

TII Research Strategy 2022-2026





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1. Introduction



Transport Infrastructure Ireland (TII) was established in August 2015 when the Railway Procurement Agency was merged with the National Roads Authority under the Roads Act 2015. TII's primary functions are:

- To provide an integrated approach to the future development and operation of the national roads network and the light rail infrastructure network throughout Ireland, and
- To secure the provision of safe and efficient networks of national roads and light rail.

TII recognises the value of research and the important role it contributes to TII achieving its strategic objectives as presented in the TII Statement of Strategy (2021-2025). TII operates a research programme as a means of promoting practical measures that contribute to enhancing quality and/or reducing costs, so that an appropriate balance between safety, cost and sustainability is achieved. The research programme is allocated an annual research budget, which is available for projects from across the organisation.

This Research Strategy was developed by the TII Research and Standards Section to coordinate research activities across all TII Directorates. The Strategy provides the basis for TII research activities.

The Research Strategy flows from TII's Statement of Strategy (2021-2025), the TII Sustainability Implementation Plan and the developing TII Innovation Strategy, all of which support TII's purpose, vision, values and goals. It is formulated in a liminal period, as the traditional assumptions underpinning transport and mobility networks are evolving in response to the Climate Crisis. In tandem with this is a greater understanding that the traditional linear economy built on the principles of 'take, make and waste' is not sustainable and alternatives need to be found if TII is to succeed in sustainable and smart mobility¹.

It is in this context that the current main dominant drivers of change that necessitate research in TII are:

- TII's Statement of Strategy (2021-2025)
- Vision Zero - the Road Safety Strategy that commits to reducing serious injury by half and eliminating death on roads by 2050
- Implementing TII's Sustainability Implementation Plan (SIP): actions will require undertaking research with the aim of enabling evidence-based decision-making
- The switch to zero carbon dependent processes - the European Green Deal and the Climate Action Plan 2021. These set a roadmap for taking decisive action to halve emissions by 2030 and reach net zero no later than 2050
- The transition to Circular Economy: an economy which is restorative and regenerative by design and which aims to keep asset components and materials at their highest utility and value at all times. The circular economy involves separating growth from the use of scarce resources through production models based on long life products that can be renewed, reused, repaired, upgraded or refurbished and requires significant changes from product design to new business and market models, new ways of turning waste into a resource to new modes of consumer behaviour².
- Increased digitalisation and new technologies. TII will need to harness the power of digital to tackle the big challenges we face in the coming years. The EU Commission's digital strategy "Europe Fit for a Digital Age" requires a focus on data, technology, and infrastructure.

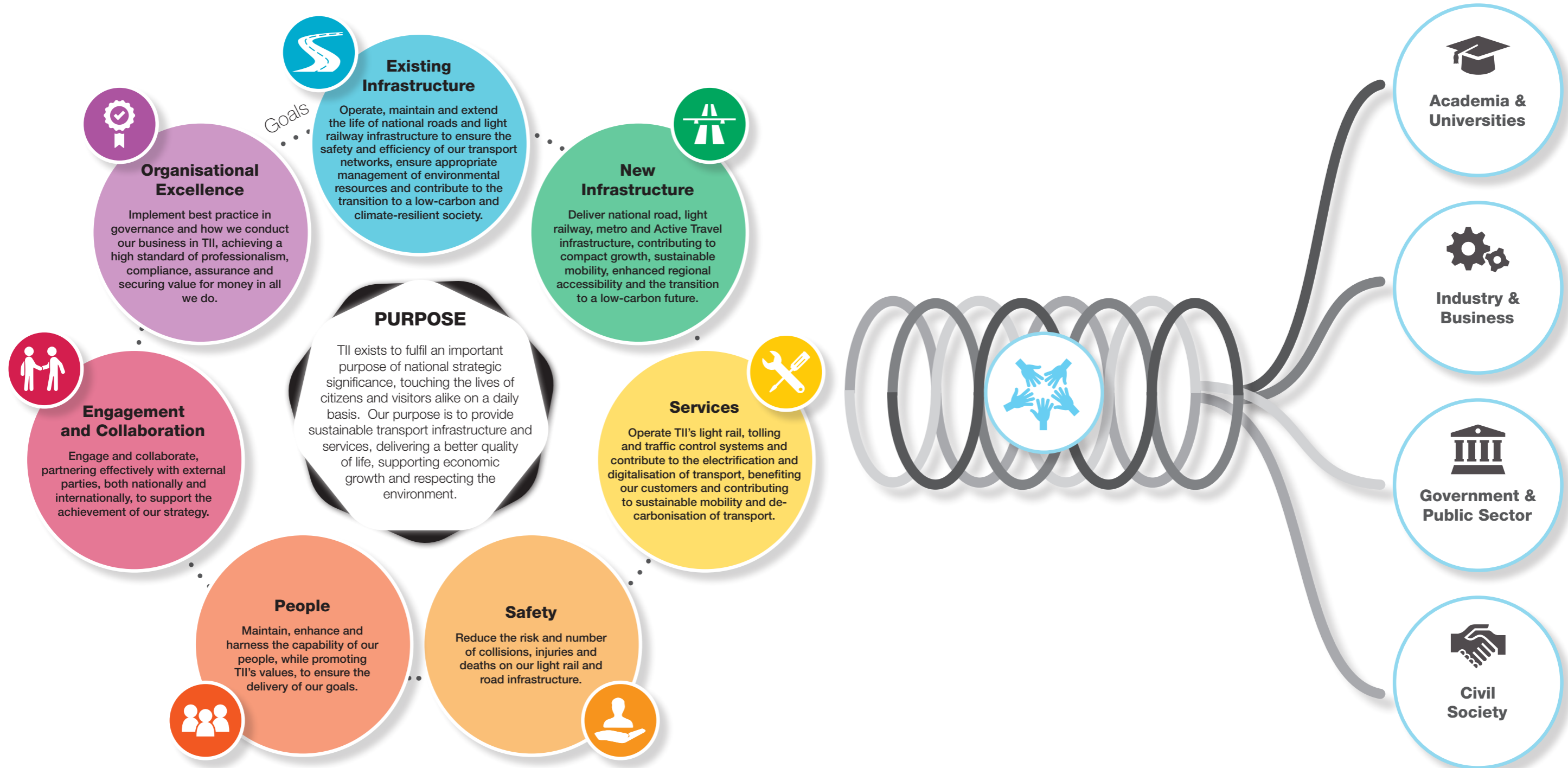
¹ | World Benchmark Alliance, "Measuring what matters most: seven systems transformations for benchmarking companies on the SDGs (2019)" circular economy contributes to at least 12 of the 17 SDG goals.

² | "Research Priority Areas 2018 to 2023" - <https://enterprise.gov.ie/en/Publications/Publication-files/Research-Priority-Areas-2018-to-2023.pdf>.

2. TII Statement of Strategy (2021-2025)

TII's Statement of Strategy (2021-2025) translates TII's Purpose, Vision and Values into 7 Goals, under which it will deliver its next set of strategic objectives. The seven Goals are:

All Directorates engage in a wide variety of research initiatives and collaborations to achieve these strategic objectives of TII.





3. Research Objectives

TII's purpose is to provide safe and sustainable transport infrastructure and services, delivering a better quality of life, supporting economic growth and respecting the environment. TII is committed to investing in research to succeed in its vision of being a leader in the delivery and operation of sustainable transport infrastructure; of ensuring Ireland's national road and light rail infrastructure is safe and resilient, delivering better accessibility and sustainable mobility for people and goods; and of being recognised as an organisation that values its people, customers and partners.

TII's Research Objectives are as follows:



To provide evidence as a basis to fill knowledge gaps and thereby enable informed decision-making.



To provide an effective mechanism for embracing new policy developments and fostering continuous improvement in standards and specifications, thereby providing direction to TII's supply chain.



To ensure that TII is looking ahead at potential advancements and innovations and is positioned to anticipate and exploit technological developments and policy changes in good time.



To enable best practice to be developed and applied to support the achievement of the TII Goals under the TII Statement of Strategy, TII Sustainable Implementation Plan (SIP), Road Safety Strategy – Vision Zero, Climate Action Plan, Circular Economy, a Europe Fit for a Digital Age, to name but a few.



To facilitate the professional development of TII staff to enable them to stay abreast of current advances in science and technology by developing their subject matter expertise.



To enable organisational excellence that fosters an innovative, dynamic and forward-thinking workforce, capable of leading TII and engaging and collaborating across several research themes within the National, European and international contexts.



4. Identification of Research Needs

As identified in Impact 2030 Ireland's Research And Innovation Strategy, launched May 2022, the manner in which the Research and Innovation community frames and conducts their research activity is central to the relevance and quality of their research outcomes. The Research Programme of TII collates ideas from across the organisation and coordinates research activities into a coherent programme. Research projects commissioned by TII have the following features:

1. They align with TII's areas of responsibility and cover planning, design, construction, maintenance and operation of road and light rail networks.
2. They can be of an academic, commercial and/or collaborative nature.
 - Academic and commercial research projects are generated internally within TII and commissioned through an open, competitive tender process.
 - TII collaborates with a number of industry and peer organisations in the specification and joint funding of research relevant to TII. Current examples of collaborative research partnerships in TII include:
 - CEDR (Conference of European Directors of Roads): an organisation of European national road administrations that promotes excellence in the management of roads. Its research programme focuses on the needs of road directors. TII has been an active participant in this research programmes since it was initiated in 2008. See <https://cedr.eu/>.
 - Ireland is taking an active role in the implementation of the European Union Cooperative-Intelligent Transport Systems (C-ITS) programme, improving its membership within C-Roads Platform to "Core" member along with other Member States: <https://www.tii.ie/technical-services/research/c-its/>.
 - iCRAG (SFI Research Centre for Applied Geosciences) project: iCRAG brings together the geotechnical and earth sciences expertise from eight major universities and institutions across Ireland. TII has been an industry partner of iCRAG since its initiation in 2016. See <https://www.icrag-centre.org/>.

TII remains open to participating in other initiatives as identified by TII staff.

3. During the process of developing research ideas and projects, stakeholder engagement is encouraged to help shape individual research projects and programmes at an early stage.
4. Research can also be commissioned to allow TII to benchmark against best practice.

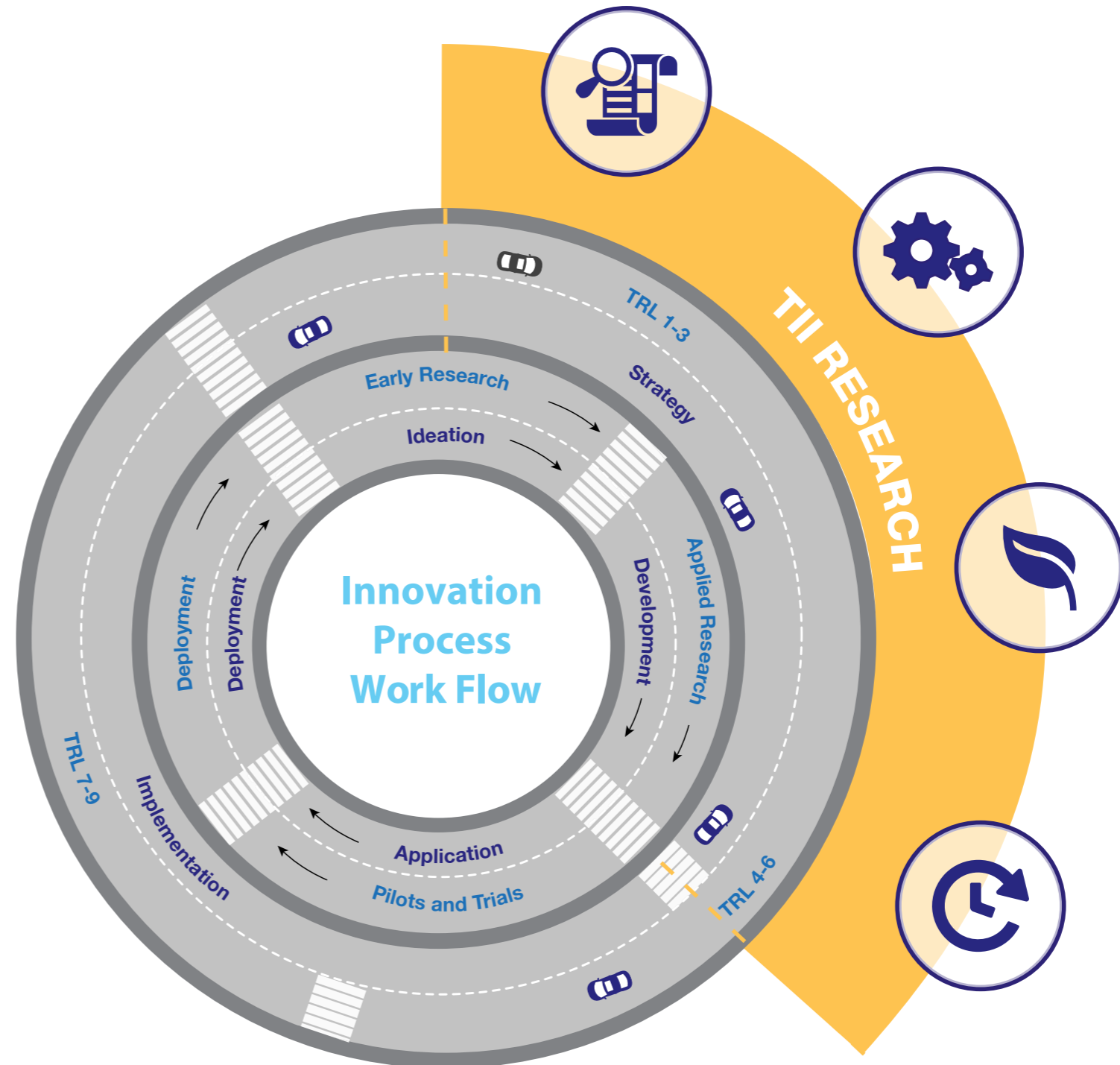


4. Identification of Research Needs

The relationship between research and innovation in TII is captured in the diagram. The research commissioned by TII has, in the past, predominantly focused on short-term goals driven by current business plan targets, i.e., applied research. Early research has also been undertaken where appropriate. Typically, TII research projects bring ideas from a Technology Readiness Level (TRL) 3 to TRL 6 as illustrated on the right.

At a national level, as set out in Impact 2030, Research and Innovation refers to the full spectrum of basic and applied research, experimental development and Innovation. It also considers that Innovation in the public service is about finding new means of delivering services and policy responses in ways that can add value to the people that are served by the public service. This value can take many forms - greater access to services; more efficient and effective interventions; increased transparency and trust in policy responses. Additionally Pillar 1 of the strategy “Maximising the impact of research and innovation on the economy, society and the environment” has the objective positioning Research and Innovation at the centre of public policy development.

Another important consideration is Open Research. Ireland’s National Open Research Forum (NORF) was established in 2017 to drive the national agenda for open research. NORF prepared Ireland’s National Framework on the Transition to an Open Research Environment (2019) which articulates national objectives in the areas of open access to research publications, enabling FAIR (Findable, Accessible, Interoperable, Reusable) data, infrastructures for access to and preservation of research, skills and competencies, and incentives and rewards. TII commissions research under the principle of “As Open as Possible As Closed as Necessary”.





5. Research Realisation

The TII Research section coordinates research activities across all of TII. This coordination provides the basis for ongoing research activities within TII such as:

- Short-term commercial research services in response to the business needs of TII
- Longer-term research projects, for example PhD or post-doctoral level projects
- Involvement in collaborative research with industry and peer organisations and other ad hoc research initiatives as necessitated by business needs.

The process for developing TII Research projects and programmes begins with the generation of ideas from TII staff. Thereafter, there are two main ways for these ideas to become a research project:

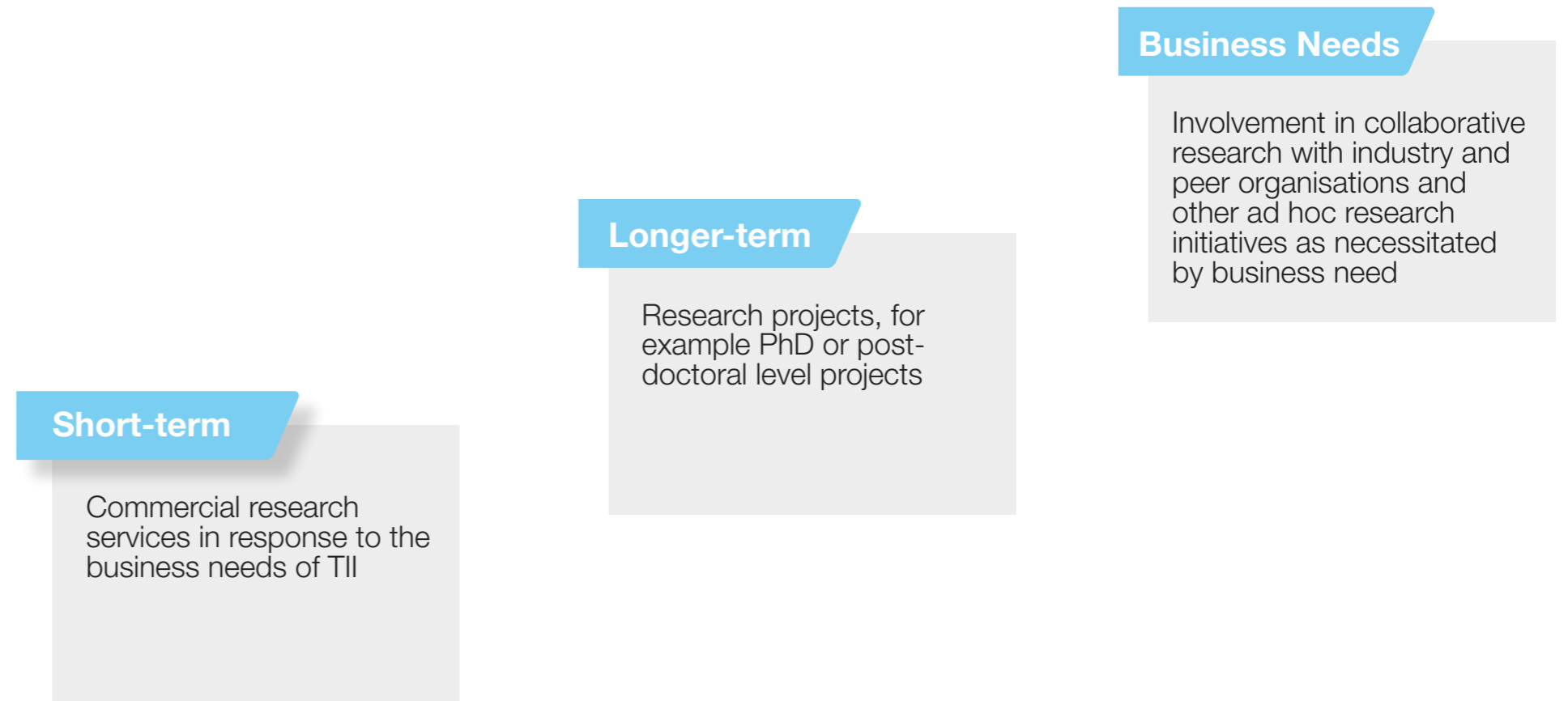
- Ideas are submitted in response to an annual invitation issued to staff to submit ideas for TII Annual Open Research Call.
- TII staff may also submit specific requests regarding research requirements in response to business needs. Collaboration projects may also be initiated in this way.

These ideas are initially reviewed by the Research Section and, if appropriate, are assessed by an Expert Group from across TII. Once an idea or research proposal is accepted, a third-party provider is commissioned, using TII's procurement process, to carry out the research. A research services contract is arranged with the research provider. This contract specifies the project requirements, the benefits of the research to TII, the research outputs and a dissemination plan to ensure results are implemented in a timely and effective way.

Participation in collaboration projects, where TII is one of a number of co-funders, are also initiated by TII staff members in response to business needs, however, in general these projects would not go through TII's Procurement process as they are commissioned by external parties. Participation in such projects is approved at Director level.

Collaboration initiatives which do not involve a financial contribution from TII may also be included in the TII Research Programme, once the business need is established.

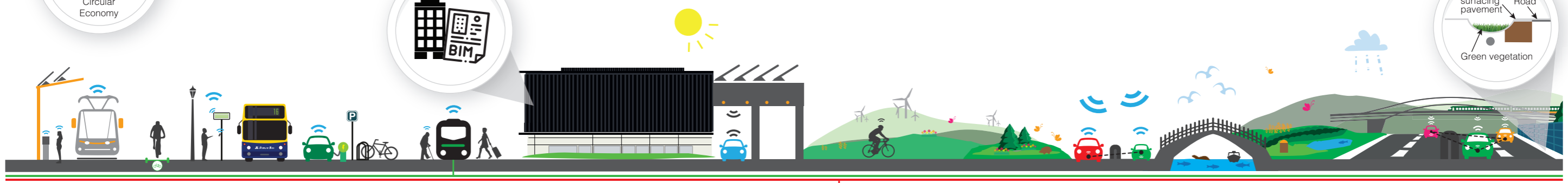
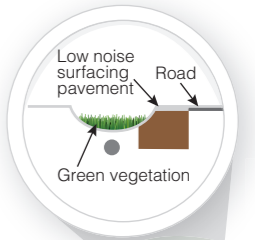
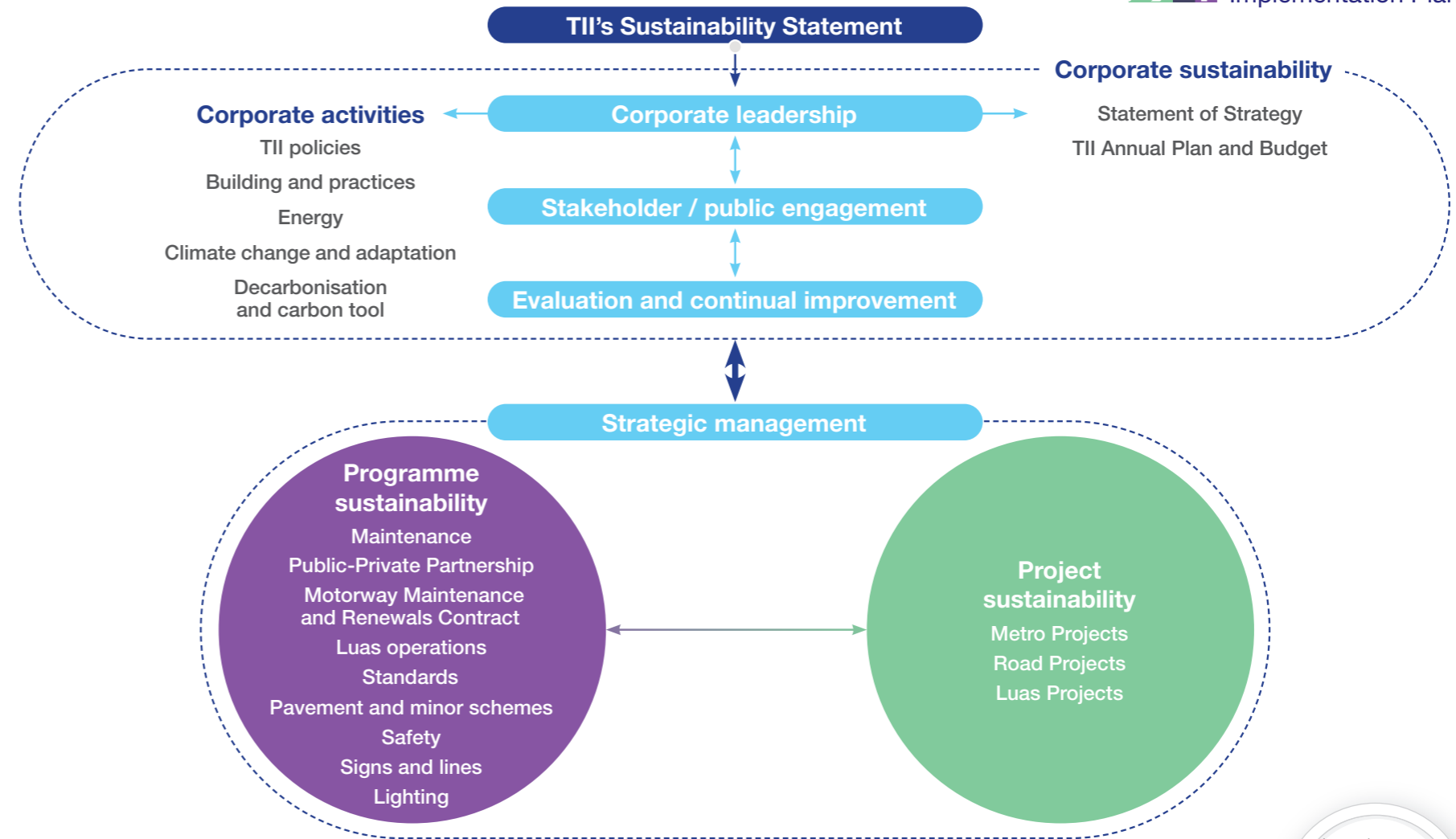
In terms of the Governance of Research activities carried out in TII, the approach is that the Professional Services Division has direct responsibility for projects funded by the TII Research Programme, whilst other Divisions have responsibility for the research projects that they fund.





6. Research Impact

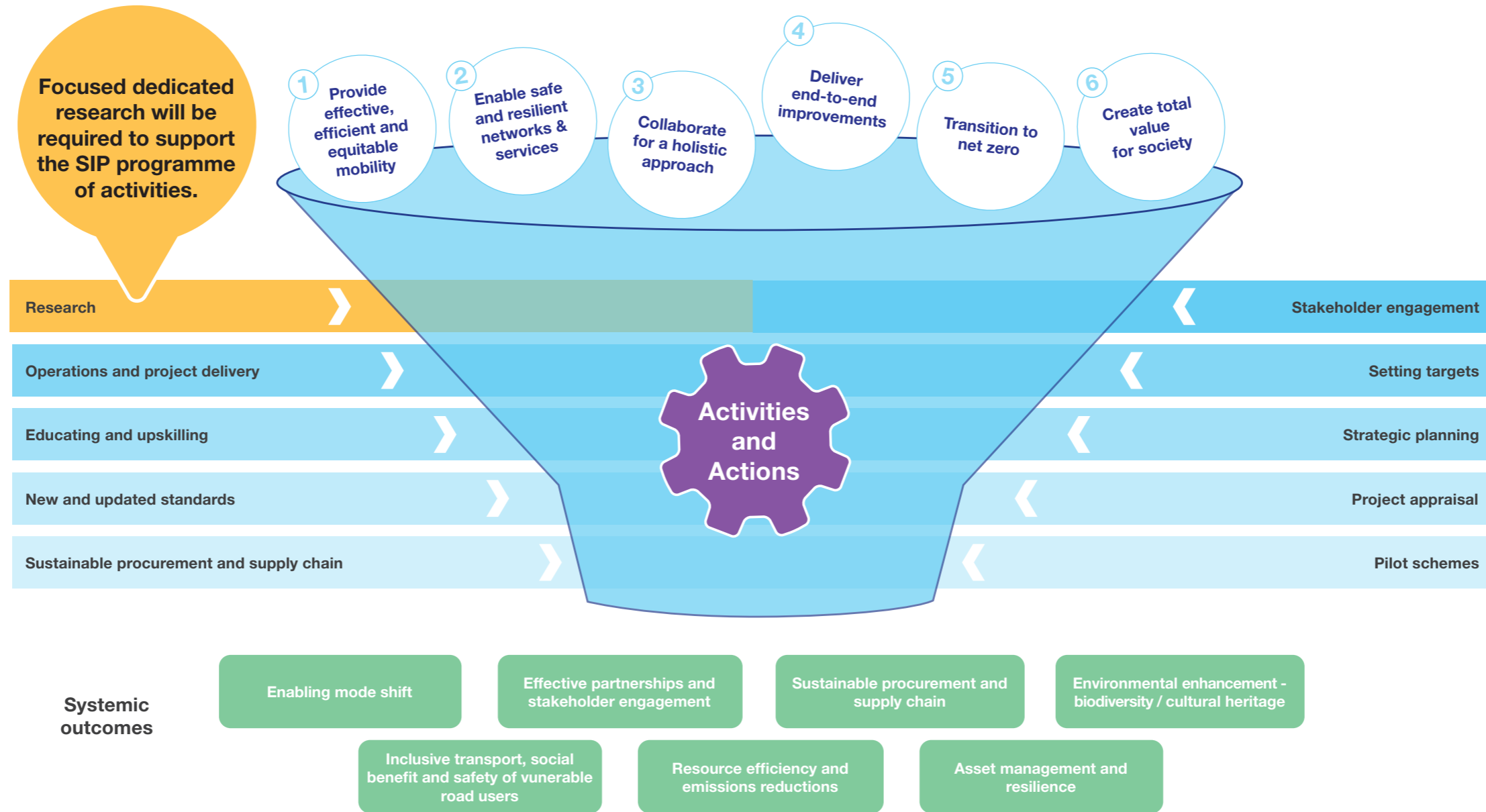
In 2021, TII launched its Sustainability Implementation Plan (SIP). The following figure from the introduction section of the SIP demonstrates the plan's reach within the organisation.



Ref: TII Environment Strategy



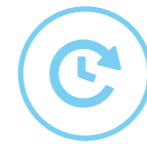
6. Research Impact



The SIP Sustainability Principles focus TII's key priority areas for the sustainable development agenda within TII. They are the product of internal consultation, external collaborations and horizon scanning. The six key TII Sustainability Principles have been developed to reflect TII's organisational ambitions and they provide a framework for delivering the future TII envisions. As the diagram above clearly illustrates, research is a key activity to ensure the systemic outcomes are achieved.

The Plan is ambitious and can be summarised by this quote as follows:

“Consolidating years of ongoing commitment and effort, and building on our existing strengths, this plan sets a clear vision, and establishes a roadmap for embedding sustainability throughout our organisation and activities. Six guiding principles of sustainability describe how TII will deliver a sustainable future through its work. Under the SIP TII will undertake a programme of activities over the next 10 years to support this ambition.”



7. Research Outputs

The **short to medium** term goals are to prioritise research requirements under the following objectives:

01

Support for projects required by TII to deliver the next set of strategic objectives of the TII Statement of Strategy (2021-2025).

02

Support for TII's Sustainability Implementation Plan to deliver TII Actions under the Climate Action Plan 2021.

03

Support of continued participation in CEDR (Conference of European Road Directorates) research projects and other collaborations.

04

Support to projects required to fill knowledge gaps to enable policy and standards development and innovation projects to progress.

05

Support to projects that provide continuous professional development opportunities for staff in topics relevant to the Zero Carbon Economy and digitalisation.

06

Fostering stronger links and collaborations with the Irish Research community and industry through organising on behalf of the Department of Transport the hosting of the 10th Transport Research Arena Conference TRA2024 in Dublin in April 2024.

The **medium to long** term goals are to prioritise research objectives and requirements that will enable TII to be positioned to respond to the following:

01

Legislative and policy changes such as the European Green Deal, A Europe Fit for the Digital Age, the Fit for 55 Package, Vision Zero, an Economy that works for People and the European Sustainable and Smart Mobility Strategy, as well as forthcoming national policies in these areas, and;

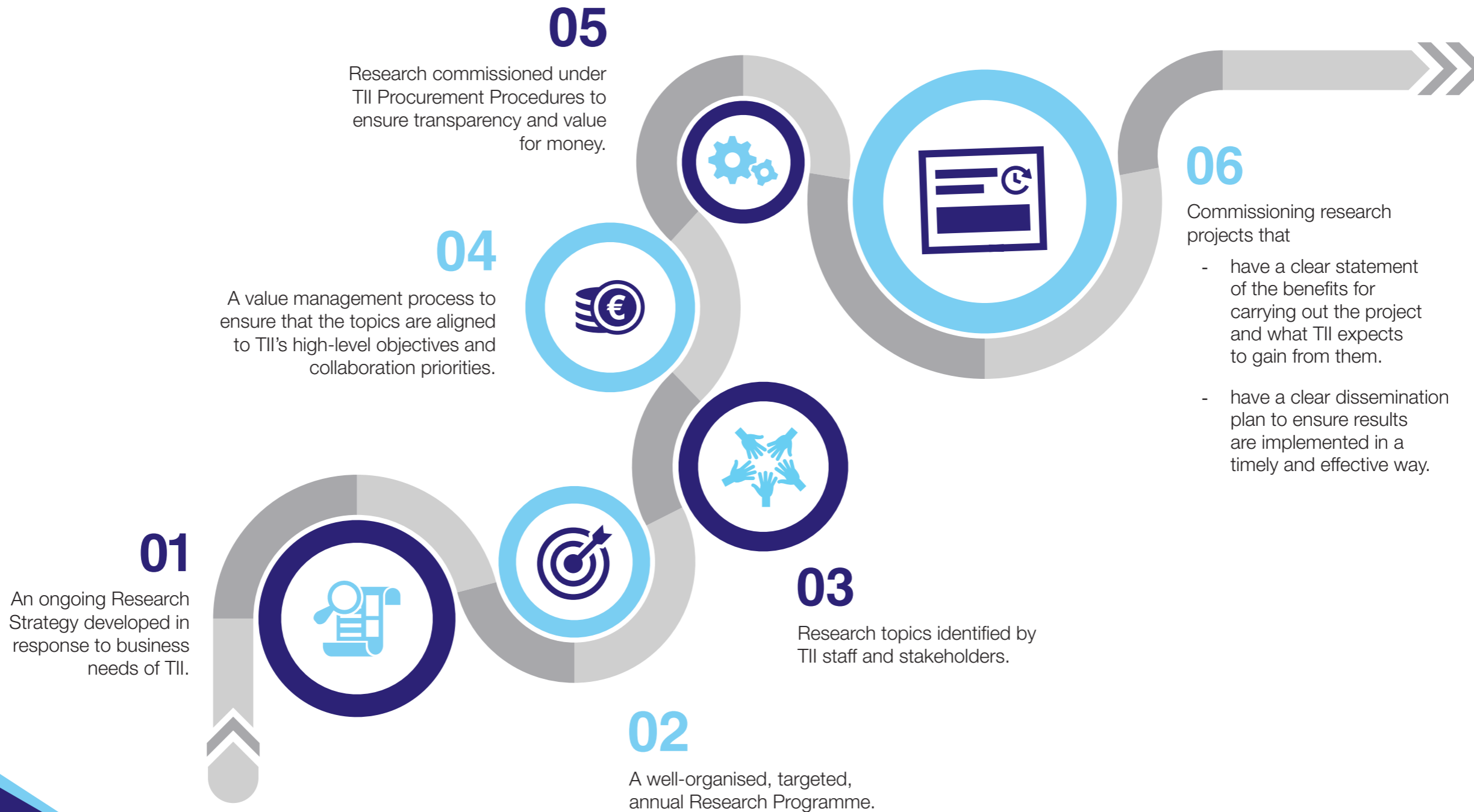
02

Government requirements under Project Ireland 2040 i.e., the National Planning Framework and the National Development Plan as well as the National Investment Framework for Transport in Ireland (NIFTI) and the Climate Action Plan.




8. Way Forward

In conclusion, the following points demonstrate how TII's Research Strategy aligns with the TII Values of Sustainability, Collaboration, Innovation, Integrity and Spirit of Public Service as set out in the TII Statement of Strategy (2021-2025).






 Ionad Ghnó Gheata na Páirce,
Stráid Gheata na Páirce,
Baile Átha Cliath 8, D08 DK10, Éire

 www.tii.ie

 +353 (01) 646 3600

 Parkgate Business Centre,
Parkgate Street,
Dublin 8, D08 DK10, Ireland

 info@tii.ie

 +353 (01) 646 3601