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Supporting Research and Innovation
Achieving Growth

TECHNICAL READINESS LEVELS

A GUIDE TO MEASURE THE TECHNICAL MATURITY OF A SOLUTION

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ABOUT INNOVATION STRATEGY

Innovation Strategy are award-winning innovation specialists supporting and connecting business, public sector, and academia in the development of innovative solutions. We possess a strong background in business and innovation and deliver expertise and resources to accelerate the development of innovative organisations throughout Wales.

Innovation Strategy work across key priority sectors including Health and Life Sciences, Food and Drink, Emerging and Enabling Technologies, Infrastructure Systems and Manufacturing. We work closely with Government and national funding agencies connecting public sector challenges with innovative ideas from industry.

Innovation Strategy have a strong track record in securing research and development funding and have secured over £15 million over recent years to solve modern challenges in society and deliver ambitious and disruptive innovations. We are proud winners of the prestigious National Procurement Innovation of the Year and Go Excellence Award.

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INTRODUCTION

Technology Readiness Levels (TRL) are a method used to measure and assess the maturity of a particular technology. The measurement provides an understanding of how much development a certain technology needs before being utilised. When applying for funding it is important to understand the technical maturity of your solution. A TRL rating can help measure the technical maturity and measure the progress of a project. TRL is based on a scale from 1 to 9 with 9 being the most mature technology. The use of TRLs enables consistent, uniform, discussions of technical maturity across different types of technologies.

DEFINITIONS

TRL-1. Basic principles observed and reported: Scientific problem or phenomenon identified. Essential characteristics and behaviors of systems and architectures are identified using mathematical formulations or algorithms. The observation of basic scientific principles or phenomena has been validated through peer-reviewed research. Technology is ready to transition from scientific research to applied research.

TRL-2. Technology concept and/or application formulated: Applied research activity. Theory and scientific principles are focused on specific application areas to define the concept. Characteristics of the application are described. Analytical tools are developed for simulation or analysis of the application.

TRL-3. Analytical and experimental critical function and/or characteristic proof of concept: Proof of concept validation has been achieved at this level. Experimental research and development is initiated with analytical and laboratory studies. System/integrated process requirements for the overall system application are well known. Demonstration of technical feasibility using immature prototype implementations are exercised with representative interface inputs to include electrical, mechanical, or controlling elements to validate predictions.

DEFINITIONS CONTINUED

TRL-4. Component and/or process validation in laboratory environment- Alpha prototype (component): Standalone prototyping implementation and testing in laboratory environment demonstrates the concept. Integration and testing of component technology elements are sufficient to validate feasibility.

TRL-5. Component and/or process validation in relevant environment- Beta prototype (component): Thorough prototype testing of the component/process in relevant environment to the end user is performed. Basic technology elements are integrated with reasonably realistic supporting elements based on available technologies. Prototyping implementations conform to the target environment and interfaces.

TRL-6. System/process model or prototype demonstration in a relevant environment- Beta prototype (system): Prototyping implementations are partially integrated with existing systems. Engineering feasibility fully demonstrated in actual or high fidelity system applications in an environment relevant to the end user.

TRL-7. System/process prototype demonstration in an operational environment- Integrated pilot (system): System prototyping demonstration in operational environment. System is at or near full scale (pilot or engineering scale) of the operational system, with most functions available for demonstration and test. The system, component, or process is integrated with collateral and ancillary systems in a near production quality prototype.

TRL-8. Actual system/process completed and qualified through test and demonstration- Pre-commercial demonstration: End of system development. Full-scale system is fully integrated into operational environment with fully operational hardware and software systems. All functionality is tested in simulated and operational scenarios with demonstrated achievement of end-user specifications. Technology is ready to move from development to commercialisation.

TRL-9. The actual application of the technology is in it's final form and proven in the operational environment, such as those encountered in operational test and evaluation.

CONCLUSSION

Thank you for reading Innovation Strategy's Technical Readiness Level guide. We hope you found this guide useful to support your projects. Please contact us if you have any further questions.

If you need support in the development of your project, please get in touch. We offer a range of services to support projects at different stages, our core services are highlighted below.

BID WRITING & SUPPORT	BID REVIEWS	FIVE CASE MODEL BUSINESS CASE DEVELOPMENT	OPTIONS ANALYSIS & FEASIBILITY STUDIES	PROGRAMME EVALUATION
PROGRAMME DESIGN AND DELIVERY	PROJECT MANAGEMENT	PLANNING AND STRATEGY	PROJECT DEVELOPMENT	PARTNERSHIP FORMATION

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