

**Search for a Spanish Partner for a  
Bilateral R&D Project (this document will be shared with potential Spanish  
companies)**

<b>Organization</b>	
<b>Date of Request:</b>	18 January, 2022
<b>Company name:</b>	<a href="#">Future university in Egypt</a>
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**SECTION 1: Your Company Profile**

*(Please give brief / to the point explanations. For more explanation on any point below, you may add a short paragraph as an annexure, with this document.)*

Business Sector	Teaching and research
Company mission or core functions	Research studies
Date of establishment	2006
Ownership (if public and traded, add stock exchange and ticker symbol)	Private university
Total number of employees	2000
Number of employees in R&D	500
Key products sold or services provided	Research investigations
Company core technical competences	Research investigations
Key R&D programs and activities	First among private universities for QS ranking
Examples of accomplishments	First among private universities for QS ranking
Company strategic orientation	Teaching and Research Facility

**SECTION 2: Partner of Interest**

*(Please provide a brief summary of the prospective partner company or organization. This summary may address some or all of the points below)*

Profile of ideal technology partner	A Spanish Company specialized in Advanced materials for construction
Core technological competencies and expertise	Ability to consult for the development of advanced materials for construction.
Other essential qualifications (e.g.: ownership, track records etc.)	start-ups, SMEs and large companies in Spain
If you have a list of companies with whom you are in contact or interested in contacting, please provide contact details	No, I do not
If you are interested in collaboration: please specify details and other important information you want to share with a potential company.	EGYPTIAN-SPANISH JOINT TECHNOLOGICAL CO-OPERATION PROGRAM, CALL-6 <a href="https://stdf.eg/web/grants/open">https://stdf.eg/web/grants/open</a>
Interested areas of collaboration	Ultra-high-performance concrete
Specific R&D contribution you are seeking/offering	Consulting in the development of Ultra-high performance concrete design guidelines for Egypt.

Signature *Ahmed Deifalla*

**Name: Ahmed Deifalla**  
**Date: 18- January 2022**

## **Abstract - English**

In our beloved Egypt, concrete is the commonly used construction material as it is the most economical construction material. Although concrete structures are known for their relatively long-life span and less maintenance cost than other construction materials, persistent maintenance neglect may increase the structure's vulnerability. These deficiencies are more pronounced in critical Egyptian infrastructures, including hospitals, schools, and bridges. More specifically, bridges are continuously exposed to the harsh environment that accelerates their aging and subsequently its functionality over their life span. Hence, future critical infrastructure facilities should be designed and constructed using innovative technologies, accounting for all direct and indirect (i.e., economic, environmental, and social) costs.

In this context, recent advancements in the concrete industry worldwide have introduced a new era of durable, cost-effective, and environmentally friendly structures. These structures mix the advancement of concrete manufacturing, namely, Ultra High Strength Performance concrete (UHPC) and fiber reinforced polymer (FRP) reinforcements, as an alternative for the conventional steel reinforcements in many critical applications. FRP non-corrosive makes are perfect for significantly essential structures as well as those subjected to harsh environments. The FRP manufacturing in Egypt is growing in many forms, including Glass FRP bars and Glass FRP hollow tubes. However, these kinds of structures are still under investigation. The objective of the proposed research is to recommend the best practices required to apply sustainable design and Construction of UHPC. This study aims to lay the foundation for developing a new generation of critical infrastructures in Egypt.

Furthermore, the study is proposed to briefly investigate the structural performance of different structural components, mainly slabs, beams, and columns. In this respect, the structural performance and failure modes of a bridge and building elements made of UHPC reinforced with FRP reinforcements will be examined through different approaches. These approaches include comprehensive literature review for previous works, full-scale experimental testing, numerical models (i.e., finite element models), and analytical modeling. In addition, the proposed research program will investigate several crucial parameters: the concrete mix, loading conditions (i.e., compression, tension, flexure, shear, torsion, and impact loading), reinforcement ratio, and shear to span ratio. The successful implementation of this study will significantly impact the country's economy and the people's social life. As a result, we will have a new

generation of corrosion-free sustainable buildings and bridges, which guarantees a consistent structural performance throughout the life period of the structure.

