward a sustainable future, demonstrating that the path to environmental stewardship is a shared journey requiring collective action and resolve.

06 How can companies secure funding for sustainable projects in the Green Construction Revolution?

Understanding the pivotal role of capital in the deployment of green construction materials is key to ushering in a new industrial revolution. This revolution rethinks the production of everything from steel and concrete to energy, sectors that traditionally demand heavy capital expenditures (CAPEX). However, there's uncertainty about whether current capital markets are adequately equipped to support this shift. Traditional venture capital often falls short, especially for pre-revenue companies facing the challenges of commercial deployment. This challenge raises a fundamental question: how and where can companies secure the necessary funding for large-scale, sustainable projects that define our future?

Early-stage Funding

In the initial phase, green materials require significant capital outlays for research and development. This early capital (Seed and Series A) is more available as venture funds can obtain a more substantial percentage of ownership in the company for a much smaller investment. So, VCs can place many bets across various technologies at these early stages to test the water. This is a proven model for VC firms. However, unlike the VC-prevalent biotech or hi-tech sectors, climate tech solutions require massive capital outlay to deploy climate solutions successfully. A few VC firms recognize the dilemma and discuss possible solutions. In a few cases, private equity is also noticing and exploring whether expanding their model to consider a pre-revenue investment makes sense.

Commercial Deployment Challenges

Once a company moves past the Series A rounds of capital, commercial deployment is often the next need. For capital, this usually means funding the construction of a 'first of the kind" (FOAK) manufacturing facility on top of supporting a growing company's ongoing needs (still pre-revenue). Many climate tech companies are all competing to garner the attention of what is now a narrowing field of funds willing to consider investments at this stage. Funding commercialization through VCs creates a situation where company and project-level capital rely on narrowing sources. This narrowing of funds for FOAK series B capital is now being referred to as the **"second valley of death."**

Series B Capital Raise

Business technology is now generally proven, and the company has engineered plans to build their first facility. A commercial interest is established, and along with other accomplished milestones, this is now an exciting stage for the company as it is moving to put the wheels in motion to generate actual revenues and profit. The company will have many expenses to fund, and it takes time, often years, to build the first facility, so a new round of capital is needed.

The current VC model historically requires each round of capital to be led by a new fund that will negotiate terms with the company and value the business as it relates to this round of capital. A question looms whether the VC community is suffering from "too much passing the torch." Typically, every capital raise round necessitates the company finding a new fund to lead the next round. Existing funds from previous rounds sit back and determine if they wish to invest their pro-rata share (sometimes more) based on terms for the proposed next round of capital. The climate company's CEO finds themselves in a difficult position to find a lead VC fund as the options of interested and capable funds are dramatically limited in later-stage climate tech rounds. Is it time for the investment community to re-evaluate the historical model?

Alternative VC Models

An alternative would be for a fund that led the Series A round to continue leading future rounds, assuming they are still bullish on the technology's commercial viability. In lieu of "passing the torch," continuing to lead future capital raises will accelerate companies' commercial deployment timeline, arguably providing cheaper capital, reducing dilution, and managing time better. Additionally, a lead fund from a past round likely sits on the company board and intimately understands the business. If this fund is still bullish on the company, why not stay engaged and continue to provide this critical support? VC funds could consider

reserving more capital to lead future rounds, understanding that they will not do this for every business in their investment portfolio but just the companies that continue to show great promise as they proceed to commercialization.

Project Capital Challenges

Questions like "Where will the capital for first-of-its-kind plant facilities come from? " and "What type of capital is going to take the first deployment risk?" are commonplace in the construction industry. Though large government grants, which are no small feat to secure, provide a potential answer to these questions, other options are complex at best.

Currently, traditional bank lending is generally not available for first-of-its-kind plants. As a result, these plants are positioned to accrue expensive forms of debt, such as venture debt, with high-interest rates and seemingly significant asks for "penny warrants." This financial burden is not lost on industry leaders. The nature of these forms of expensive capital is receiving criticism from leaders across the industry, as they bear the brunt of this financial burden yet have little leverage to negotiate better terms.

At a certain point, the initial capital costs associated with establishing the first plants will delay the ability of companies to break even - hindering their capacity to generate substantial profits and build up cash reserves to sustain themselves long-term. It is imperative to foster companies that can swiftly achieve self-sufficiency to address climate challenges effectively, steering clear of costly capital dependencies from the outset. The timely scaling of the business cannot be understated. From an environmental, societal, and economic standpoint, it is pivotal for these companies to have a solid foundation to scale to meet urgent climate goals and achieve success.

Mitigating Industry Risks

As climate-tech companies progress, companies operating within the construction industry must also prepare to mitigate typical risks. The construction industry is particularly susceptible to economic cycles, regulatory changes, and shifts in commodity prices. That said, capital reserves are crucial to long-term success and impact. Companies with robust capital reserves are better equipped to handle these economic challenges while maintaining their sustainability goals. These companies can also invest in continued innovation to improve material performance and reduce costs, further solidifying their position in the market.

Regarding market penetration, capital investment again plays a critical role, specifically in marketing. Marketing new green materials is not severed from traditional advertising methods; however, it does encompass a market education component as proving the long-term cost benefits over conventional materials is essential to earning potential clients' business. Additionally, building a network for distribution and securing strategic partnerships demands upfront investment, which can be substantial but is critical for widespread adoption.

On this topic, it is essential to note that the capital-raising stages are often asymmetric. Seed and Series A rounds may provide enough capital to get a company off the ground, but the deployment phase presents new challenges. At this point, the need for capital exponentially intensifies as companies scale up production and establish their market presence. The difficulty lies in convincing investors to commit to the high capital expenditure (CAPEX) necessary for scaling physical production facilities.

The heavy base industries where most climate tech solutions will reside are established in the current landscape. Margins in these industries will not materially change from the historical norm regardless of how "green" a solution is. Now, more than ever, VC firms must face this reality, especially when comparing the construction industry to biotech, where a company can develop a groundbreaking drug with the potential for 90% margins out of the gate. Considering the flow of capital, this will likely never happen in climate tech.

Other Considerations

The jury is still out as to whether the venture capital community is ready and equipped to broadly support the later stages of development for climate tech companies. The construction materials industry is naturally a heavy industry known for its capital-intensive operations. To propel this industry forward, VC firms must be ready to stomach the potentially expensive forms of debt at the project level, which will impact their returns materially, or roll up their sleeves and help companies access cheaper forms of project-level capital.

The financial ecosystem is struggling to adapt to the needs of the green construction sector. Green investment funds, impact investors, and sustainability-focused financial instruments are becoming more prevalent. Still, they must be engaged fully through all the funding stages. Some funds will be invested in later-stage capital needs, but only after the first plant is proven out. So, the question remains: who will support the first plant?

The need for later-stage investment associated with measurable commercial and environmental impact cannot be understated. Recently, governments worldwide have begun recognizing the need for supportive policies and economic mechanisms to lower capital barriers for green construction ventures. Though this is a step in the right direction, it does not provide a complete solution.

Seizing the Opportunity

The challenges in securing funding for sustainable projects in the green construction revolution are significant but must be addressed urgently. The financial ecosystem must adapt to the needs of the green construction sector, and a concerted effort from private and public entities is essential to support innovative companies in building the future of sustainable construction. Failure to do so could hinder the industry's ability to play its part in reducing the global carbon footprint and mitigating the effects of climate change. It is crucial for all stakeholders to recognize the importance of adequate funding in driving the transition towards sustainable construction practices and to work together to overcome the barriers faced by companies in this sector.