Innovate UK Business Connect - KTP Platform (Current)
2741 Innovate UK KTP 50th Golden Awards

Macrete Ireland Ltd & Queen's University Belfast

Application name should be the nominee name (i.e. the name of the Partnership team, project, people or person who will be the recipient of the Award).

Confidentiality Declaration

- ✓ I confirm all contributors to this project have provided consent for the use of the information provided in this application to be used by the organisers in any promotion of the Awards.
- ✓ The information provided does not include comercially sensitive content that requires approval before it is made public.

Consent

- ✓ I am happy for any of the information provided to be used by the organisers in any promotion of the Awards

1. Knowledge with Impact
Criteria
In this category applications should demonstrate exemplary TCS / KTP credentials, with a particular focus on evidencing the impacts made, the transformative outcomes delivered, and the exploitation potential realised.
Eligibility
To be eligible for this award, your TCS / KTP participation must have begun after 1st January 1975 and have been completed by 30 June 2025.

2. Driving Innovation for the Future
Criteria
Here we wish to showcase the most creative, innovative and market-disruptive aspects of TCS / KTP. Applicants here should be able to demonstrate and evidence the nature, novelty and scale of progressive change enabled and exploited by TCS / KTP.
Eligibility
To be eligible for this award, your TCS / KTP participation must have begun after 1st January 1975 and have been completed by 30 June 2025.

3. The Art of Successful Collaboration
Criteria
This theme exemplifies the TCS / KTP ethos, here we wish to focus on the relationship aspects of TCS / KTP and how applicants can demonstrate a depth and breadth of reach and impact that has been facilitated through people and organisations working in partnership for a common goal.

Eligibility
To be eligible for this award, your TCS / KTP participation must have begun after 1st January 1975 and have been completed by 30 June 2025.

The shortlisted finalists for each category will be invited to attend the Gold Awards Gala Dinner on Wednesday, 29th October 2025 at the Kimpton Clock Tower Hotel in Manchester.
Each shortlisted finalist will be allocated three Gold Awards Gala Dinner tickets, but will be responsible for covering their own travel and accommodation costs.

Are you applying for the Driving Innovation for the Future Category? Yes

About the Nominee(s)

Describe the People/ Partners/ Participants involved including any available TCS/ KTP project details (mention here any relevant context such as Knowledge Base and Company Partner details, main company activities, markets, locations; also consider providing turnover, profitability, and headcount numbers where possible).

> Macrete Ireland Ltd (est.1979), based in Toomebridge, Co. Antrim, is a leading manufacturer of precast concrete solutions for civil engineering infrastructure. In March 2024, Macrete employed 109 staff with a turnover of £25M.
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> Macrete's first KTP with Queen's University Belfast began in 2004, aiming to commercialise an innovative structural concept—the FlexiArch bridge system. This patented design uses tapered concrete blocks that naturally form an arch when lifted into place from flat-pack, combining ancient engineering principles with off-site modern manufacturing techniques, meeting sustainability goals.
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> The KTP was a major success – the FlexiArch product was launched, KTP Associate Abhey Gupta was named "Business Leader of Tomorrow" and the project won the KTP Engineering Excellence Award in 2009. The FlexiArch collaborations have generated 40+ academic publications in peer reviewed journals and international conferences, supported 22 student projects including 4 PhDs (one receiving a prestigious IStructE Model Analysis Award), demonstrating strong knowledge exchange and impact.
>
> Macrete and Queen's have completed multiple KTPs, focusing on a range of business challenges: concrete mix innovation, sustainability, and expanding FlexiArch applications. These Partnerships have embedded a culture of innovation and resilience within Macrete, strengthening technical capabilities, market competitiveness, and showcasing the long-term value of academic-industry collaborations.

The Strategic Context

What was the strategic challenge, need or opportunity that this KTP (or formerly TCS) nomination set out to address? Please outline the key purpose/ aims/ objectives of your partnership(s) and/ or the drivers motivating the Gold Award nominee(s)

> In 2004, due to a downturn in the construction sector, Macrete sought to diversify its product range and strengthen technical capabilities. The challenge addressed by the first KTP was in transforming an innovative academic concept into a commercially viable product.
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> The Partnership developed FlexiArch—a patented, modular concrete arch bridge system that can be rapidly installed, reducing on-site construction time and offering long-term durability and resilience against extreme climate events. FlexiArch is currently manufactured in Northern Ireland and also licensed in Australia and South Africa, with expansion discussions underway in Japan and the USA.
>
> Macrete wanted to embed advanced materials knowledge and structural design expertise across operations that would give increased capability to bid for more complex infrastructure projects.

The initial KTP aimed to:

Develop and commercialise a novel durable bridge system.

Enhance internal R&D capacity.

Build long-term academic-industry collaboration.

Position the company for future growth in national and international markets.

Since 2004, Macrete has completed three further KTPs, addressing strategic needs including sustainability, product innovation, and market expansion. These Partnerships have embedded a culture of innovation and resilience, leading to a fully funded £652k Innovate UK project. So far, Macrete has collaborated with over nine QUB academics, two Researchers, and supported four FlexiArch-related PhD projects.

Maintaining the structural integrity and sustainability of UK bridge infrastructure is estimated to cost ~£6B. In June 2025, the UK government pledged £1B to upgrade substandard bridges. Thanks to KTP-enabled capabilities initiated with FlexiArch in 2004, Macrete is a leader in the pre-cast sector, well-positioned to respond to this and other opportunities.

The Gold Award nomination recognises the transformative impact of KTP on Macrete's strategic direction, technical leadership, and global reach—driven by a shared vision between academia and industry, brought to life by a talented and innovative graduate.

Overview of Outcomes/ Impacts for the Beneficiaries

Please outline the key achievements for the host Organisation(s), the Knowledge Base(s) and the Associate(s). What were the evidential impacts and outcomes realised alongside any evidence of changes in operations, culture, economic/ societal/ environmental benefits etc. How was the transferred knowledge applied to optimal effect within the company/ sector context and how did the beneficiaries ensure that the legacy capabilities were fully embedded and utilised.

Macrete has demonstrated exceptional commitment to innovation through its sustained engagement with KTP. The cumulative impact of four KTPs with Queen's University Belfast has transformed the company's operations, culture, and market position.

Projects 1, 3, and 4 focused on the development and refinement of the FlexiArch bridge system, including complex geometry of skew bridges from flat-pack. These collaborations evolved an academic concept into a patented, modular solution with complex geometries and self-equilibrating designs. The resulting product has secured high-profile contracts across the UK and Ireland, positioning Macrete as a leader in precast bridge technology. The first KTP alone generated £1 million in annual revenue with sustained 10% profit margins since 2006—clear evidence of long-term commercial impact.

KTP2 addressed a key operational challenge: lowering CO2, improving the quality and versatility of Macrete's products. By developing low-energy self-compacting concretes, Macrete achieved superior surface finishes and complex shapes. The embodied carbon was reduced by 50% which reduced CO2 from 6M kg to 3M kg pa.

The academic team has delivered extensive publication output (40+ papers in peer-reviewed international journal/conference proceedings) 4 PhDs associated with the FlexiArch system, a further PhD, 10+ papers from an Innovate UK project with QUB/Macrete 'Lightweight low energy concretes for use in novel structures' plus numerous student project dissertation.

The Associate, Abhey Gupta, exemplifies the success of KTP, progressing from project lead to Operations/Commercial Director, embedding a culture of innovation and technical excellence that is leading the SME pre-cast concrete sector in the UK and Ireland - a remarkable achievement for what began as a family business in rural Northern Ireland.

Operationally, Macrete has shifted from a traditional manufacturer to a knowledge-led, design-driven enterprise. Culturally, the company embraces continuous improvement and academic collaboration. Environmentally, innovations in materials and design have reduced waste and improved sustainability.

WOW Factor!

What makes this nomination special in having realised its transformative innovation potential and why should it win the Driving Innovation for the Future Gold Award?

Concrete is the second most used material in the world after water and, traditionally, has very high embodied CO2 associated with Portland cement. The concrete industry accounts for ~8% of all global emissions. The UK's precast concrete sector is evolving in line with a drive towards net-zero, off-site modern manufacturing techniques and Macrete's KTP portfolio is leading this transformation. Through visionary collaboration with Queen's University Belfast, Macrete has redefined what's possible for civil engineering infrastructure, blending cutting-edge academic research with real-world sustainable and durable applications.

This is not just innovation—it's innovation with impact.

At the heart of this success is Abhey Gupta, the first KTP Associate in 2004, now Operations/Commercial Director of Macrete. Abhey's journey from graduate to national award-winning civil engineer exemplifies the power of KTP to shape careers and companies.

Under Abhey's leadership, Macrete has achieved:

- 55% revenue growth from £14.75M to £22.80M (2017–2023)
- A staggering increase in gross profit from 0.6% to 21.5%
- 100% staff retention, reflecting a culture of excellence and innovation
- A £12M contract with HS2 and in part due to the high quality and low carbon concrete solutions offered

These are not just numbers—they're proof of a business transformed.

Macrete's long-standing partnership with Queen's University's Civil Engineering has unlocked novel lower energy materials (with waste encapsulation), smarter designs, and sustainable practices. This synergy has now attracted FP McCann, another KTP success story, to acquire Macrete - recognising the strategic value of its innovation-led growth and retaining Abhey Gupta to drive forward a new era of construction excellence.
Together, Macrete and FP McCann are poised to become a powerhouse of innovation, setting new standards for the sector. This is a story of vision, leadership, and lasting impact—one that exemplifies the very essence of the Driving Innovation for the Future Gold Award.