TWI GROUP STRATEGY 2022-26

CONTENTS

FOREWORD

Aamir Khalid
TWI Chief Executive

I am delighted to present our 5 year strategy, which outlines the direction and goals of the business. We have engaged with our Members, staff and Council to ensure alignment with the needs of industry.

We have navigated a challenging 3 year period. Throughout 2020 and 2021 the team worked to maximise our assets and, with the right strategy and implementation, we realised more than £100m from our assets. These funds will be used to invest into the core business to serve our Industrial and Professional Members and our staff throughout the World. Our strategy is built on investment into our people and facilities to better serve our Members.

The process of formulating our strategy has given us the opportunity to reflect on our successes and failures to identify our unique value proposition. Through this we have created a technology plan to identify the

specific growth technologies and sectors we will focus on over the coming years. Environment, social and governance is becoming a core thesis across our membership's decision-making process and we are pleased to make this ours too. We are committed to diversifying our work culture and ensuring that diversity and inclusion are at the core of everything that we do.

To ensure the longevity of our Institute and operating entities, we will be investing a portion of our recently released funds to create an endowment that will support continued reinvestment into research moving forward.

We are entering an exciting period in our company's history and look forward to working with our Industrial and Professional Members to achieve their goals too.

TWI is the most financially secure now compared to the past 75 years of its history. This platform now allows us to give more to our Members and staff.

Aamir Khalid
TWI Chief Executive

In June 2021, I was voted into the position of Chair of TWI's Council. With this role comes great responsibility to ensure a 75 year old organisation continues to prosper in an ever changing world. To thrive in this environment, we must remain aligned with what the business was founded on, serving our Members. Both Professional and Industrial Membership remain at the core of our business and this will continue to be the motivation of Council when making decisions.

The organisation has been on a transformational journey over the past three years which has proved very challenging for staff and the Executive. As we emerge from this turbulent time in TWI's history, it was important to me that we had a clearly defined strategy in place to guide decision making. The hard work in 2021 paid off, with the divestment of an asset to provide stability and funds for investment.

The production of this 5 year strategy gives me great pleasure as it clearly emphasises the focus on sustainability of the core business (technology and training) by improving value for members. Our people are critical to everything we do, Council and the Executive have placed an important theme that runs throughout this document on ensuring we retain and develop our staff. Council will be monitoring the sustainability of the core business and ensuring investments generate value for Members and financial returns.

We are excited to embark upon this 5 year journey and look forward to supporting the Executive to achieve their goals.

Humbert Mozzi
Chair of Council

Humbert Mozzi
Chair of Council

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MISSION,
VISION AND
VALUES

MISSION

Enabling our Members to fulfil their purpose through independent, world-leading expertise across materials, joining and structural integrity, supported by our global investment into innovation, people and capabilities.

VISION

Promoting and advancing materials, joining and structural integrity.

VALUES

INCLUSION

TEAM WORK

INNOVATION AND EXPERTISE

TAKING RESPONSIBILITY

CUSTOMER FOCUS

ADAPTABILITY

TWI NETWORK

40+ TECHNOLOGY CONFERENCES AND SEMINARS

3,000 NEW WELDASEARCH ABSTRACTS

10,000 VISITORS TO TWI OFFICES

145 NSIRC AFFILIATED UNIVERSITIES

20,000 PEOPLE TRAINED

23 GROUP OR ASSOCIATED COMPANIES

5000+ PROFESSIONAL MEMBERS IN 18 BRANCHES

45 UNIVERSITY PARTNERSHIPS

3,000+
STUDENTS REACHED VIA EDUCATION OUTREACH

2,850
LIBRARY ENQUIRIES

500+
WELDING SOFTWARE LICENCES

600+
INDUSTRIAL MEMBER COMPANIES WORLDWIDE

4
PRIVATE TECHNOLOGY INNOVATION PARTNERSHIPS

14
INNOVATION CENTRES

20000+
STUDENTS (NSIRC AND TRAINING SCHOOL)

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ASPIRATIONS

ASPIRATIONS

In order to be able to measure success, we have defined the key milestones along our journey and the responsible owner. The main objectives for the strategy are summarised below.

TWI GROUP 2022-2026

Health, Safety and Environment

25% carbon reduction by 2025 and carbon neutral by 2035

Double sustainability R&D by 2026

ROSPA Gold by 2023

ISO5001:2018 energy management system standard by 2024

External verification of culture change by 2025

Diversity

Close the gender pay gap from 23% to <10% by 2026 with 33% of leadership positions held by women (team leader level and above)

Achieve 10% improvement in ethnic minority and disability representation at all levels by 2026

Up to 95% response on Diversity & Inclusion data from Global TWI Staff by 2023

Inclusion

Implementing a structured pay and reward policy across the TWI Group by 2024

An employee engagement survey with a score of >65% by 2026

To achieve Level 3 recognition from the government Disability Confident Scheme by 2024

Technology Leadership

Focus on adding value to key accounts via our core competency to consistently grow profit margin and achieve at least 8% growth in Member Funded Projects to £27m

Customer Satisfaction

Mean Client Approval > **90%**

Training/certification candidate feedback, annual membership survey

Governance

Compliant with the Wates Corporate Governance Principles

Group Profit

Increasing the margin from 8% to 14%,

To grow by 83% (£6.3m → £11.5m)

Group Turnover

To Grow by 10% (£76.2m → £83.5m)

Group Reserves (Worth)

To Grow by 21% (£177.5m → £215m)

Value of Property Portfolio

To Grow by 3% (£133m → £137m)

TWI Ltd Cash

To Grow by 237% (£6.9m → £23m)

TWI Group Turnover

TWI Group Profit

TURNOVER-GROUP (£M)

Figure 2: TWI Group Turnover

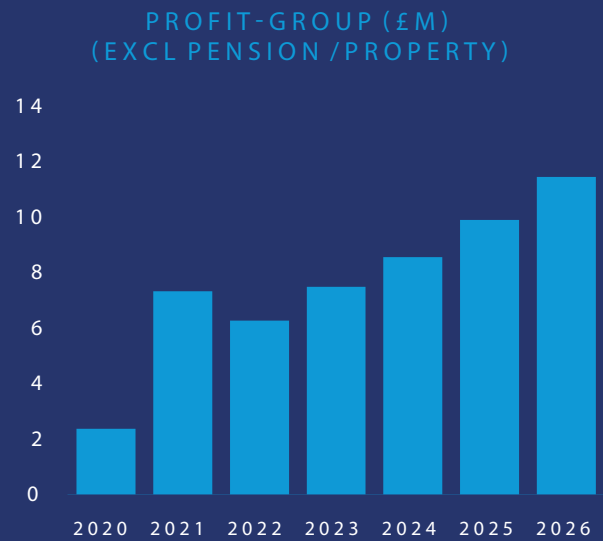## PROFIT-GROUP (£M)
(EXCL PENSION/PROPERTY)

Figure 3: TWI Group Profit

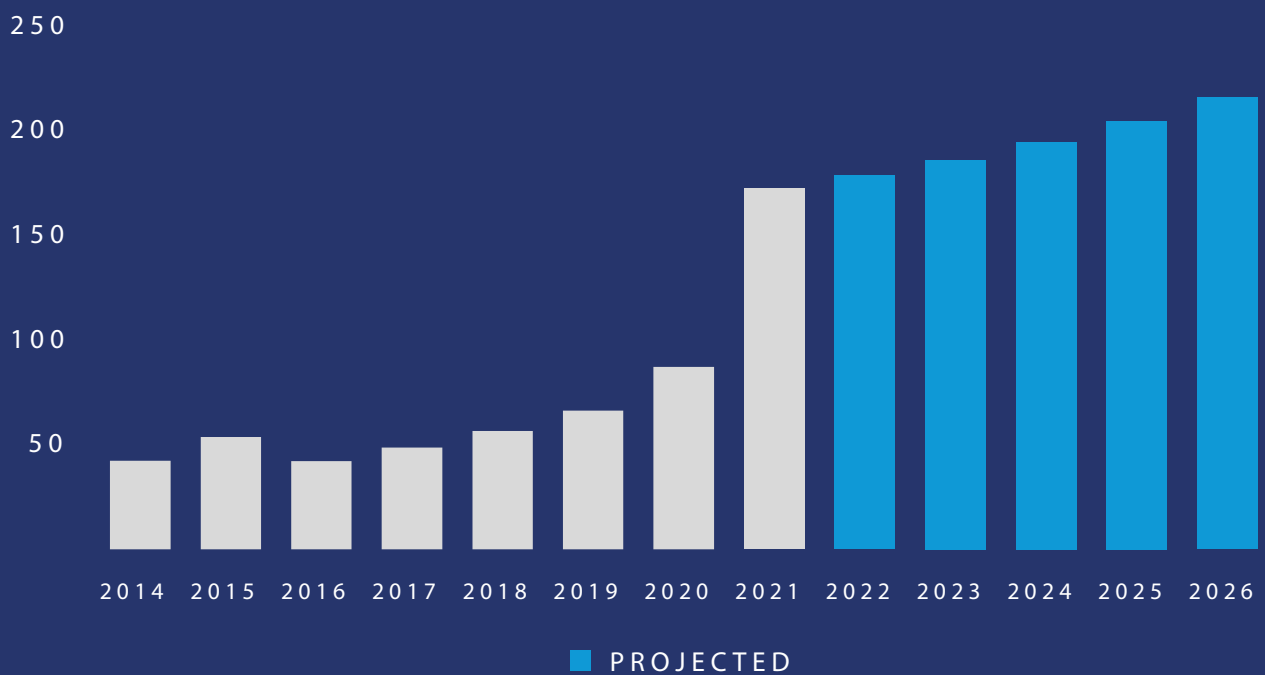## TWI GROUP-NET WORTH (£M)

■ PROJECTED

Figure 4: TWI Group Net Worth

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The company will be divided into three business units to support our overarching vision and mission:
· Technology (Serving Industrial and Professional Members)
· Global Training, Global Technical Solutions & Certification
· Property

The core business is considered as Technology, Training and Certification. Property exists to serve the core business by generating cash to reinvest back into the core business.

Figure 5: A visual representation of the business. The value we provide to our Members is built upon our engineering knowledge, people, equipment/infrastructure, training and certification. Underpinning this to provide financial stability is property and the regions in which we operate to support our Members.

OUR PEOPLE

PEOPLE STRATEGY

PEOPLE AND CULTURE

People Strategy

We believe that our people are the most important element of our business. The work we do at TWI plays a crucial role in shaping the world around us, interacting with our Members and customers to find sustainable solutions to the biggest engineering challenges our world faces. In a world that is both diverse and connected, our people reflect the society we seek to serve. We are committed to creating an environment where our people feel engaged and empowered to achieve to the best of their ability.

An Inclusive Organisation

In 2021, TWI embarked on a culture change programme of 'inclusion'. We have developed a diversity and inclusion strategy and plan that will support our people to work in an environment where they feel included and recognised for the contribution they make.

We will continue the work on the 'Living the Values' programme where we aim to bring our values to life, and develop a collective understanding of what each value means to us as individuals and as an organisation.

Tackling discrimination

We continue to adopt a zero tolerance approach when responding to fair treatment about acts of direct discrimination.

Our Leadership

The development of our leaders is a critical aspect of delivering our people strategy. We are focusing on accelerating our leadership talent and developing diverse leadership to achieve our vision.

Psychological Safety

We strive to create a culture that offers a positive experience for everyone. To do this we know we need to create psychologically safe spaces where people can speak up and share their views and ideas without fear of reprisal.

Health & Wellbeing

We are developing a dedicated online Health & Wellbeing Hub for employees to access support and advice. In addition, we will be running monthly Wellbeing Webinars and events and our Mental Health First Aiders will continue to offer support totheir employees.

Development – Training and Mentoring

We will develop a matrix of training that will allow our people to progress within the company, from new beginnings to being the expert and support career pathways.

Apprenticeships and Internships and a Graduate Programme

We will grow our apprenticeship scheme to provide a holistic approach to gaining skills at TWI, as well as creating a graduate programme that will attract future talent.

Global Inclusion

We will be working with our overseas subsidiaries to create an inclusive global TWI for all our people.

Closing the Gender Pay Gap

We remain committed to achieving positive change in closing the gender pay gap and our diversity and inclusion plan will assist us with driving progress. Actions to address the GPG are:

- A commitment to have a third of women in leadership positions by 2025 (team leader level and above)
- Close the gender pay gap from 23% to <10% by 2026
- Focused recruitment and selection processes
- Policy review
- Flexible working
- Inspiring women leaders programme
- Mentoring programme

Organisational Design

Our organisational design framework will provide an opportunity to address attraction, retention, and will help us built a talent pipeline as well as support our commitment to create a more diverse workforce through clear career pathways and succession planning.

The global organisational design framework will include:

- Defining the organisational design to fit the working structure for TWI
- Aligning the job profile to match the
- organisational structure
- Salary benchmarking
- Talent Gap Analysis and determining future
- workforce needs
- Succession planning – using appraisals and Nine-box Grid
- Create career pathways for progression for five strands of the business: management/technology specialist/specialist other/technical support/administration
- Create a mentor programme

Cross Group Working

Creating a matrix structure will assist in breaking silo working. We will identify process owners, experts in their field and provide visibility of those process owners to the whole organisation.

Hybrid Working

Our people have demonstrated that working flexibly can be effective across many parts of our business and we are introducing our new hybrid working policy as well as a more flexible approach to working on site.

Corporate Social Responsibility (CSR)

TWI provides innovative manufacturing technology for many renewable industries, including wind, nuclear fission and fusion.

Of course, none of this is possible without the people to meet these challenges. We are committed to investing in training our people, our graduate schemes and addressing the shortage of skilled engineers through our training school to achieve our commitment to a 'net zero' future.

Investment in our future generation

We know that we have a shortage of graduates joining the engineering field and as such, we will continue to invest in our outreach programmes with RAEng (GEEP programme), neighbouring schools, colleges and universities providing an awareness of the different routes into engineering.

A new focus

HR will be renamed "People and Culture" to reflect the vital shift to focus on our employees' experience. HR in no longer just about managing, rules, and policies, it is a role that aids in designing inclusive work environments so that people want to show up. Not only to be present, but to be engaged and feel a sense of ownership and pride in their work.

Employee Engagement

An engaged and empowered workforce is critical to the success of our business. We will undertake an employee engagement survey to help us understand how our people feel about their working environment and how we can improve for the future.

Our Diversity & Inclusion Aspirations

We know that to achieve our ambition to become a truly inclusive organisation, we need everyone to take accountability and play their part. **This is why in 2022, we will be incorporating diversity and inclusion evaluation measures in all employee appraisals**. This will not only drive leadership accountability but will support us to live by our value of inclusion.

We are committed to ensuring TWI is accessible to all. **We will be reviewing the accessibility of our sites to consider the access needs of people with a disability**, to create a positive environment where everyone can achieve their best.

We want all of our people to feel like they are on the journey to a stronger future. It is important to us that employees from across the organisation feel engaged, respected and listened to. This is why we've made a commitment to **achieve an employee engagement score of >65% by 2026**.

We know that our gender pay gap needs improving and we must work create more equitable opportunities for our female talent to thrive. We are committing to **reduce our Gender pay Gap from 23% to <10% by 2026**. To help us achieve this, **we've made a commitment to have a third of women in senior roles by 2025**.

To fully understand the diversity of our people, we need to build the psychological safety of our teams. We want to encourage them to share diversity data that will support us to benchmark how diverse we are across every level of the organisation beyond just gender. **We aim to achieve a >75% return on Diversity & Inclusion data from global TWI by 2023** to support our ambition to achieve **10% improvement in ethnic minority and disability representation** at all levels by 2026.

ENVIRONMENTAL, SOCIAL AND GOVERNANCE

HEALTH, SAFETY AND ENVIRONMENT GOVERNANCE

HEALTH, SAFETY AND ENVIRONMENT

TWI aspires to be a leader in safe and sustainable research. All employees, students, visitors and contractors should complete their activities safely, allowing them to return home uninjured, and with minimal impact on the environment, whilst working for TWI.

TWI's reputation has been built on reliably undertaking hazardous research and development work using a number of world leading, non-standard engineering practices. To maintain this high standard of work and to take into account changes in industry best practice and the type and range of hazards being managed, TWI will focus on developing a health, safety and environmental strategy and culture change.

To achieve this, the health and safety basics remain:
• Strong and visible leadership.
• Collaboration and partnership, including genuine worker engagement.
• All having the competence to identify and control the risks created by their work activities.

TWI has certified Environmental and Health and Safety Management Systems. However these systems have been in place since the 1990s and underwent a step change in 2021 to ensure they met business needs.

Due to the nature of TWI's operations, we need to be more aware than most businesses that a number of factors will be continually changing in our day to day work, especially the health, safety and environmental risks from the advanced technologies that we develop, including possible new occupational health risks and carbon footprint generation.

The next phase of the project will require active engagement of all employees to ensure a successful implementation phase, and will focus on the following strategic themes:

• Focus on environmental impact and sustainability of both Members and TWI.
• Stimulate broader ownership via clearer staff responsibilities for health, safety and environment.
• Identify and manage health, safety and environmental risks holistically with other risks at the proposal stage.
• Implement change management procedures for effective risk management of new or emerging technologies.
• Ensure appropriate health, safety and environmental information is readily available in a suitable format.

TWI25 is our leading goal to reduce our carbon footprint by 25% by 2025, with the aim of being carbon neutral by 2035.

The main environmental activity for 2022 will be establishing the baseline from which to build momentum. TWI will develop a roadmap to reducing its carbon footprint during 2022, together with roadmaps for research in support of sustainability for Members. TWI will push towards creating a reputation as a lead and industry role model for environmental sustainability, research and technology.

MEMBERSHIP GROWTH

**INDUSTRIAL MEMBERSHIP
KEY ACCOUNT GROWTH PLAN
PROFESSIONAL MEMBERSHIP
GLOBAL MARKETING STRATEGY**

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INDUSTRIAL MEMBERSHIP

Corporate Mission and Objectives

The long term corporate objectives:

- Grow TWI's reputation for generating value for Members

- Improve and create new products and services to better support the objectives and challenges of its Members

- Grow single client projects (SCP)/joint industry project (JIP) businesses by providing better support and improving value to Members

The overall strategy for achieving the above objectives is to have a smaller number but more stable membership subscription, and focus on better serving the existing Members to grow SCPs with initiatives including:

- Key account management to develop long-term partnership with key Members and establish market technical leadership

- Digital marketing to increase global visibility and contacts

- Proactive engagement with Members to understand and address Member needs

- Focussing on emerging and fast growing sectors in line with our core competence

- Targeting fast growing international regions (China, Japan and US)

- Localised support to Members' demands

- Industry-pulled research to develop new products and new capabilities for emerging sectors

Proactive Member Engagement to Grow Single Client Projects

The overall business development strategies are:

Key Account Management to Develop Long Term Relationship to Grow SCPs

- Developing long term strategic relationship with the existing key accounts

- Identifying and growing new key accounts by 'customer segregation' and provide tailored services to Members in each segment in order to maximise the value of each Member to the business

- Prioritised support for better customer satisfaction and maximise the business value (Figure 9)

Industrial Sector Focus

- Redefine the sectors and agree target key accounts, who are willing to align/partner with TWI

- Focus on low carbon energy (wind, nuclear and hydrogen), smart and electric transport, defence, digital manufacturing supply chain

- Target key geographic regions

- Target key accounts in each sector/region with director champions

- Establish schedule for pitching TWI products, reviewing market trends and sector intelligence via panel meetings, workshops, Zoom and visits

- Setting individual targets in line with sector opportunities and budget

International Growth

- Employ representatives in US to grow membership and SCP from energy, manufacturing and transport

- Establish TWI China admin office to grow membership and SCP

- Expand the exclusive arrangement with TWI representative in Japan to grow membership and SCP in energy, transport and electrification

- Europe: Grow additional SCP per year from the representatives in Netherlands, Germany and Italy**ocused Growth**

- Products may be goods or services. TWI's focus remains on services that support Members to develop their products. Developing TWI's product streams and understanding where these can be sold

- Identifying who else is likely to purchase the same type of services, what other industry sectors would it be relevant to and what else could be done if the product/project was adapted

Achieve High Level Customer Satisfaction and Loyalty

Deliver what customers require:

- Work with RAEng to capture diversity data of our Members

- Sustain strong customer relationships to resolve complaints, answer questions, educate, present new ideas and cross-sell/up sell

- Measure customer satisfaction regularly

- Actively ask customers for feedback

SECTOR	STRATEGIC ACCOUNT	EXECUTIVE RESPONSIBLE
UK Government	LEPs, BEIS	Aamir Khalid
Oil and gas and the energy transition	BP, Chevron, ExxonMobil, OneSubsea, Shell, TechnipFMC	Paul Woollin
	AramcoTech	Mike Russell
	ADNOC	Shervin Maleki
Nuclear	Rolls Royce	Paul Woollin
	ITER	Mike Russell
Defence	MoD	Paul Woollin
	BAE Systems, Navantia	Mike Russell
Transport	BMW, ESA	Mike Russell
Multi-sector	Lloyds Register Foundation	Tat-Hean Gan
China	JITRI, AVIC, CRRC	Steve Shi

Figure 9: Prioritised Support for Better Customer Satisfaction

PROFESSIONAL MEMBERSHIP
The Welding Institute

Operations and Marketing Strategy

The Welding Institute – a globally recognised professional engineering institution, delivering first class professional qualifications, education and professional development to our Professional Members. We are licenced and regulated by the Engineering Council to award professional registration, accreditation and approve qualifications.

From 2022 we will focus our attention on providing a deeper and more value driven Member experience with one size no longer fitting all. Our strategy will focus on the retention, recruitment and engagement of our core Member segments:

- As a professional engineering institution – We will develop new programmes to improve retention and acquisition, improving the way we work as an organisation, whilst remaining mindful of our purpose and roles

- As a membership body - We will provide valued services to our Members that are relevant to their stage of career and location, and are regularly reviewed in consultation with our membership team

- As a learned society – We will bring together the community to develop its thinking and support the continuing strength of the industry, building stronger relationships with our Industrial and Professional Members

- As a Network – We will encourage Members to participate in the activities of the Institute and to contribute voluntarily to the development of the Institute via participation in the Board and Committees, through the Branch Network and by supporting and participating in the events and activities

We will work with our regulators, partners and stakeholders to:

- Be more diverse and inclusive

- Be more digitally innovative

- Continue to uphold ethical principles and sustainability

We are already working on some initiatives for 2022-2026, including:

- Collaborating with Industrial Membership to improve Member retention and acquisition

- We are teaming up with our Industrial Membership colleagues to grow Professional Membership within companies and strengthen these relationships to help Members keep ahead of the latest knowledge and practices locally, regionally, and globally and assist in personal career development and continuing professional development for all

- This will facilitate greater relationship opportunities, through deeper conversations around more topics across the company

- We will organically build greater awareness by making more connections from within their business, across global divisions

Globalising Technical Group Webinars/ Events

We are aligning the technical groups (TG) scope with current industry hot topics and consider non-UK chairs. Work closely with the technical groups co-ordinator and technical group chairs to deliver a fuller programme relevant to a global audience.

Increasing the number of global Members

Increasing the proportion of non-UK Members (currently 28%) by offering a membership relevant to and priced for the global regions.

Outcomes:

- IMS/PAG Collaboration – Increased Professional Membership globally within Member companies will strengthen relationships and improve the age demographic of our membership base

- Maximised Member retention – Increases ROI, boosts loyalty, and brings in new Members. Engaged Members contribute more frequently, and are more likely to act as ambassadors for the organisation. We will do this by talking to Members to understand what Members and non-Members need and want through surveys and effective targeted interactions. We will improve Member value by on-boarding and segmentation and keeping Members informed, whilst continuing to provide excellent Member service

- By widening technical group offering to include webinars/events on both fundamental and advanced topics, it will increase the value to Professional Members at various stages of their careers and introduce membership to non-Members via the AWeldI and TG package

Feedback:

- Industrial and Professional Membership collaboration - We already have new Member sign up; companies are positive about the new initiative; the membership teams are working closer together to improved benefit for Member companies and all involved are confident

- The introduction of webinars has meant a marked increase in attendance to include a more global audience and a new revenue/membership stream

- Global membership has been growing steadily, but there is an opportunity by working with other areas of TWI (Training,

Certification and Global Offices) to accelerate the process and increase the global brand awareness of The Welding Institute

Weaknesses:

- We are reliant on companies to provide contacts; Members may be hard to find/sign up

- We need more business analysis dedicating just as many resources to analysis to retain existing customers. We need to prioritise areas for development/improvement; improve operational efficiency; identify the best channels for interaction and engagement; target messages and communication; simplify and segment benefits to better suit the needs of Members

- It is difficult to recruit Technical Group Chairs and for them to commit to more events as their role is voluntary. There is also a problem with getting TG secretaries (traditionally TWI staff) as they are busy delivering projects in addition to which they need to book to a number

Opportunities:

- Increased professional membership in the working demographic, will offer new career paths and programmes within companies to provide cross company opportunities in training, certification and NSIRC

- Customer acquisition relies on our ability to reach and attract new audiences, customer retention is more about ongoing engagement, personalisation, and value to Members we work with already. The cost is less than the cost of customer acquisition; it also offers the opportunity to upsell and cross-sell and builds advocacy

- By widening the TG offering to include webinars/events on both fundamental and advanced topics, it will increase the value to Professional Members at various stages of their careers and introduce membership to non-Members via the AWeldI and TG package

- There is a great opportunity to increase the global membership but also for training and certification to add to their customer offering

TECHNOLOGY

RESEARCH STRATEGY
RESEARCH AND INNOVATION
OPERATIONAL STRATEGY

TECHNOLOGY PLAN

Industry Market Analysis

Member Feedback

The 2021 Industrial Member survey identified:

- The most valued areas of TWI expertise are metallurgy, non-destructive testing, arc processes, corrosion and structural integrity

- Areas for improvement to increase value were identified as:

  - On-time delivery
  - Translation of technology to give industrial benefit
  - CRP engagement with Members
  - Accessibility and ease of use of information
  - Communication of latest technologies

TWI has seen rising demand to address the following target market needs:

- The energy sector, as it transitions to wind, hydrogen and carbon capture, whilst repurposing and maintaining resilient oil and gas infrastructure

- The nuclear sector, as it seeks to manufacture new plant, whilst operating and decommissioning ageing facilities

- The transport sector, as it transitions to low carbon vehicles and exploits space

- The defence sector

- Supply chains offering innovative products, involving new materials and computer-enabled capabilities

Technology Products

The technology plan is based on the "Hedgehog Principle," i.e. sustainable business comes from a focus on the overlap of what you are deeply passionate about, what products drive your economic engine and what you can be the best in the world at.

TWI's Industrial Member products are:

- Expert advice

- Technical information and data

- Bespoke, confidential projects, requiring expert advice or interpretation

- Core Research programme

- Intellectual property

Non-Member products, include:

- Weld integrity standards

- Certification

- Training

- Weld quality assurance software and hardware

- Projects providing commodity services

- Collaborative research

TWI Staff: Deeply Passionate about Our Core Competence

TWI staff are deeply passionate about materials, welding, inspection and structural integrity, which allow us to fulfil the mission. TWI will preserve and build on the core competence to ensure TWI thrives, with the ambition to be leaders, Table 2.

Driving the Economic Engine by Differentiation of TWI from Competitors

TWI's ability to overcome difficult industrial challenges associated with weld integrity, differentiates it and creats demand, which drives single client work. This ability comes from deep understanding of microstructure- property relationships that determine weld integrity, developed by learning from each other and from industry.

Growth opportunities lie at the overlap of disciplines, where both expertise and laboratories are required. The vision for development to drive value creation and industrial Member business isillustrated in Table 2.

Investing in Being the Best in the World: Focusing our Knowledge, Capabilities and Products

The biggest opportunities are where there is a clear need and TWI has unique capability to address the need,Table 3. Hence, future investments will be focused on the overlaps of Tables 2 and 3.

Recruitment and progression will be redesigned to create diverse and inclusive teams, and to support staff in reaching their full potential.

TWI will ensure it remains the recognised leader in metal and non-metal weld integrity design, ECA and competence standards, during the transition to net zero.

Technology Plan Actions

- Culture development via the organisational design initiative, the HS&E culture and security improvement plans and integration of the R&D programme

- The core competencies and value proposition for staff will be developed via organisational design and a staff development programme leading to a cascade of technology leadership and clear career paths, to underpin staff progression and succession planning.

- Development of the existing strategic plans for (i) hydrogen, (ii) nuclear, (iii) polymers and composites, and (iv) digital technologies will focus on communicating them to key customers and seeking feedback. Additional plans will be created. Roadmaps will be co-created with key customers and Research Board, to align pursuit of the technology vision with addressing the market gaps

- Engagement of TWI technologists with industry will focus on communicating and translating the value of TWI capabilities and products, identifying opportunities and presenting

- TWI's future vision plans and R&D proposals to develop long term relationships

- Ensuring security of customer assets, notably information and developed IP, together with export control, are vital for maintaining key customer trust. TWI will continue to develop its security governance and risk management system in line with UK Government requirements.

- Capital and R&D investment will be focused on the technology vision and target market gapsto create a pipeline of differentiated new TWI capabilities, and products. The R&D programme will include exploratory, CRP, collaborative and commercialisation activities, supported by communication of TWI's track record and vision , together with proposals of how to realise the vision

- A new integrated management system will becdeveloped, built around TWI's core business processes, with appropriate tools to support staff, to drive order growth, on-time delivery and continuous improvement

- Further development of the hybrid operational model will address the need for staff interaction, including technicians and project leading staff, to exploit the differentiation and creativity at the overlap of individual technical disciplines

- Investments in IT and software will be focused on facilitating exchange of ideas and knowledge, creating technical links between staff and customers, demonstrating value and improving accessibility and utility of TWI information and data

Key Performance Indicators

- Industrial Member project income (SCP and JIP) to budget, including from key accounts, target sectors and repeat orders

- TWI technologist engagements with technologists in key customers and target sectors: measured by single company meetings, panel meetings and webinars

- Competent TWI technologists trained and future experts mentored

- Publications, including track record and foresight documents, R&D proposals addressing the target technology gaps, Member R&D deliverables, technical achievements and press releases, design, ECA and competence standards

SUSTAINABILITY & KEY CUSTOMERS DRIVING ENERGY AND TRANSPORT TRANSITIONS

MAKE

OPERATE

RE-USE OR DECOMMISSION

WELD, JOIN, COAT AND INSPECT

INSPECT, MONITOR AND MAINTAIN

REPAIR AND CUT

LABORATORY TESTING: MANUFACTURING AND SERVICE PERFORMANCE

STRUCTURAL INTEGRITY: DESIGN, ECA AND LIFE PREDICTION

MATERIALS MICROSTRUCTURE-PROPERTY RELATIONSHIPS AND FAILURE MODES

NEW MATERIALS AND COMPUTING CAPABILITY DRIVING NEW SOLUTIONS

Figure 12: TWI's Core Competencies and Alignment with Member Businesses and Industry Drivers

ENGAGE POTENTIAL CUSTOMERS, TO ESTABLISH NEEDS

PROPOSE TWI SOLUTIONS

COMMUNICATE VALUE OF TWI CAPABILITIES AND PRODUCTS

DELIVER TWI SOLUTIONS

Figure 13: The TWI Value Creation and Business Development Cycle

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Target Sector	Need that TWI ca
Resilient oil and gas assets	*Short term need: testi… fracture of metals, inclu…
Energy sector transition from metallic to polymer/composite and flexible pipes	*Short term need: testi… developments
	Long term need: greate… new, high integrity prod…
Energy sector transition to a hydrogen economy, including space	*Short term need: testi…
	Long term need: increa… standards for high integ…
Energy sector transition to wind turbines	Short term need: fatigu…
	Long term need: improv… conservatism in design …
Nuclear industry	Short term need: high a…
	Short term need: desig…
	Short term need: applic… reactor materials and g…
	Long term need: remot…
	Long term need: new m…
	Long term need: afford…
Transport transition and electric vehicles	Short term need: applic… with adequate integrity …
Space sector	Short term need: high a…
	Long term need: transf… latest methods
Energy and transport	Long term need: autom…
Energy and transport	Long term need: charac… and additively manufact…
Various sectors being led by supply chains	Long term need: high in…
	Long term need: exploit…

Table 3

ng of metals to establish effects of hydrogen from sour service on fatigue and
ding mechanically lined pipes

ng of polymers to generate permeation data in support of new pipe product

r understanding of polymer/composite permeation and degradation, to facilitate
lucts, monitoring and life prediction methods, and associated integrity standards

ng for weld and material qualification in hydrogen gas at low and high pressure

sed understanding of failure modes, to underpin new design, qualification and ECA
grity metal, non-metal and mixed material products

e data for welds in thick sections, EB welds, bolts and nodal joints

ved understanding and new fatigue design approaches for monopoles, to reduce

accuracy characterisation of difficult to inspect welds

n of high integrity welds for modular manufacture for the Rolls-Royce SMR

ation of the latest manufacturing and monitoring capabilities to difficult fusion
eometries, to lower the costs of manufacture for UKAEA and ITER

e manufacturing, inspection and disassembly technologies

nanufacture methods to reduce supply chain lead times

able, high integrity manufacturing for waste canisters

ation of laser and friction stir technologies to high speed, low distortion welding
for electric vehicle battery assemblies

accuracy inspection of difficult to inspect welds

ormational manufacture of high integrity, lightweight structures exploiting the

nated, robotic, high resolution and rapid inspection of welds of high significance

terisation and understanding of degradation of polymers, composites, powders
tured parts

ntegrity polymer and composite products and joints

tation of digital technologies for data utilisation and control

*3: Target Market Gaps Based on Overlap of Industry Demand and TWI Capability. Asterisk
Indicates an Immediate Priority.*

RESEARCH AND INNOVATION

TWI Core Research Programme

TWI's core research programme (CRP) addresses technical challenges in the operating environment that TWI's Industrial Member companies are experiencing and benefits from cross-sector insight. We recognise that a diverse workforce underpins innovation and we embrace the different perspectives our people contribute towards find novel solutions for our customers.

In 2021, a strategic review and technology mapping identified the most pressing challenges facing TWI Industrial Members and/or the sectors they operate in, and how these might be most effectively tackled. The industry drivers and priorities were identified as:

- Digitalisation and Data: real-time data capture to enable more rapid understanding of mature inspection and monitoring techniques, automation including defect recognition and classification
- Smart Manufacturing: enhancement of additive manufacturing (AM) processes, materials, in-process monitoring and integrity, digital manufacturing, optimization an zero waste
- New Materials and Circular Economy: improved understanding of properties, damage mechanisms, flaw detection, integrity management, joining techniques and recyclability
- Net-zero: applications towards low carbon processes, hydrogen transport and storage, energy transition and decarbonisation

To deliver the best possible benefits to TWI Industrial Members, the five year targets are:

- Better engagement with Members including; involving them in shaping the next proposal call; launching a customer satisfaction process; developing an impact database to ensure the CRP continues to delivers value; and continuing to build on CRP marketing and dissemination activities
- 50% of CRP projects to be turned into commercial (SCP/JIP) projects (long term goal: 100%)
- Achieve IP status and patent protection to enable exploitation of CRP projects into new technologies, systems, products and processes for commercialisation
- Advance the commercialisation stage through to licensing through third parties and spin-offs to further exploit the technologies
- Establish a plan for return on investment (ROI) in 2022

Technology Innovation 2022-2026 Objectives

TWI's route to innovation utilises a research to commercialisation approach. The Innovation Hub will be established in 2022 to conduct activities such as exploratory programmes, technology R&D and exploitation.

Exploratory

- Explores and assesses the technical feasibility and commercial potential of a breakthrough innovation in an industry
- Could cover risk assessment, market study

CRP Roadmap

DIGITALISATION AND DATA
- AUTOMATED INSPECTION AND REMOTE MONITORING
- USE OF HISTORICAL DATA
- SIMPLIFIED SOFTWARE FOR SIMULATION AND FEA
- DIGITAL TWIN

SMART MANUFACTURING
- ADDITIVE MANUFACTURING PROCESS MONITORING
- MOBILE/REMOTE REPAIR AND VALIDATION
- MANUFACTURING QUALITY ASSURANCE AND IN-PROCESS EVALUTION

NEW MATERIALS
- MATERIALS PERFORMANCE
- STRUCTURAL INTEGRITY FOR HYDROGEN APPLICATIONS
- RECYCLABILITY OF MATERIALS

NET ZERO
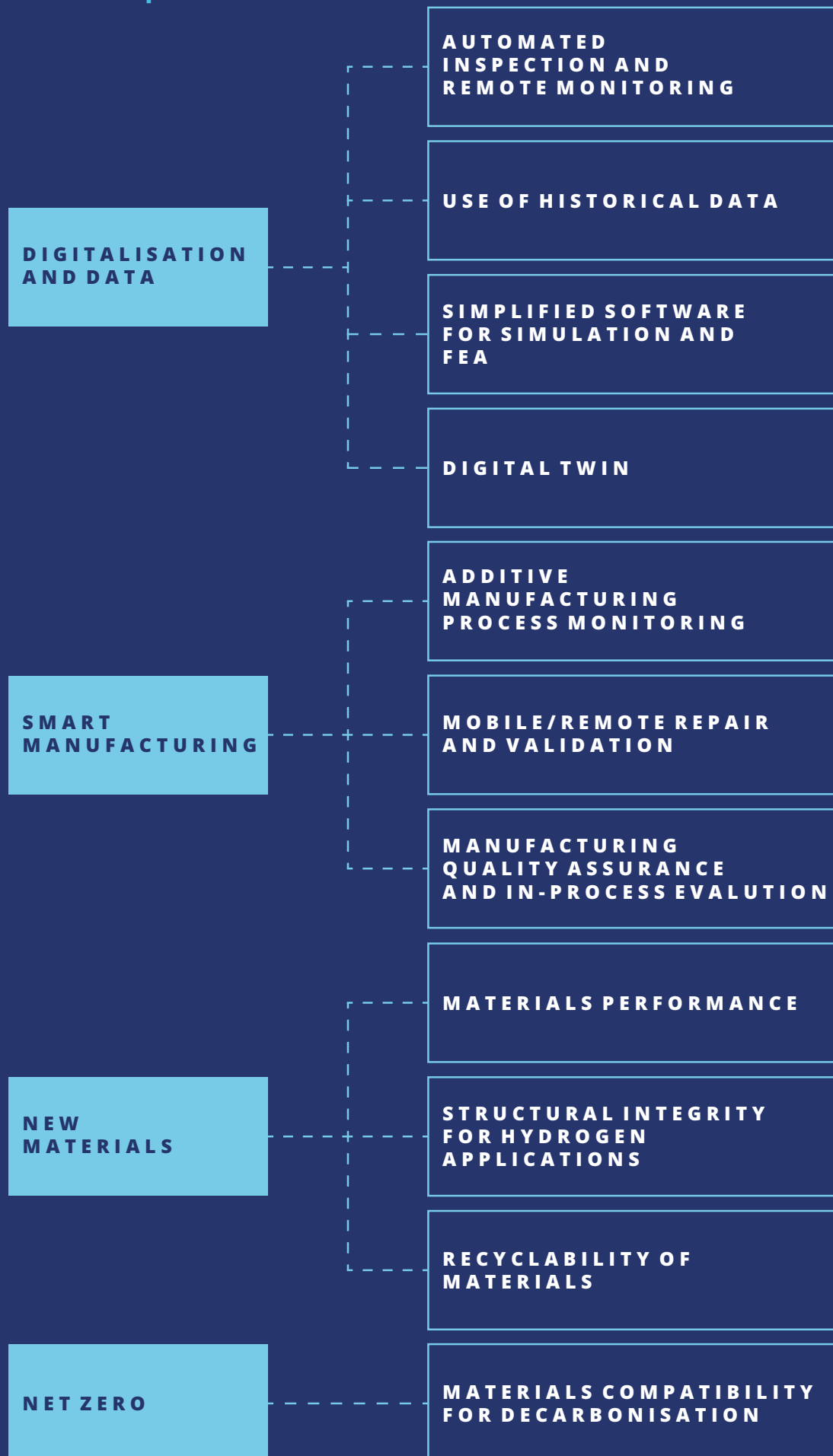- MATERIALS COMPATIBILITY FOR DECARBONISATION

Figure 14: CRP Roadmap

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or intellectual property, or a new application of existing technologies
- Open to Innovation Centres (will be negotiated so that IP belongs to TWI)
- Seed fund up to £25k each, up to 6 months for generation of new opportunities or IP

Core Research

- Proven product, process, service development that will be launched on the market
- Includes trials and validation, and considers scale-up of development
- Business innovation plan incorporating a detailed commercialisation strategy and how to exploit / attract investors
- Up to 15 projects selected p.a, £120k (maximum) p.a. per project with usual duration of 1-2 years
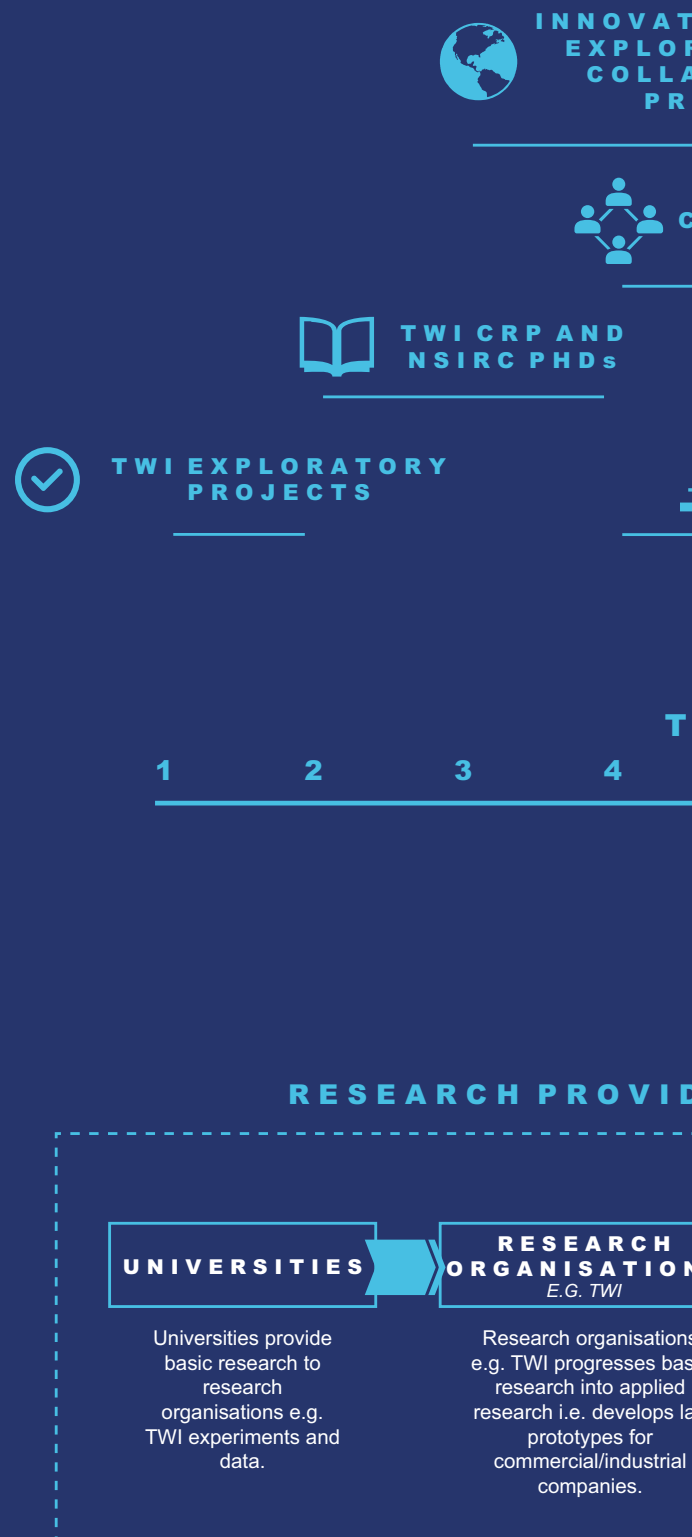
Technology Exploitation and Commercialisation)

- Single client projects (SCP)
- Proven product, process, service development that will be launched on the market
- Includes trials and validation, and considers scale-up of development
- Business innovation plan incorporating a detailed commercialisation strategy and how to exploit / attract investors
- Up to £120k p.a. per project with usual duration of 1-2 years
- If directly aligned to TWI's core business, explore direct equity investment in to companies

TWI Innovation Network (TWIIN): Unifying Industry Collaboration

TWIIN is a collaborative ecosystem bringing together the innovation initiatives and activities of TWI, and its industry and academic associates. TWIIN develops international partnerships, enabling engineering based, technological advances across industry sectors in response to commercial needs, and facilitates the training and up-skilling of the next generation of industry experts.

TWIIN: 2022 – 2026 Objectives

The network will continue to build on its centres and programmes, bringing new technologies, systems and services to market, to the benefit of TWIIN partners and TWI Industrial Members, and wider industry, specifically:

INNOVAT...
EXPLOR...
COLLA...
PR...

TWI CRP AND NSIRC PHDs

TWI EXPLORATORY PROJECTS

1   2   3   4

RESEARCH PROVID...

UNIVERSITIES

Universities provide basic research to research organisations e.g. TWI experiments and data.

RESEARCH ORGANISATION...
E.G. TWI

Research organisations e.g. TWI progresses bas... research into applied research i.e. develops la... prototypes for commercial/industrial companies.

TWI Technology Readiness Levels (TRL)

TION CENTRES
RATORY AND
ABORATIVE
OJECTS

TWI
COLLABORATIVE
PROJECTS

TWI CERTIFICATION
AND TRAINING

TWI SCP AND
JIP

SPIN-OUTS /
LICENCING

RL LEVEL:

5   6   7   8   9

INDUSTRIAL /
COMMERCIAL
COMPANIES

DERS

RESEARCH
ORGANISATIONS
AND
UNIVERSITIES
(TWI)

NS

s

sic

ab

provide lab prototypes to
SMEs. SMEs convert
these to products and
services to sell to LEs.

SMALL
ENTERPRISE

MEDIUM
ENTERPRISE

LARGE
ENTERPRISE

OUTPUTS FOR
ECONOMY
(DELIVERABLES
FOR FUNDING
BODIES)

Sales of products and services
by SMEs. Output is £s of sales
from SMEs. UK and EU SMEs
get greater market share
worldwide.

Job creation in SMEs and their
supply chain. UK and EU
industrial / commercial jobs are
created.

Savings and improved
productivity for LEs business
because they are using latest
technology (products and
services) provided by SMEs.

Figure 15: TWI Technology Readiness Levels (TRLs)

- Innovation Centres – expand the number of centres by two per annum, based on the virtual model, focused on the technology areas identified by TWI Industrial Members, and R&D spanning TRLs 4-6, via new agreements with existing or prospective university partners
- Technology Acceleration Programme (TAPs) Members – increase the number of subscribing TAPs Members from 30 SMEs to 130 by the end of 2026, achieving 20 new subscribers per annum focused on R&D spanning TRLs 4-9
- Private Technology Innovation Partnerships (PTIPs) – create 2-3 new PTIPs over five years between TWI and an international or multi- national company or organisation, focused on R&D with academia, RTOs, industry operators and supply chains, and spanning TRLs 4-9
- Collaborative Innovation Partnerships (CIPs) – develop this new model (2021) to achieve 2-3 new CIPs per annum with large enterprises in the UK and internationally, focused on TRLs 3-7
- European Innovation Centre (EICs) – develop this new model (2021) to achieve three new EICs per annum with RTOs based in Europe, such as university industrial centres and research institutions, focused on TRLs 3-6
- TWI Hellas – achieve 5% growth per annum for each of EU public funding secured, the associated collaborative projects and the number of partners supported respectively, focused on TRLs 1-6. Utilise the outputs from the R&D projects to develop new SCPs with approximate £1m target by 2026
- TWIIN events – continue to deliver per annum: an annual NSIRC conference; an annual TWIIN summit, a minimum of four research and innovation brokerage partner matching workshops (matching TWI Industrial Members with collaborative projects); and a minimum of six TAPs Members seminars

National Structural Integrity Research Centre (NSIRC): 2022-2026 Objectives

NSIRC was established in 2012 by founding partners Lloyd's Register Foundation and TWI as a postgraduate engineering facility to bridge the gap between academia and industry. Based in Cambridge and managed by TWI, NSIRC offers structural integrity related PhDs and MScs which advance fundamental research with real world applications in industry. In the next five years NSIRC aims to:

- Establish 20 PhDs with international subsidiaries in collaboration with local universities and government agencies
- Secure R&D funding up to £300k within five years
- Upskill local teams with state of the art R&D capabilities
- Attract 15 PhD students to start their qualification per annum
- Secure £1M worth of funding from industry and/or government bodies within five years for studentships

OPERATIONAL STRATEGY

Technology Group Operational Strategy

Introduction

This section provides an overview of the functional arrangements and management processes of TWI's technology group. These systems together form the operational strategy of the group, underpinning its capabilities and providing a framework for delivery of the mission.

Scope of Services

TWI's technology group is an engineering research business with expertise in joining technologies, materials and structural integrity. The group exists to support TWI's Industrial Member companies Figure 16 illustrates the primary value adding activities of the group.

Organisational Structure

The technology group has annual revenues of approximately £40m and a complement of around 300 staff (2021 position). The business includes 20 technical sections, structured into 4 main groups. The structure of the directorate is shown in Figure 17. A schematic of the group's core behaviours and priorities is provided in figure 18

Value Proposition

The technology group's value proposition can be described as:

"Trusted Advisor for Joining, Materials and Structural Integrity"

The group seeks to be world-leading in its areas of expertise, and has built a strong reputation for such. TWI's work includes the invention/development of novel technologies and knowledge, which helps to sustain this reputation.

Considering our key dimensions of value, figure 4 shows the main elements that support client perceptions of TWI's technology group being a trusted advisor with world-class capabilities.

It is recognised that the technology group's services are experienced by its client's employees. Client value judgements are influenced by their expectations, their perceptions of working with TWI, and by the actual value delivered. Managing the customer experience and developing customer empathy is a vital element in the group's service delivery.
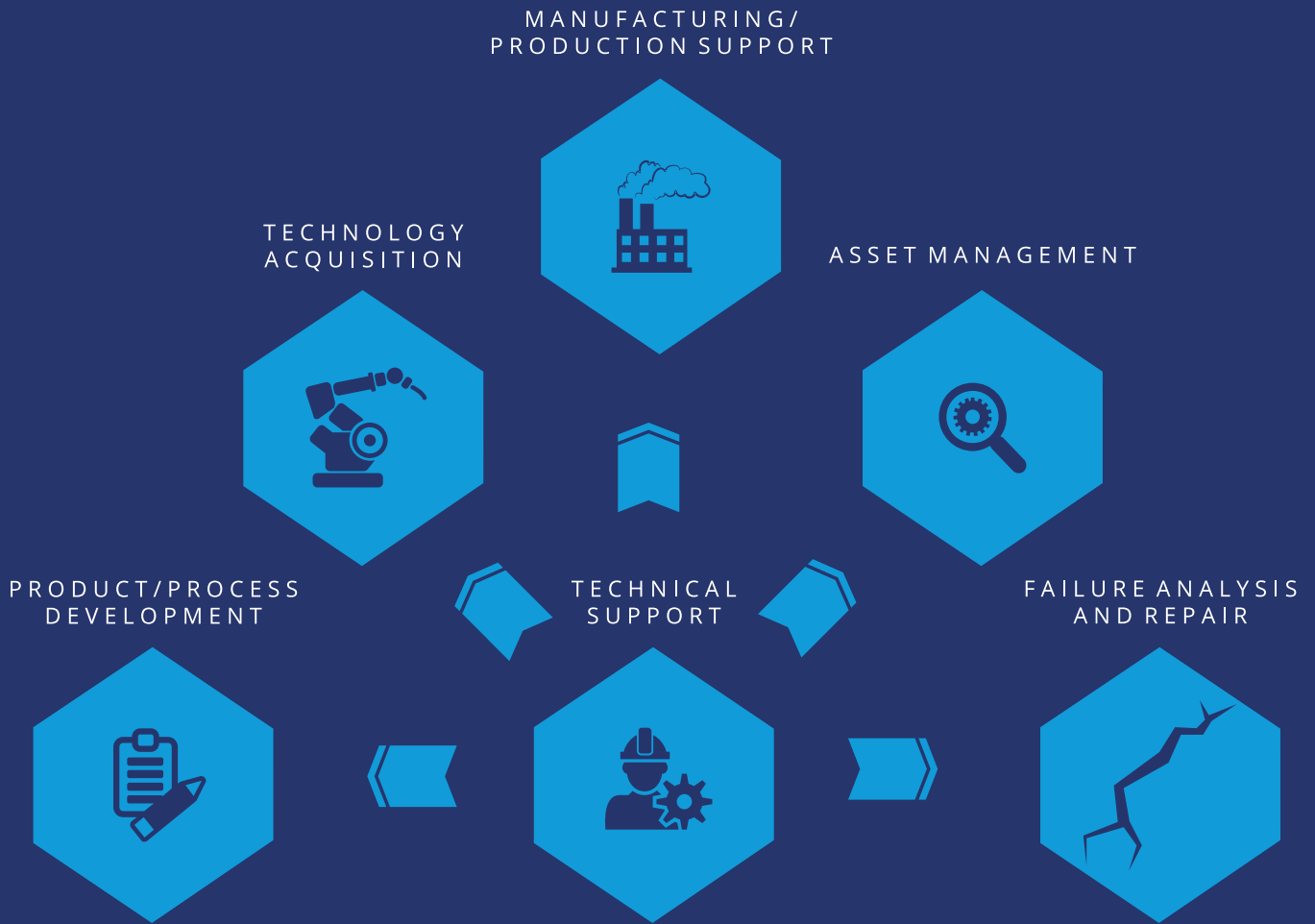
MANUFACTURING/
PRODUCTION SUPPORT

TECHNOLOGY
ACQUISITION

ASSET MANAGEMENT

PRODUCT/PROCESS
DEVELOPMENT

TECHNICAL
SUPPORT

FAILURE ANALYSIS
AND REPAIR

Figure 16: Support and Services Provided by TWI's Technology Group

**DIRECTOR:
TECHNOLOGY**

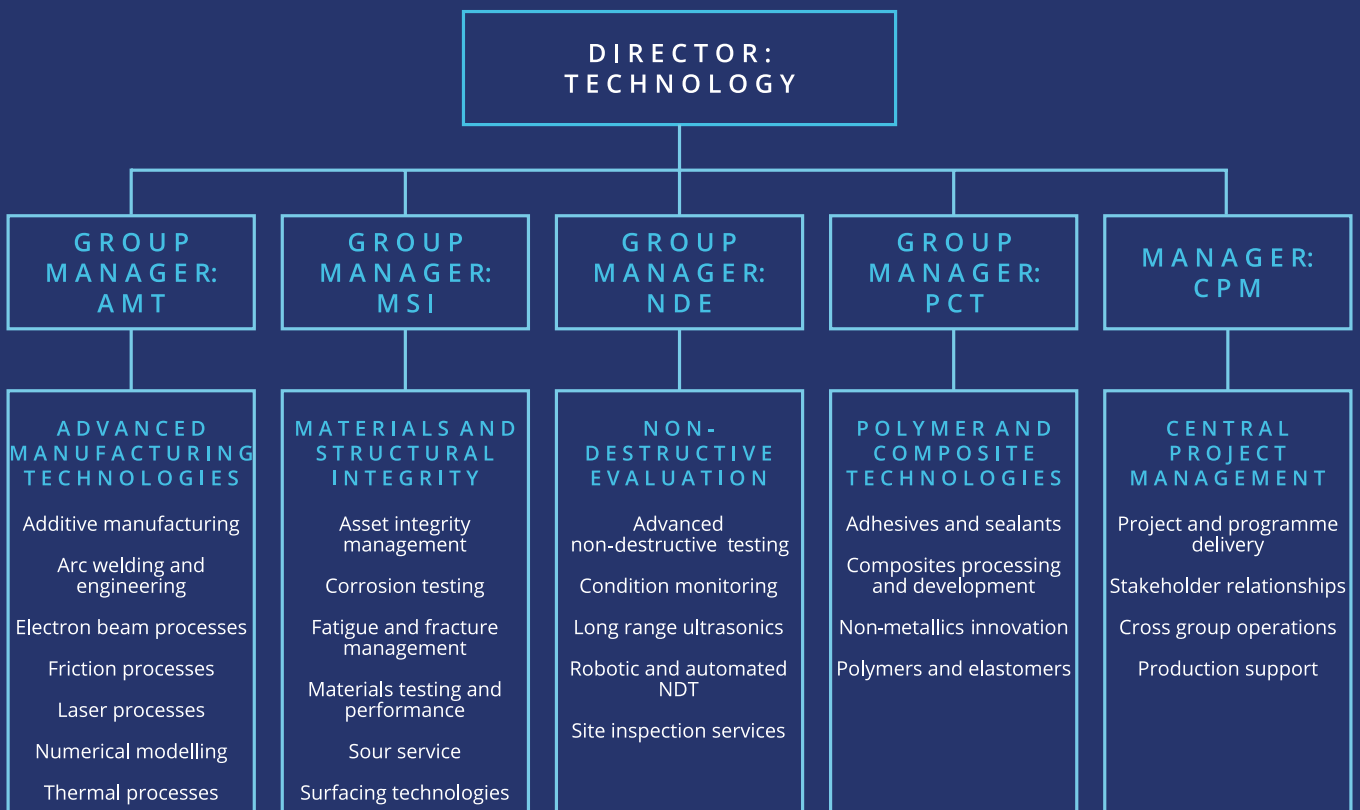| GROUP MANAGER: AMT	GROUP MANAGER: MSI	GROUP MANAGER: NDE	GROUP MANAGER: PCT	MANAGER: CPM
ADVANCED MANUFACTURING TECHNOLOGIES	**MATERIALS AND STRUCTURAL INTEGRITY**	**NON-DESTRUCTIVE EVALUATION**	**POLYMER AND COMPOSITE TECHNOLOGIES**	**CENTRAL PROJECT MANAGEMENT**
Additive manufacturing	Asset integrity management	Advanced non-destructive testing	Adhesives and sealants	Project and programme delivery
Arc welding and engineering	Corrosion testing	Condition monitoring	Composites processing and development	Stakeholder relationships
Electron beam processes	Fatigue and fracture management	Long range ultrasonics	Non-metallics innovation	Cross group operations
Friction processes	Materials testing and performance	Robotic and automated NDT	Polymers and elastomers	Production support
Laser processes	Sour service	Site inspection services		
Numerical modelling	Surfacing technologies			
Thermal processes				

Figure 17: Technology Group Structure

Key Processes

The core process that underpin the operations of the technology group are described in Table 4. Links to other operational teams and systems are noted where relevant.

Profitability Growth

Looking forward, the technology group is targeting four main areas where there is considered to be good potential to improve operational profitability. These priority areas, and the supporting actions by the group, are shown in Figure 20.

With these measures, and the framework of processes described above, TWI's technology group aims to achieve >10% profitability (on labour income) over the lifetime of this plan. Achievement of this position will ensure sustainability for the technology group and will support ongoing delivery of TWI's mission by the largest function of the core business.
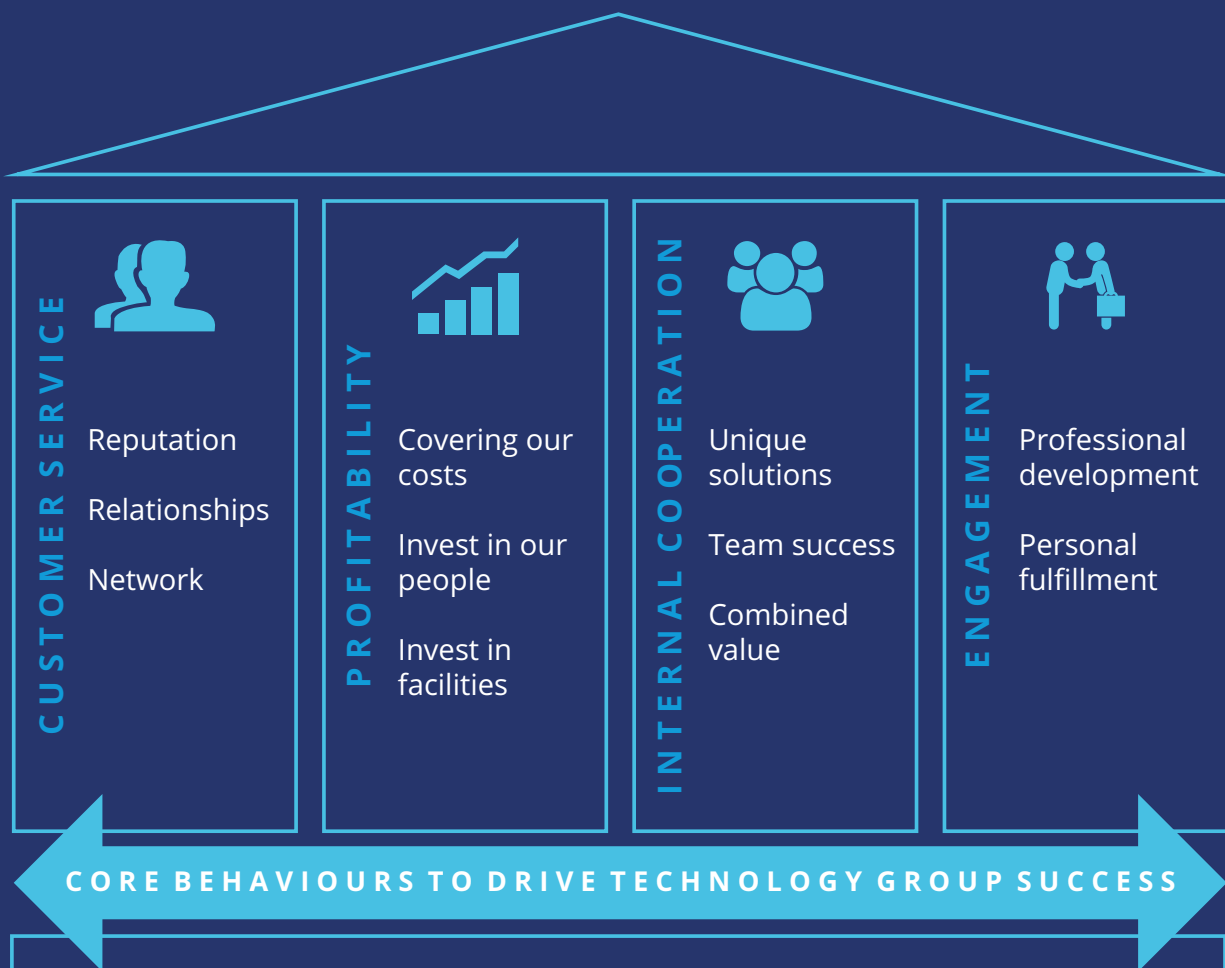

CUSTOMER SERVICE

Reputation

Relationships

Network

PROFITABILITY

Covering our costs

Invest in our people

Invest in facilities

INTERNAL COOPERATION

Unique solutions

Team success

Combined value

ENGAGEMENT

Professional development

Personal fulfillment

CORE BEHAVIOURS TO DRIVE TECHNOLOGY GROUP SUCCESS

Figure 18: Technology Group Core Behaviours

STRONG REPUTATION AND WORLDWIDE NETWORK OF ADVOCATES

ESTABLISHED RECORD OF SOLVING PROBLEMS AND ADDING VALUE

WORLD-CLASS PEOPLE, EQUIPMENT AND FACILITIES

EXCELLENT CUSTOMER SERVICE AND CLIENT EXPERIENCE

INDEPENDENCE, IMPARTIALITY, SECURITY AND CONFIDENTIALITY

LEADING PRESENCE IN INTERNATIONAL BODIES AND EVENTS

EFFECTIVE DIGITAL PRESENCE AND MULTICHANNEL MARKETING

Figure 19: Dimensions of Value for TWI's Technology Group

IMPROVE COLLABORATIVE POSITION	IMPROVE SCP MARGINS	DELIVER TO TARGET	REVIEW OPERATIONAL COSTS
ACTIONS TO REDUCE IN SOME CASES	COST ACCURATELY	IMPROVE WORK PLANNING	OPTIMISE OFFICE SPACE USE
ALIGN MORE WITH CRP	PRICE WELL AND NEGOTIATE	IMPROVE CHANGE CONTROL	OPTIMISE LAB SPACE USE
IMPROVE APPROVAL PROCESS	MOVE TO LARGER PROJECTS	FOCUS PM SUPPORT ON COMPLEX SCPS	REVIEW COST BY SECTION

Figure 20: Figure 20: Areas of Focus to Drive Profitability Improvement

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	Process	Scope	Links/Support
1	Market Understanding	Key clients, relationships and opportunities Competitive threat and positioning	BD & TG team: Market awareness BGMs/DRS: Key future themes Cooperatition
2	Technology Theme Maps	Mapping of needs vs capabilities Investment plans (CRP, Collab, Expl.)	BGMs: TRL oversight/review Res. and I&S Dir: internal investment
3	Focused Offering	Definition of key technical areas Appointment of theme leads/ teams	Tech. Dir. and BGMs: Focus areas BGMs/teams: Theme roadmaps
4	Route to Market (RtM)	RtM plans, content Marketing programme	BD/MPP teams: Support and systems
5	Enquiry Handling	Enquiry handling and Proposal generation Costing and pricing	BD, CRM, legal and QAS systems Sign off & admin processes/ support off processes and admin
6	Project Acceptance	Order review and Work planning/ scheduling Client comms/management	Legal/CPM/Lab teams: Support SMs/BGMs: Oversignt/Support BGMs: Oversight/Support
7	Project Delivery	Project management Client comms/management	SMs & CPM: Expertise and support BGMs.DRS : Oversight/support
8	Client Relationships	CSS process and CRM tools Winning of follow-on/further orders	CSS and CRMCRM teams: Support BD team, SMs, BGMs, DRS; : Support

Table 4: Technology Group Core Processes

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GLOBAL TRAINING AND TECHNICAL SOLUTIONS

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GLOBAL TRAINING AND TECHNICAL SOLUTIONS

Global Training and Technical Solutions

The global development directorate provides training and technical solutions through a number of regional hubs in strategic locations globally.

Multidimensional Growth Plan

A TWI methodology (Figure 21) based on the Ansoff Matrix was used to structure the interactive sessions for business growth strategy.

Strategy sessions were hold with members of the global team and a product, service and location prioritisation exercise was conducted using a directional policy matrix (DPM) as illustrated in Figure 22. Each course, service and location on the development list was assessed on its relative competitive position in the market and its market attractiveness based on projected sales volume globally.

Global Training

TES Global Strategy Map

Customer Value Proposition: Product Leadership - Unrivalled, world-class training, and competence of successful students.

Internal Perspective: To operate as one global team, collaborating across business and technical boundaries.

People and Culture Perspective: Recruit, train and retain multi-lingual, competent and motivated team players and develop customer admin team to re-shape themselves mainly into a career advisor who provides advice on career progression opportunities to the candidates.

IT and Systems Perspective: Enhance productivity and service and generate competitive advantage through technology. Maximise utilisation of capabilities from Achiever, Surpass and Kallidus.

Global Training Top 5 Priorities:

1. To offer an unprecedented competitive advantage by improving customer journey through utilisation of Achiever, Surpass and with assistance from customer services, e.g. less than one working week turnaround time for all exam results through a completely paperless operation by 2025. The details of the process is demonstrated in Figure 23.

2. To deliver exceptional customer value through blended learning on TWI Virtual Academy.

3. Global market penetration (i.e. attracting increased candidates to CSWIP) and market

PRODUCTS

	EXISTING	**NEW**
NEW	**MARKET DEVELOPMENT** • New Sales area • New Sector • Buying competitors	**DIVERSIFICATION** • Create new business units • Acquisition • Technology / facility share
EXISTING	**MARKET PENETRATION** • Productivity • Marketing • Collaboration • Quality	**PRODUCT DEVELOPMENT** • R&D investment • Buy-in products

MARKET

Figure 21: Ansoff Matrix

OUR RELATIVE COMPETITIVENESS

	LOW	**MEDIUM**	**HIGH**
HIGH	MAINTAIN SELECTIVELY	BUILD SELECTIVELY	BUILD AGRESIVELY
MEDIUM	PROVE VIABILITY	MAINTAIN SELECTIVELY	BUILD SELECTIVELY
LOW	DIVEST / LIQUIDATE	COMPETITIVE HARASSER / DIVEST	PROVE VIABILITY

MARKET

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Figure 22: Directional Policy Matrix (DPM)

development (i.e. moving into new territories using International Skills Enhancement Programme (ISEP) initiative where industry or individuals cannot afford training fees (e.g. Indonesia).

4. To further expand regional territories by opening office/appointing active training representative in new countries where industry or individuals *can* afford training fee (e.g. ME, Central Aisa).

5. To develop strong CSWIP/training products in response to market demand including apprenticeship schemes in the UK. Priorities include:

> **a.** Welding Engineering Diploma through Apprenticeship Scheme

> **b.** Global wind organisations (GWO) basic safety training

> **c.** Senior plant inspector

Southeast Asia Skills Enhancement Programme (SEASEP)

The current programme, 'Southeast Asia Skills Enhancement Programme' (SEASEP) is an initiative aiming to up-skill under represented individuals within selected countries, with the aim of improving critical infrastructure inspections, reducing infrastructure failures, and thus reducing the potential of fatalities and injury. The first phase adopted in both Indonesia and India was awarded a £2m charitable investment by LRF and matched by TWI in kind.

TWI is approaching the second phase application with the Lloyd's Register Foundation (LRF) to deliver a vocational training programme in other selected countries/regions with a further potential of a £3m investment by LRF, to be once again matched by TWI in kind. SEASEP is part of a larger programme called International Skills Enhancement Programme (ISEP) which enables programmes like SEASEP to be delivered in other parts of the world e.g. countries in Africa.

Global Training Growth strategy on Directional Policy Matrix (DPM)

Figure 24 provides the summary of global training strategy sessions outcome on DPM. The main actions include:

1. Enhance/build TWI training facilities in Chennai and Kuala Lumpur

2. Establish apprenticeship training centre in Cambridge and Middlesbrough

3. Review the existing TWI training establishment in China and propose an alternative set up in light of the recent growth in training business in China

4. Develop new training in renewable energy in conjunction with Global Wind Organisations (GWO)

Global Technical Solutions (GTS)

GTS brings value and income which TWI would not have otherwise had through their UK offices. GTS has currently turnover of less than £4M (forecast, <5% of the group income). The aim is to expand the income significantly over the next three years with the vision of growing the business to £5M by 2025.
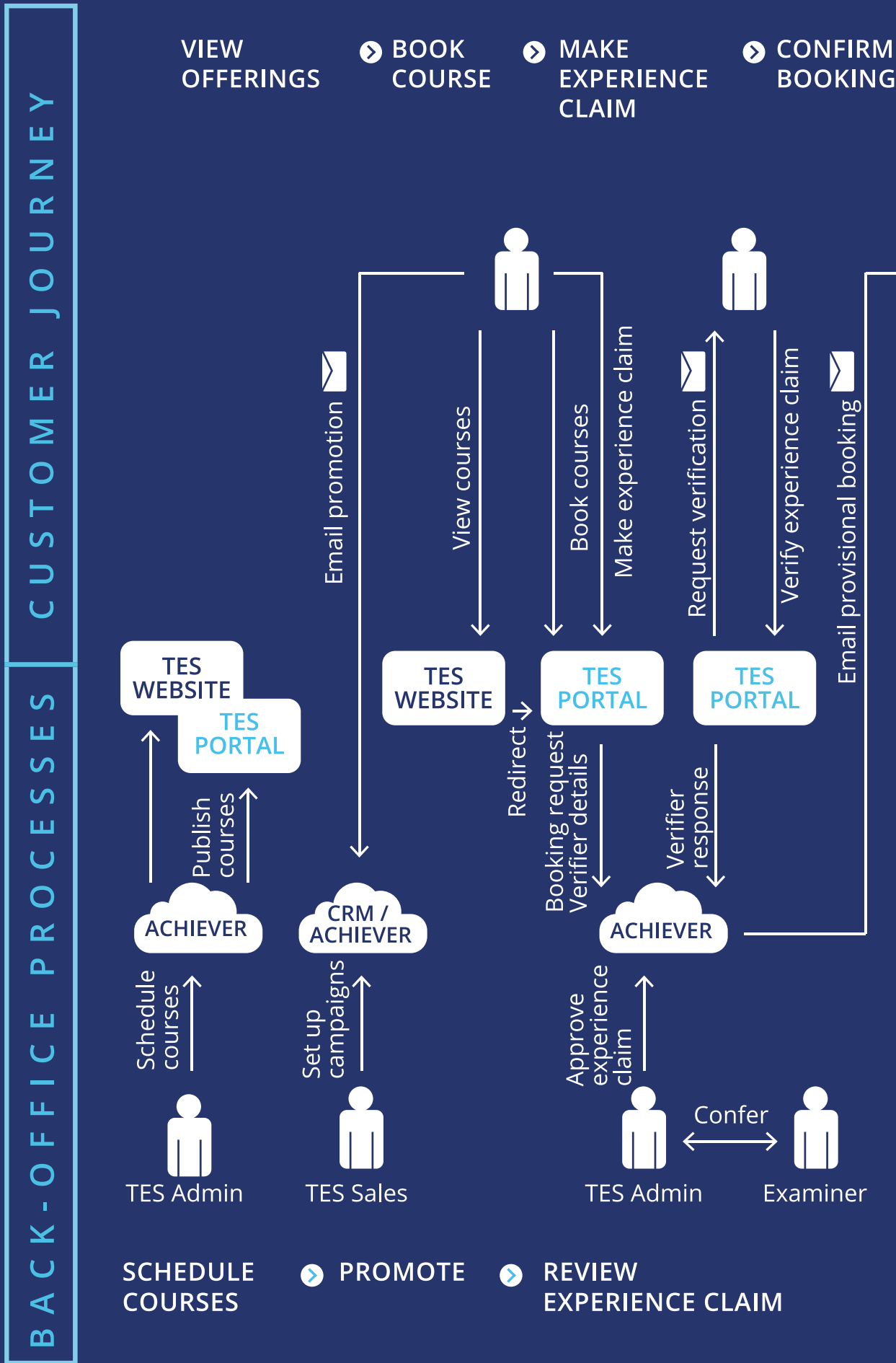
GTS Strategy Map

Customer Value Proposition: Product leadership - Unrivalled, world-class engineering solutions and clients' safer asset

Internal Perspective: To operate as one global team, collaborating across business and technical boundaries by creating a global network of competent engineers from TWI international offices

People and Culture Perspective: Recruit, train and retain multi-lingual competent and motivated team players

IT and Systems Perspective: Enhance productivity and service and generate competitive advantage through technology
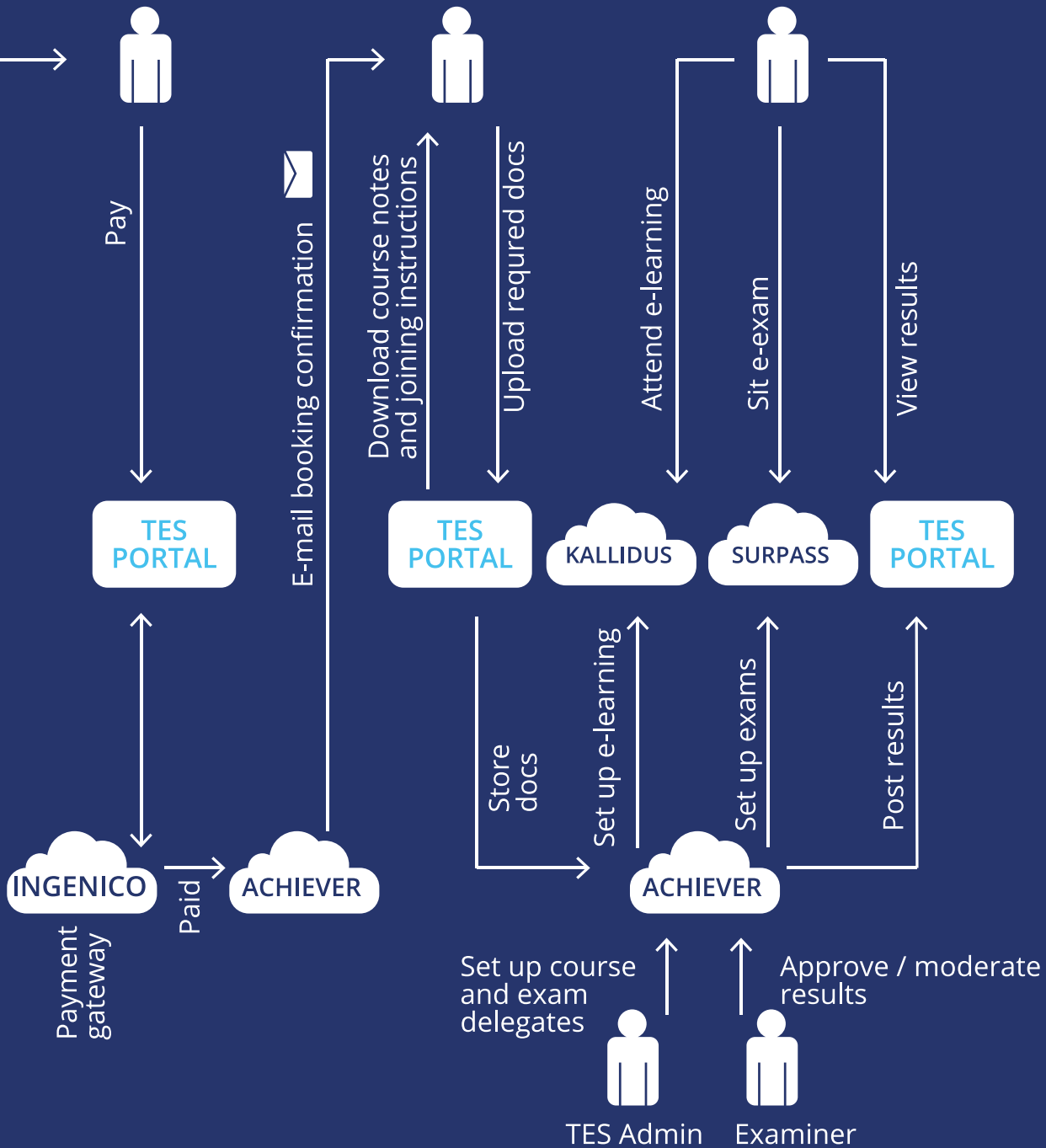
CUSTOMER JOURNEY

BACK-OFFICE PROCESSES

VIEW OFFERINGS

BOOK COURSE

MAKE EXPERIENCE CLAIM

CONFIRM BOOKING

Email promotion

View courses

Book courses

Make experience claim

Request verification

Verify experience claim

Email provisional booking

TES WEBSITE

TES PORTAL

TES WEBSITE

TES PORTAL

TES PORTAL

Publish courses

Redirect

Booking request Verifier details

Verifier response

ACHIEVER

CRM / ACHIEVER

ACHIEVER

Schedule courses

Set up campaigns

Approve experience claim

Confer

TES Admin

TES Sales

TES Admin

Examiner

SCHEDULE COURSES

PROMOTE

REVIEW EXPERIENCE CLAIM

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GET COURSE DETAILS, UPLOAD DOCS

ATTEND COURSE AND SIT EXAM

FETCH RESULTS

AWAIT CERTIFICATION

Pay

E-mail booking confirmation

Download course notes and joining instructions

Upload requred docs

Attend e-learning

Sit e-exam

View results

TES PORTAL

TES PORTAL

KALLIDUS

SURPASS

TES PORTAL

INGENICO

Paid

ACHIEVER

Payment gateway

Store docs

Set up e-learning

Set up exams

Post results

ACHIEVER

Set up course and exam delegates

Approve / moderate results

TES Admin

Examiner

SET UP E-EXAMS

REVIEW AND POST RESULTS

HAND OVER TO CSWIP

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Figure 23: Training Customer Journey

GTS Top 5 Priorities:

1. Creating a global network of competent engineers from TWI regional offices, on the ground, to face the client on a daily basis providing them with world class engineering solutions.

2. Establishing a sustainable source of income through relationship with major national O&G organisations (e.g. ADNOC, Petronas, QP, Pertamina, SOCAR, etc.) whilst providing them with high quality and fast response services.

3. Develop machine learning capabilities in RiskWISE© to turn it to a smart decision making tool for asset integrity management (AIM).

4. Partner with asset integrity management (AIM) software providers (eg. Siemens and Antea) to make competitive advantage for large AIM tenders.

5. Capitalise on our international outreach and R&D opportunities, including engagement with Research Board, and Professional Members' opportunities

GTS Growth strategy on Directional Policy Matrix (DPM)

Figure 25 provides the summary of GTS strategy sessions outcome on DPM. The main actions include:

1. Increase the share capital for Indonesia to obtain large enterprise (LE) status to enable the business to participate in large engineering tenders (> £1M)

2. Recruit competent engineers in UAE to build the critical mass composed of competent engineers and sustain on the ground delivery of large projects in hand.

3. Develop a team of RiskWISE© experts in Kuala Lumpur.

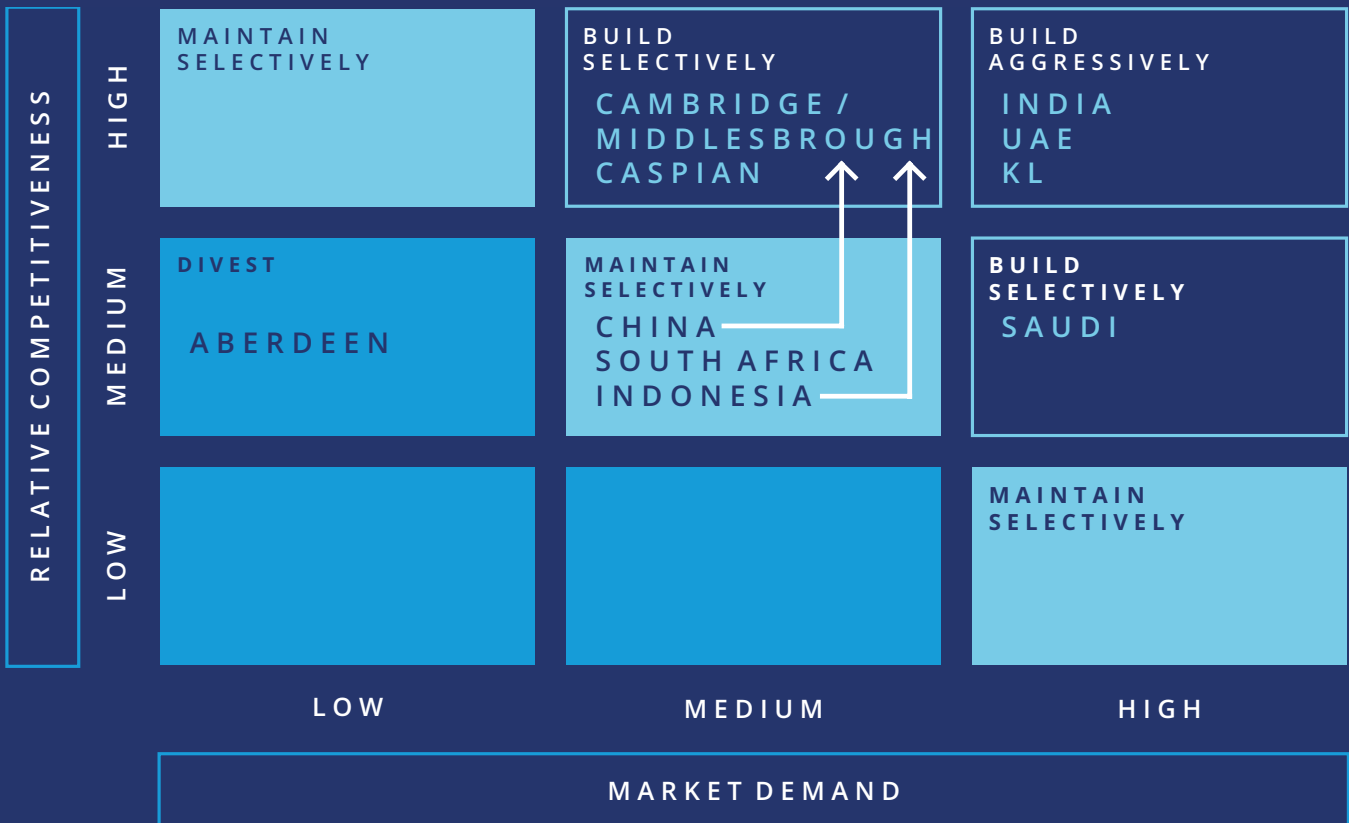# Global Training Growth strategy on Directional Policy Matrix

RELATIVE COMPETITIVENESS

HIGH
- MAINTAIN SELECTIVELY
- BUILD SELECTIVELY — CAMBRIDGE / MIDDLESBROUGH CASPIAN
- BUILD AGGRESSIVELY — INDIA UAE KL

MEDIUM
- DIVEST — ABERDEEN
- MAINTAIN SELECTIVELY — CHINA SOUTH AFRICA INDONESIA
- BUILD SELECTIVELY — SAUDI

LOW
- (empty)
- (empty)
- MAINTAIN SELECTIVELY

Market Demand axis: LOW — MEDIUM — HIGH

MARKET DEMAND

Figure 24: Global Training Growth Strategy on Directional Policy Matrix

Global Technical Solutions (GTS) Engineering Growth strategy on Directional Policy Matrix

RELATIVE COMPETITIVENESS

HIGH
- BUILD SELECTIVELY
- BUILD SELECTIVELY
- BUILD AGGRESIVELY

MEDIUM
- (empty)
- MAINTAIN SELECTIVELY — KL CASPIAN
- BUILD SELECTIVELY — UAE INDONESIA

LOW
- (empty)
- (empty)
- PROVE VIABILITY — INDIA

Market Demand axis: LOW — MEDIUM — HIGH

MARKET DEMAND
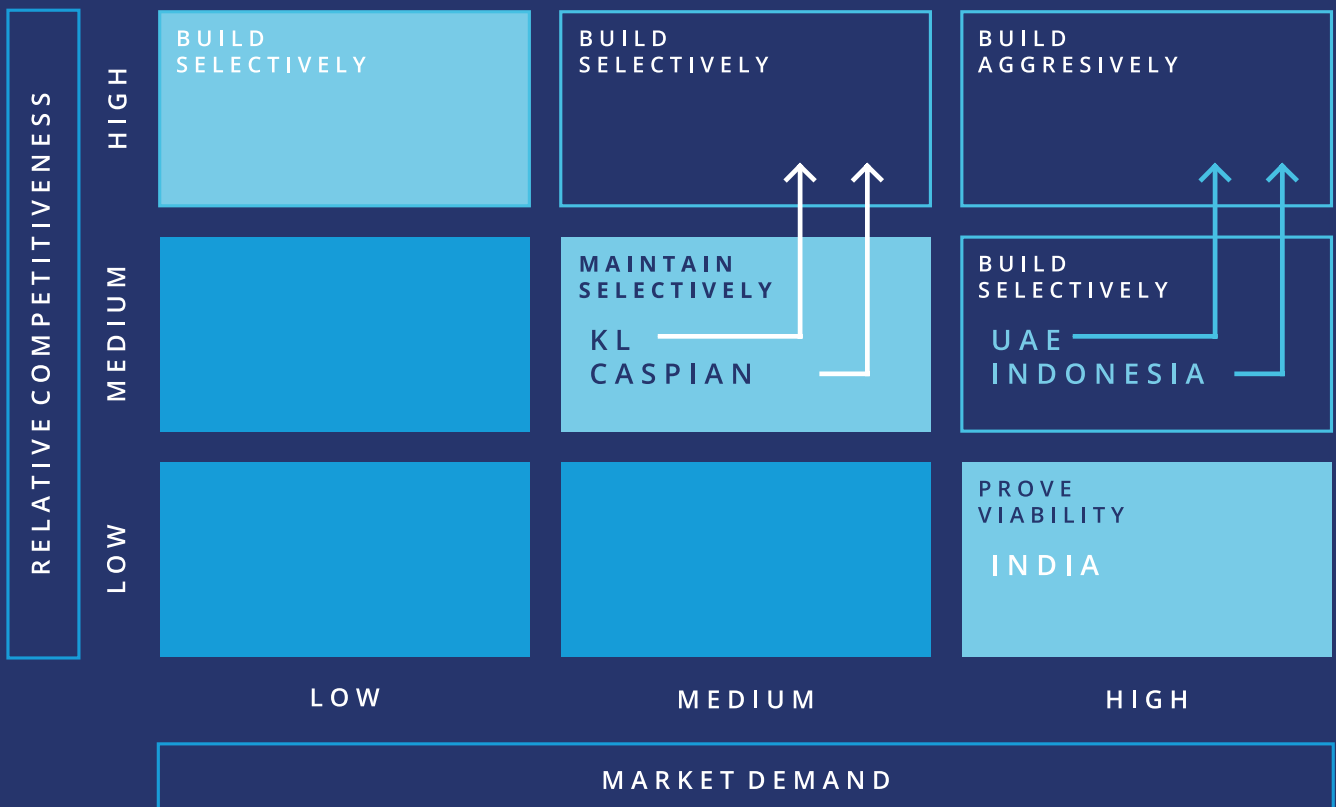
Figure 25: GTS Growth strategy on Directional Policy Matrix

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CERTIFICATION

CERTIFICATION

Introduction

Formed in 1993, TWI Certification is accredited by the United Kingdom Accreditation Services (UKAS) to ISO/IEC 17024: General requirements for bodies operating certification of persons and ISO/IEC 17065: Requirements for bodies certifying products, processes and services.

It provides certification that meets the needs of individuals, companies and training organisations. It is an integral source of third-party certification, providing assurance to industry of the competence and compliance of its people, products and procedures and acts as a comprehensive source of client confidence and industry compliance on a worldwide scale.

INCREASE EFFICIENCY
ENHANCE BRAND NAME AND REPUTATION

In the next 12 months implement a new TWI CL software which will decrease certification turnaround time by 30% and admin processing by 20%.
Improve customer experience with electronic portals for documentation uploads.
Reduce manual admin tasks e.g. scanning photo and forms through software automation, from application to certification production.

EXPAND SCHEME OFFERINGS
ENHANCE BRAND NAME AND REPUTATION

Increase schemes based on regional office needs, targeting 2- 3 new schemes per annum.
Start a new welding certification section to expand capabilities on end point assessment, welding qualification, etc.

INCREASE PROFIT MARGINS
ENHANCE BRAND NAME AND REPUTATION

Increase profit margin by 10% each year by increasing the uptake of CSWIP and company schemes, improving our customer support for the renewal process and expanding into low cost regions such as Middlesbrough.

Enhance brand name and reputation
Increase marketing activities by 30% and implement customer surveys.
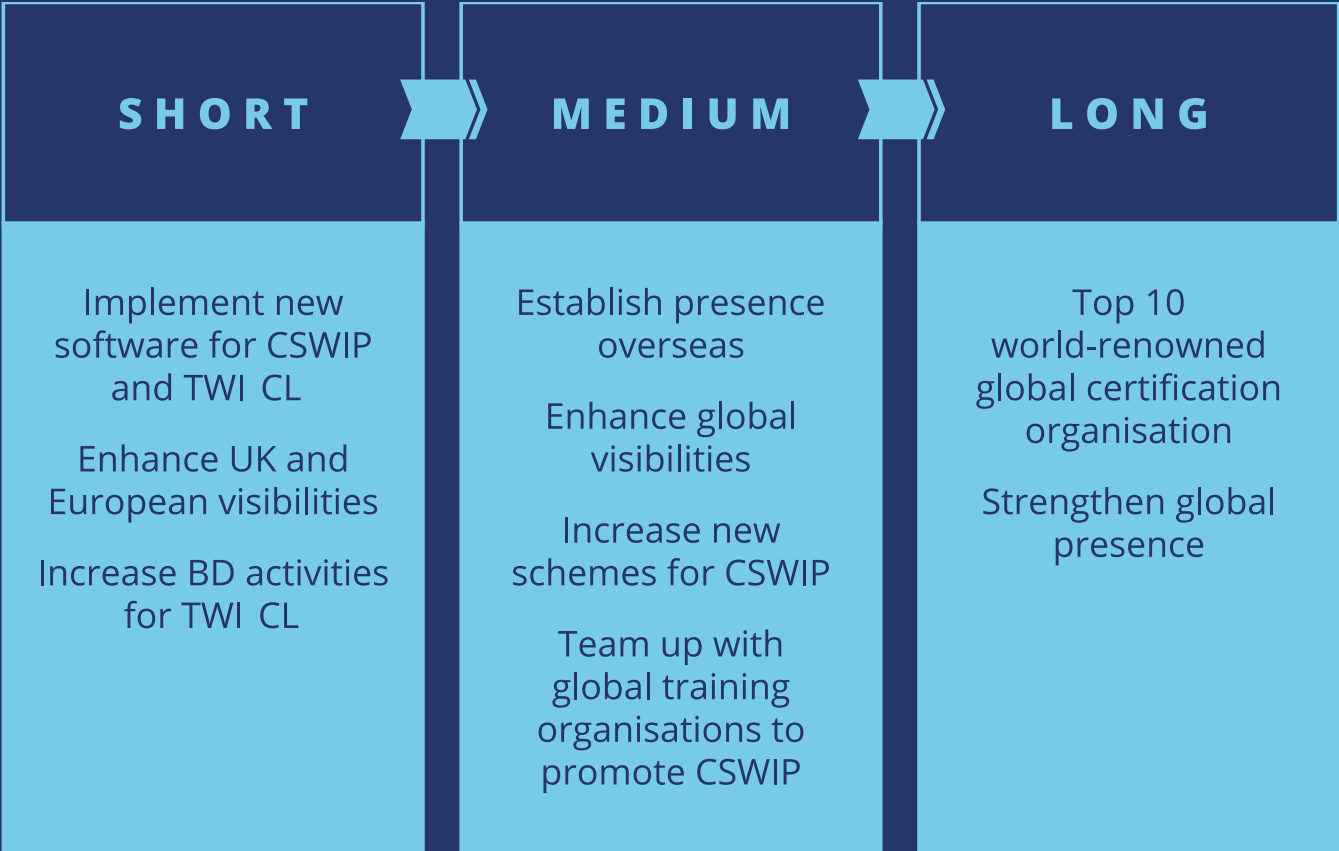
Figure 26: Certification Strategy

SHORT

MEDIUM

LONG

Implement new software for CSWIP and TWI CL

Enhance UK and European visibilities

Increase BD activities for TWI CL

Establish presence overseas

Enhance global visibilities

Increase new schemes for CSWIP

Team up with global training organisations to promote CSWIP

Top 10 world-renowned global certification organisation

Strengthen global presence

Figure 27: Certification Action Plan

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GOVERNANCE

Governance Approach

The Welding Institute (the 'Institute') is a unique membership-based organisation serving both Industrial Members (organisations) and Professional Members (individuals) through its group companies, of which the Institute is the parent.

As a company limited by guarantee, which is an alternative type of corporation used primarily for non-profit organisations that require legal personality, the Institute does not have share capital or shareholders, but instead has Members who act as guarantors. Furthermore, the Institute qualifies as a Scientific Research Organisation under statutory instrument 2007 No. 3426 for corporation tax.

Council, who are responsible for co-ordinating and directing the business of the Institute, have delegated many of their day to day decisions to the executive team led by the Group CEO who has spearheaded extensive governance improvements over the last two years. The Institute, and all Group companies, aim to adopt an internal system of practices, controls, and procedures in order to effect best practice governance, to make effective decisions, to both engage and meet the needs of stakeholders, and to comply with the law. The Wates Corporate Governance Principles for Large Private Companies (December 2018) provides a blueprint to achieve these aims.

Building on the adoption of best practice, the Group is focused on the following objectives aligned with the 6 principles of (Wates) corporate governance.

PURPOSE AND LEADERSHIP

Develop and promote the purpose of the company

Council and the executive board will:
· Promote the success of the company
· Promote and communicate the strategy, values and culture of the organisation in their activities
· Establish strong and clear policies and approaches to concerns regarding misconduct and unethical practices
· Promote, and maintain the effectiveness of, whistle blowing processes

BOARD COMPOSITION

Effective board composition

Balance of skills, backgrounds, expertise and knowledge

Enabling effective company leadership and board engagement by:
· Implementing a director training programme and carrying out at least three training sessions with Council on an annual basis from 2022
· Promoting diversity and inclusion, maintain an open and transparent recruitment process for the selection of new board members
· Undertake at least two (Council) board effectiveness reviews by 2026

DIRECTOR RESPONSIBILITIES

Transparent and clear understanding of accountability and responsibilities.

Policies and procedures to support effective decision making

Clarify the role and responsibilities of Council and delegated bodies by:
· Finalising the governance overview for adoption by Council in Q1 2022
· In 2022, establishing a governance working group to explore amendments to the company Articles to adopt best practice and clarity
· In 2024, proposing new Institute Articles to Council and then to Members for approval
· In 2025, review all terms of reference for delegated bodies

Ensure the governance overview (approvals and responsibility matrix) is operative across all Group companies
· In 2022, put in place necessary governance framework to flow down the approvals and responsibility matrix in accord with the remit of Council
· In 2024, review the governance overview document and issue amendments for Council review and adoption

To complete a review of Group policies and processes to ensure they are fit for purpose and robust.
· In 2022, conclude the activities of the policies framework working group established in 2021 and:
  · Provide a comprehensive list of policy headings for executive board approval
  · Implement a process of policy creation and renewal so as to have all polices updated or created by end 2022
  · All polices to be available to staff on CIPHR by Dec 2023
· Introduce dedicated training courses to supplement policies

OPPORTUNITY AND RISK

Promote long-term sustainable success of the company

Create and preserve value

Identification and management of risk

Identify and manage risk by the adoption of a Group wide corporate risk management system
· In 2022:
  · Appoint a corporate risk manager
  · Agree risk appetites with the executive board
  · Develop a corporate risk management framework
· In 2023, agree a monitoring and review process
· In 2024, review internal and external risk communications channels

Internal controls: Engage with a reputable consulting firm (PwC) to undertake internal audit in Group companies
· **Phase 1:** 2021/2022, PwC will audit cash-flow and payment controls, project and contract management, information governance and cyber security, international offices (for regulatory and tax compliance, fraud and bribery, governance, finance systems, H&S)
· **Phase 2:** 2022, PwC will audit risk governance, compliance with public funding rules, H&S compliance, IT change management
  · By 2024, PwC will have completed the 3 year IA plan
· The Group internal audit will be competitively tendered in 2025

External audit: Engage with a reputable consulting firm (Grant Thornton) to undertake external audit in Group companies
· GT to audit active non-UK subsidiary 2020 accounts
· GT to audit non-UK and UK accounts (Group) 2021 onwards
· The Group external audit will be competitively tendered in 2025

REMUNERATION

Promote payment structure aligned to the long term strategy

Consider pay and conditions across the business

Linking executive pay to ESG goals
· Undertake an annual review of executive pay and provide recommendations to RemCo for alignment of pay to ESG goals from 2022

Gender pay gap reduced from 23.2% to 15% by 2026
· In 2026, to achieve at least 8.2% reduction rendering a less than or equal to 15% pay gap

Promote female leadership opportunities across the business
· In 2026, to achieve at least 33.3% of leadership positions held by women

STAKEHOLDER RELATIONSHIPS AND ENGAGEMENT

Effective engagement with stakeholders including staff and Members

In the operation of the business, the executive board will:
· Consider the environmental impact of the Group business on an annual basis [to be checked against environmental (E) strategy
· Maintain at least annual surveys of companies and individuals in membership
· Undertake staff surveys at no less than three year intervals
· Showcase staff who demonstrate the company core values
· Promote and deliver clear and effective communications to staff and related stakeholders
· Present to stakeholders a clear, fair and balanced assessment of the company's position

Table 1: Governance Approach

PROPERTY

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PROPERTY

TWI invests in property to provide security to the group's operations and to indicate a long term commitment to local governments to unlock funding for our core business. This provides benefits to Members by reducing the cost of operations and therefore the price of our services and receiving funding for research to advance industry and staff knowledge.

Since 1946, when the British Welding Research Association (TWI's original name) purchased Abington Hall with a government grant, property has been a key component of our success. TWI's headquarters remains on this site today. In 2000, when 100% of TWI's operations were based out of Cambridge, turnover was £22.5m and there were 423 employees. In 2020, 60% of operations were based out of Cambridge generating a turnover of £65m with 796 employees. Internationalisation has expanded our global impact and enabled growth.

The business strategy is to continue to regionalise and internationalise our core operations to better serve our Members and create centres of excellence. Place is a key component of the Government's strategy known as 'levelling up'. This will be achieved by investment into infrastructure and skills. TWI has the opportunity to capitalise on this initiative by working with local government and industry to achieve this.

Our current property assets are predominantly operational, with some investment property on Granta Park in Cambridge, UK. Over the coming years, TWI will continue to invest in property for the Group's operations and the creation of an endowment to support the underlying stability of the business.

Operational Property Strategy

- UK Regional Expansion - Middlesbrough, Sheffield and Port Talbot have become centres of excellence for specific technologies. There is a strong knowledge base in the regions and our customers know the capabilities of each site. We wish to continue this trend of expansion into the UK regions to build specific capabilities and align to the Government agenda. We will be investing in new facilities to mee existing Member demand and build for the future in new emerging areas of technology As set out in 2020, due to the high cost of operations in Cambridge, additional UK growth will be focused on the UK regions. This will enable us to leverage local government support through the levelling up agenda to support our Members in the best way possible and align with strategic programmes such as the hydrogen corridor and offshore wind hubs.

- Cambridge Refurbishment – We will be consolidating operations into a smaller footprint in Cambridge to reduce the operating costs of the core business. In doing so, this gives us the opportunity to improve our facilities for our staff and Members, upgrading certain office and laboratory environments whilst ensuring our operational space is accessible to people with disabilities. We will also transform our office to align with our flexible working policy; creating virtual meeting rooms, social areas and hot desking facilities. Certain laboratories are in need of investment to decrease downtime, repair costs and improve health and safety. We will be investing in these laboratories

to ensure they are efficient and fit for operations.

- International – Where subsidiaries have been operating consistently and generating cash over a prolonged period of time, we will consider investing in buildings/land for their core operations. As we did in Malaysia, purpose built facilities have a number of benefits over leased buildings and can offer a competitive advantage for our core business. International subsidiaries must have a proven track record and sound justification for long term presence in that country.

This investment into our core business operational sites will provide stability for our staff and operations, while creating an enjoyable working environment for staff to thrive.

Investment Property

TWI uses investment property to:

- Generate cash to invest back into the core business to further our purpose

- Provide stability via access to liquidity when required

- Reduce operational costs to increase profit margin while not increasing Member costs

Since 1946, Cambridge has changed remarkably, becoming Europe's largest life science hub. This has provided TWI with the opportunity to maximise the potential of its assets. In 2010, we acquired the development land adjacent to our site for £4m. After strategic investment into obtaining planning consent and building relationships with key stakeholders, we were able to divest this asset for just over £122m (Zone 1 and 2).

As we have done with the development land previously, we will focus attention on the Cambridge operational site to maximise the value for the business and reduce the operational overhead. This will allow the expensive operating space in the main Cambridge operational buildings to be converted to cash-generating assets, enabling

underlying stability to the core business. This will mean certain underutilised operational buildings will be converted to accommodate external tenants and done in a phased manner to support the strategy. Alongside this, there will be a significant investment into Abington Hall to restore it back to a useable site and improve the surroundings.

We differentiate ourselves in the Cambridge rental market by offering large footprints able to accommodate offices and wet/dry labs in one of the premier life science parks. The majority of the Cambridge market is custom build for single occupancy or multi-tenanted for smaller companies. Grow on space between these two phases of company life is scarce and we target this section of the market for our leases.

The intention is to generate enough cash annually to cover off the defined pension deficit reduction payments, removing this liability from the core business. Any additional surplus will be used to contribute to the growth of the core business.

The legal structure of property holdings within the group will be reviewed to ensure the most tax efficient structure is achieved.