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## Sustainable Business Models for Concrete (CIRCLE Project)

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### ABSTRACT

Cement and concrete production are characterised by high energy and carbon intensity, placing them amongst the highest polluting industrial sectors globally. Addressing the growing need for sustainability, novel concrete solutions become increasingly popular for mitigating the negative environmental impacts, such as high CO<sub>2</sub> emissions output and the overuse of raw materials, providing alternatives to conventional concrete products. The industry is lacking a jointly approved analytical framework, which can evaluate business models focused on sustainable concrete solutions across economic, environmental, and social dimensions. Our research compares selected sustainable business model frameworks to assess the best fit for the sustainable concrete product proposed by the CIRCLE project, which develops a permeable mixture by substituting nonrenewable aggregates found in the conventional concrete mix with shellfish waste. Different business model frameworks are tested against production efficiency, area of application, customer involvement, and supply of raw materials as elements found in cement/concrete production and select the most appropriate framework to analyse the CIRCLE solution. The study concludes that the Triple-Layered Business Model Canvas (TL-BMC) is the most appropriate framework for stakeholders to identify and establish successful business models focused on sustainable concrete.

**Keywords:** business models; triple-layered business model canvas; sustainability; novel concrete solutions; construction