What does Technology Management involve?

- A set of five management disciplines that allow organisations to manage their technology fundamentals in order to create competitive advantage. It is the integrated planning, identification, selecting, design/acquiring, optimisation/exploiting, protection, operation and control of technological products, processes and services.
- **Technology Strategy** - The overall plan which consists of objectives, principles and tactics relating to use of the technologies within a particular organisation.
- **Technology Forecasting** - The process of identifying relevant technologies for the organisation either through technology scouting or de-risking partnering opportunities. Can involve Futurology (the study of postulating possible, probable and preferable futures and the world views and myths that underlie them; considered a branch of social science).
- **Technology Roadmapping** - The process of mapping technologies to business and market needs., matching short-term and long-term goals to help organisations reach a consensus position about the priority by time, provides a mechanism to help forecast and align technology development, and creates a framework to help plan, coordinate and undertake gap analysis for all dominant design technology developments. Roadmapping consists of 11 steps; Preliminary Phase (satisfy essential conditions, provide leadership/ sponsorship, define the scope and boundaries), Development Phase (identify the products that will be the focus of the roadmap, identify the critical system requirements and their targets, specify the major technology areas, specify the technology drivers and their targets, identify technology alternatives and their timelines, recommend the technology that should be pursed/avoided that may lead to dead ends, create the technology roadmap report), Follow-up Phase (roadmap is critiqued, validated and implemented)
- **Technology Project Portfolio** - A set of projects under development.
- **Technology Portfolio** - A set of technologies in use.

- Traditionally technology lifecycle follows the form of an ’s’ curve (emerge, grow, mature and age) based on a standard distribution of adoption, hype cycle and declining cost per unit over time. The Capability Maturity Model proposes a series of progressive capability through a series of tests (involving repeatability, definition, management, optimisation).

- Technology Readiness levels have been a useful ontology by which stakeholders can quickly evaluate/assess the maturity of technologies. TRL was a metric pioneered by NASA in the 1980’s, and these were followed by MRLs, Technology Readiness Assessment (TRA), Critical Technology Element (CTE), Integrated Technology Index (ITE), Integration Readiness Level (IRL), System Readiness Levels (SRL), and more recently Market Readiness Level and Cost Readiness Levels. They are all useful indicators however they do have their limitations in terms of not addressing uncertainty, difficulty, complexity, software very well, aging, obsolescence, support, fully integration into cost or risk models.
- **Technology Readiness Levels (TRL)** (TRL1) Basic principles observed; (TRL2) Technology concept and/or application formulated; (TRL3) Analytical and experimental critical function and/or characteristic proof-of-concept; (TRL4) Component and/or breadboard validation in lab environment; (TRL5) Component and/or breadboard validation in relevant environment; (TRL6) System/Sub-system model or prototype demonstrated in a relevant environment; (TRL7) System prototyping demonstrated in an operational environment with limited documentation available; (TRL8) Actual System Completed and ‘Mission Qualified’ through test and demonstration in an operational environment with V&V completed; (TRL9) Actual System ‘Mission Proven’ through successful mission operations with all documentation complete, successful operational experience and sustained engineering support in place.
- **Manufacturing Readiness Levels (MRL)** Phase 1 Technology Assessment and Proving (MRL1 - Concept Proposed with Scientific Validation, MRL2 - Application and validity of concept validated or demonstrated, MRL3 - Experimental proof of concept completed, MRL4 - Production validated in Lab Environment), Phase 2 Pre-Production (MRL5 - Basic Capability demonstrated, MRL6 - Process optimised for production on production equipment), Phase 3 Production Implementation (MRL7 - Capability and rate confirmed, MRL8 - Full Production process qualified for full range of parts, MRL9 - Full Production process qualified for full range of parts and full metrics achieved).

- **Market Readiness Levels (MRL2)** ranging from Unsatisfied Needs Identified, Identification of the Potential Business Opportunities, System Analysis and General Environment, market Research, Targeting, Industry Analysis, Competitors Analysis and Positioning, Value Proposition, The Product/Service Definition, right through to Business Model.
- **Cost Readiness Level (CRL)** ranges from CRL1-3 not ready; CRL4 Cost fit for very preliminary engineering decisions and very preliminary budget use (+/- 45%); CRL5 Cost fit for preliminary engineering decisions and preliminary budget use (+/- 35%); CRL6 Cost fit for PDR engineering decisions and PDR budget use (+/- 25%); CRL7 Cost fit for firm engineering decisions and firm budget constraints (+/- 15%); CRL8 Cost fit for very firm engineering decisions and very firm budget constraints (+/- 5%); CRL9 Actual cost of completed project.

- Alignment with Business Systems - Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Human Resource Systems (HRS), Knowledge Management Systems (KMS), Business Process Management (BPM), Call Centres & Helpdesks., Models (Architectural Reference, Service Reference), Service Orientated Architecture (SOA) and Health Usage Monitoring Systems (HUMS), and in the future linkages to Cognitive & Artificial Intelligence Technologies (e.g. IBM Watson), Semi-Autonomous Systems and Fully Autonomous Systems, Mobile Robotics Systems, Airborne/ Seaborne Robotic Systems.
- Technical Standards is an established norm or requirement in regard to technical systems It is usually a formal document that establishes uniform engineering or technical criteria, methods, processes and practices usually involving the formal consensus of technical experts and eminent business organisations that support/sponsor them. Standards organisations control the standards and they vary between mandatory standards (those adopted by government usually through legislation), voluntary standards or private/ unilateral standards (used by a corporation, regulatory body or militaries). Beware not all standards at universal, and there exists many different versions (metric/European and imperial/American) however moves to migrate the United States to the metric system are being led by Federal Agencies in order to remove a major handicap to the Nation's industry and economy, so they then fall in line with the rest of the World.
- Obsolescence presents itself in two forms, one where the item in question is no longer suitable for current demands/needs, and secondly if it is no longer available from the Original Equipment Manufacturer (OEM). Both need different approaches to manage and resolve, however Obsolescence Management is a process that is able to give you a future view on the second option, allowing you to buy time through lifetime buys, before you need to do something else. Reclamation and cannibalisation of sub-systems and parts is when you know you are in the danger zone.
- The aspect of baselines, interoperability between baselines, approaches to dealing with legacy systems (sustain, decommission, remediate, re-platform, replace, consolidate, enhance), configuration management of those systems into approved bundles/patterns, fast and slow deployed cycle times, interoperability with wider systems.
- The whole aspect of supporting hardware, firmware and software in the field, dealing with the configuration management, documentation, ILS, training, providing upgrades, withdrawing obsolete systems. The use of test, diagnostics and HUMS tools is becoming more essential, as systems become more complex.

What personal skills and knowledge areas will you need?

- Enthusiasm, Drive and Motivation for Technology .
- Communication, Leadership and Team Working Skills..
- Analytical, Critical Thinking and Problem Solving Skills.
- Planning, Organisation and Time Management Skills.
- Knowledge Networks.
- Applications Development, Architecture, Coding, Design, Development, Integration, Operating Systems, Product Development, Technical Writing, Testing, Tools, UI,UX.

- Information Systems, Big Data, Business Intelligence, Content Management, Databases, Data Analysis, Data Intelligence, Data Mining, Metrics, SEO, Software Engineering & Development,
- Data Storage, Cloud Computing, Computing Devices, Mobile Devices, Servers
- Product Support, Product Training, Customer Support, Documentation, HelpDesk, Repairs, Reporting.
- Emerging Technologies, Virtualisation.
- Deployment, Installation.
- IT Security.

What qualifications will you need?

- A strong technology background (Mechanical, IT, Mathematics, Programming).