



The ElecTech Council Response to the “Building an Industrial Strategy” consultation green paper

Created: 2nd April 2017

Last Updated: 19th April 2017

Report No: ELECTECH/ISCons STATUS v1.1

Overview

This report summarises the response of The ElecTech Council to the green paper “Building an Industrial Strategy” published by the Department of Business, Energy and Industrial Strategy in January 2017.

Change History

Version	Date	Details of Changes in Update	Author(s)
v0.1	03apr2017	Initial draft	Tony King-Smith
V1.0	17apr2017	Final content used in submission to BEIS, plus summaries and overviews	Tony King-Smith
V1.1	19apr2017	Updates reflecting latest messaging	Tony King-Smith

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1 Introduction

The global economy is entering a period of unprecedented change. Significant shifts in the political landscape around the world, coupled with the relentless drive of technology to increasingly influence of our lives wherever we live.

Here in the UK, as we start to shape our economy for a post-Brexit Britain, there has never been a greater need for a cohesive, over-arching industrial strategy. We need to ensure that government and industry work together to focus our limited resources, skills, innovation and finances to make the UK the strongest country in the world to do business in the 21st century.

The ElecTech Council – formerly known as the Electronic Systems Community (ESCO) – started back in 2011 with the objective of creating the ESCO report in response to a request from the then Secretary of State for Business and Enterprise, the Rt. Hon. Mark Prisk MP, to help the UK government better understand the electronics industries in the UK and the challenges and opportunities offered by those industries. In the process of creating the report, companies from across the UK involved with electronics, electrical, electro-technical and embedded software and systems industries came together for the first time. They started to discuss the common challenges they face, the unique opportunities they bring, and the value of working together thanks to the common skills base and complementary business challenges they face.

The ElecTech Council therefore welcomes the opportunity to play a leading role in the establishment, and more importantly implementation, of the industrial strategies being developed by this government. We've called ourselves the ElecTech sector, to make it easier to talk to all of us. We've been hard at work getting things done, like the creation of some of the first degree-level apprenticeships under the Trailblazer scheme, and the establishment of a new strategic standards group with the BSI. We're an industry sector that likes moving quickly.

We see initiatives such as the Industry Digitalisation Review led by Juergen Maier (of which our Chairman Brian Holliday of Siemens and Vice-Chairman Sean Redmond of Vertizan are both active participants), and the "Each Home Counts" review recently completed by Dr. Peter Bonfield (of which BEAMA was a key participant) are examples of pragmatic initiatives key to establishing policies and sector deals that create real value and growth for both large multinationals as well as SMEs and startups.

As one of the largest horizontal industry sectors, we look forward to working with the government alongside other vertical and specialist industry sectors to ensure that the UK's future industrial strategies evolve into something that demonstrates a unique level of "joined-up thinking" across industries, skills, research and business to create more sophisticated strategies that other countries will struggle to emulate.

2 Overview

The ElecTech Council (formerly known as ESCO – the Electronic Systems Council) is keen to respond to the consultation and subsequent sector deals and initiatives outlined in the BEIS January 2017 consultation green paper “Building an Industrial Strategy”. As one of the largest “horizontal” industry sectors, based around skills not products, we believe it is only through working with specific industry groups such as the ElecTech Council, supported by key trade bodies such as BEAMA, GAMBICA and the NMI, that meaningful progress can be achieved.

A realistic set of industrial strategies can only be created by engaging with substantial groups of like-minded companies and individuals who are capable of speaking with one voice. The ElecTech Council is such a group, representing:

- more than one million jobs
- more than 45,000 businesses, large and small, across every part of the UK
- Approaching £100bn (6%) of UK GDP

Through our key sponsors – the trade bodies BEAMA, GAMBICA and the NMI - together with key industry leaders from multinationals as well as SMEs and startups, we’re bringing together common skills-based needs with one voice at national level. We represent substantial parts of the UK business community and working people in every region, addressing the key themes of how ElecTech can influence and enhance policy, investment, skills and productivity strategies, driven by a strong UK-centric focus on innovation, wealth creation and cross-sector strategic thinking of which our industry sector is second to none.

We believe that the government must take ElecTech far more seriously as a significant industry sector that offers some of the greatest potential for increasing inward investment and exports; raising the incentives for more global businesses to base more activities here in the UK. By focusing investment in strengthening the ElecTech skills and industry base here in the UK, benefits can be seen in sectors as diverse as smart manufacturing; digital healthcare; low energy buildings; agritech; fintech; autonomous vehicles and quantum computing.

2.1 What is ElecTech?

The ElecTech Council has realised over the past few years that in order for the UK to recognise and exploit the unique potential of our sector, we need to articulate more clearly what we do to everyone. We need to deliver our messages in particular to those without a technical background – including many in government – so that everyone can more easily see the value we bring to every aspect of the UK economy. And we need to be seen to be speaking with one voice, despite being a broad, somewhat fragmented industry sector.

We have therefore defined a new industry sector called “ElecTech”, which covers all businesses, institutions and academia involved in everything from research and manufacturing through to installation, maintenance and support of:

Electronics: chips; brains, communications, sensors, control

Electro-technical: power, automation, lighting, motors

Firmware: software that makes controls electronics and electro-technical hardware, and connects it to software applications

When people think of “tech”, they usually think of the software running anything from apps on mobile phones to massive databases and AI running in cloud servers. None of this would be possible without the ElecTech computers they need to execute on.

Tech is nothing without ElecTech!

2.2 Who is on the ElecTech Council?

The ElecTech Council is supported by many key trade associations, led by BEAMA, GAMBICA and the NMI, who together represent more than one thousand companies involved in smart building and energy, manufacturing and process automation, and electronics. We have key institutions like the IET and BSI alongside us, as well as senior executives from a wide range of industries from aerospace and manufacturing to consumer electronics and mobile. Our combined voice is indeed broad, yet increasingly unified with shared objectives, challenges, and complementary initiatives.

2.3 Why isn't the ElecTech Council more widely recognised?

One of the key challenges facing us when engaging with government – and indeed within our own industry - is that ElecTech is a large “horizontal” sector. Well-known industry sectors such as aerospace, automotive and defence are product-centric: everyone recognises what they do by the products they make. ElecTech however is a skills-centric industry sector: the technologies, components and subsystems developed and deployed by the ElecTech community are key to success for almost every industry sector large and small.

While our influence is uniquely wide-ranging across almost every aspect of the UK economy, it has been hard for government to engage with us until now. It is therefore our intention, starting with this industrial strategy consultation, to demonstrate that the ElecTech sector is economically significant, and one of the most powerful tools that Government can utilise to realise the greatest economic impact across all industries in all locations across the UK.

Our sector is growing fast: according to our most recent analysis we've grown more than 20% in the past two years alone. That's because when we consider many of the most innovative and exciting changes to our society, ElecTech is usually at the heart of them. From electric and autonomous vehicles to LED lighting; from wireless and broadband communications to smart homes and energy systems; from smart transport and energy infrastructure to network security and augmented reality: most innovation relies to a significant degree on ElecTech.

2.4 Why is the ElecTech industry sector so important?

ElecTech delivers the building blocks on which so much of tomorrow's society depends. From the electronics powering every mobile phone, computer, data centre server and communications centre, through the opto-electronics and radio chips on which our entire broadband and wireless infrastructure relies; to the electro-technical devices powering the delivery of electricity to every home, office, factory and (increasingly) car and truck.

The “embedded” software – the “low level” software that controls every aspect of the hardware - is very much a “behind the scenes” technology, but every bit as vital as electronics or electro-technical technologies. It’s the low level software running inside every Wi-Fi or 3G/4G/5G chip and switch enabling us to communicate to each other and around the world. It’s the software controlling every robot or machine. It’s controlling every disk drive in a datacentre; It’s the reason the graphics on every phone or tablet looks so good. It’s the software making every network secure.

Smart “tech” relies on electronics ElecTech

Electrical power is created, distributed and controlled thanks to electro-technical ElecTech

Embedded software ElecTech is the brawn behind the brains of Tech

Everywhere you look, ElecTech is there somewhere. However, few people understand the significance of the ElecTech sector. So, to ensure everyone understand our impact across the industrial landscape, we’re working with InnovateUK to conduct some vital research. We’re working to create an easy to understand set of roadmaps that help government and industry better understand and utilise the cross-industry benefits of a strong ElecTech sector. Through this, we aim to make clear the benefit of ElecTech to all industry sectors large and small, both well-established and emerging.

2.5 Key recommendations

As part of the ElecTech Council’s submission, a wide range of proposals and recommendations are made. These include:

1. The creation of a national **Interoperability Institute**, that leverages the power of international standards and regulations - and the UK’s historically strong role in their creation – to create a unique organisation managing the standards and regulations necessary to ensure that everything from every industry works together easily, reliably and safely
2. An Electech-focused **STEM careers outreach program** targeting parents, teachers and school children on the benefits of children pursuing a career in ElecTech in the UK
3. The creation of a long-term “**Electech is GREAT**” campaign to encourage the uptake of ElecTech careers by everyone regardless of age or experience, and to promote the UK’s Electech industrial sector as one of the strongest in the world to drive further inward investment
4. Co-ordinated **strategic investment in ElecTech** by both the government and the UK financial sector aligned to UKRI and InnovateUK investment, using crowdfunding and other incentives to ensure the UK significantly improves its ability to convert its world-class research into world-beating companies
5. Better **recognition and active use of trade bodies such as BEAMA, GAMBICA and the NMI** to conceptualise, review and implement ElecTech-related industrial strategies. Their combined membership, national reach and technology capabilities make them ideal for driving ElecTech-based initiatives through stronger guidance and, where appropriate, project-related investment
6. Greater **investment in trade body-led communities** demonstrating specific vertical industry sector success, such as the NMI communities AESIN (automotive), IOTSF (IOT security) and Power Electronics UK

3 Recommendations by Pillar

A government industrial strategy that embraces ElecTech to help it drive industrial and economic growth will benefit almost every other industry sector from automotive and aerospace to AI, AR/VR, robotics and manufacturing based on Industry 4.0 technologies (most of which rely on ElecTech). Embracing ElecTech will enable the UK to show the world it is leading the way in many areas of emerging technology and innovation that are globally relevant and strategic, highly visible, and vital to the emerging smart, connected society both here in the UK and world-wide.

By investing in a horizontal skills-led industry sector such as ElecTech, the government has a unique opportunity to significantly change the way it approaches stimulating growth. Since ElecTech is relevant to almost every vertical industrial sector large and small, based on high quality, widely valued skills, using ElecTech as an exemplar for a strategy targeting horizontal as a complement to vertical sector strategies, the scope for creating growth and skills across every region of the UK, enabling everyone regardless of place to achieve the fullest potential, becomes not only possible but realistic.

With this in mind, the following summarises The ElecTech Council's recommendations based on the ten pillars identified in the green paper:

1. Invest in science, research and innovation

ElecTech is widely recognised as one of the leading skills-based sectors driving innovation in everything from autonomous vehicles to smart manufacturing. The UK investment programme in science and research must be better aligned with the projected needs of business, through closer attention paid to the "Impact" assessment for funded academic programmes. Collaboration between government and industry should also be actively developed to drive startups and industry adoption of the results of successful research, and close attention through regular, publicly visible review of how well research is being translated into economic success.

2. Develop skills

By engaging with a horizontal industry sector like ElecTech, which touches more than one million people and 45,000 companies in the UK and which drives success in so many vertical industry sectors, the UK can ensure it maintains and extends leadership in the broadest range of industries. By investing in such widely-used skills as ElecTech, the government can ensure that its STEM-related investment is deployed for greatest impact on the UK economy.

3. Upgrade digital, energy, transport, water and flood defence infrastructure

The government must recognise and embrace the fact that ElecTech lies at the heart of most aspects of upgrading to a smarter infrastructure. Every form of infrastructure involves a combination of smart technologies driven by ElecTech, combined with close attention to regulation and standards.

The ElecTech Council is already closely engaged on implementation of initiatives such as "Each Home Counts", as well as driving the cross-industry standards agenda through the recently announced ESSAC (Electro-technical Standardization Strategic Advisory Council) initiative, a collaboration between the BSI, GAMBICA, BEAMA and ElecTech.

4. Support businesses to start and grow

The government needs to recognise that a significant and growing proportion of startups and smaller businesses developing products for a smarter, connected economy will either be developing ElecTech-based products or services, or relying on ElecTech for their product implementation. By investing in ElecTech skills, the government is investing in the future of the UK's dynamic business community across every region, city and town.

But beyond this, we need more businesses that scale into significant global players – and the ElecTech sector has demonstrated over many decades the ability for businesses in our sector to scale rapidly from small startups to major multinationals. This will come from a combination of increasing the number of startups, and finding ways to encourage existing companies to grow rather than be acquired. ElecTech companies are recognised the world over as shining examples of rapid growth, especially in the US and China. A focused agenda on creating and growing more ElecTech-based companies will ensure growth of businesses in the UK, and ensure their success trading with markets world-wide.

The decision for the UK to leave the EU also presents a set of major challenges for supply chains – issues that are being tackled by the EURIS group. Led by ElecTech, the EURIS group (European Union Relationship and Industrial Strategy) is focused on tackling post-Brexit strategies for growth and business success across every aspect of the supply chain. This new industry group represents the combined industrial membership of BEAMA and GAMBICA, with additional representation from other aligned Trade Associations. (EAMA, NMI, CESA) representing in total more than 2000+ companies. The ElecTech industries form an integral and substantial part of European industry, who care about all the political, legislative and regulatory aspects of EU membership. The ownership and management of member companies, EURIS leadership is split between UK, European and global entities.

5. Improve procurement

The ElecTech Council has always believed that the scale of government procurement means it is one of the most powerful tools for stimulating growth of UK companies. However this should not just be for showcase projects, but should reach across every aspect of operations involving ElecTech. That means everything from smart energy in hospitals to the communications hardware security used in the IT in every government office; from the computers and hardware used to teach IOT and coding in schools to the lighting used in Westminster. Procurement of ElecTech needs to become a key part of government procurement everywhere – it will stimulate new startups and jobs across the country.

6. Encourage trade and investment

The government must acknowledge the strength of the ElecTech sector, and work with the ElecTech Council to help foster growth in the sector to drive growth, productivity, exports and inward investment. ElecTech businesses have always been recognised for their engagement with global markets. Therefore ElecTech-based companies are far more likely to focus on international trade than many other industries, because it has always operated that way. Furthermore, it is through our existing strengths in ElecTech – both in design and early market adoption - that has encouraged companies such as Apple, Google, Huawei and Samsung to invest significantly in both R&D and early market deployment in the UK. ElecTech offers greater opportunities for rapid growth in trade and investment thanks to its fast-moving nature

7. Deliver affordable energy and clean growth

The government needs to recognise the significance of ElecTech for its fundamental role in delivering clean, affordable energy to digital buildings and industry through clean, smart energy networks. Support should be given to the ongoing and significant efforts of initiatives such as those led by BEAMA members (a key sponsor of the ElecTech Council) to deliver a low carbon economy. BEAMA are developing implementation strategies for every aspect of design and deployment of the technologies necessary to realise a low carbon economy, and greater flexibility and choice for consumers and businesses in their use of energy.

The government also needs to recognise and support the leading role taken by GAMBICA members (another key sponsor of the ElecTech Council) in industrial digitalisation, in particular Industry 4.0 technologies. These technologies and capabilities are fundamental for growth in cleaner manufacturing.

8. Cultivate world-leading sectors

The UK's ElecTech industry already has many world-leading global players, in areas as diverse as intellectual property (ARM, Imagination), consumer electronics (Dyson, Pure, Roberts, as well as high end audio manufacturers such as B&W, Linn, NAIM and Meridian), defence (BAE Systems) and aerospace (Rolls Royce). We continue to attract significant investment in ElecTech R&D from multinationals such as Apple (graphics), Google (IOT), power (NXP semiconductors) and automotive (Tata/JLR, Visteon, Ricardo) and manufacturing (Siemens, Schneider). Focusing support for growing the ElecTech industrial sector maximises the UK's opportunities for continuing to attract significant strategic inward investment, and ensuring that the UK remains one of the world's best places to develop ElecTech technologies.

9. Drive growth across the whole country

The skills at the heart of the ElecTech industrial sector are at the heart of many regional initiatives around the UK that have the ability to generate jobs and growth in every city and town across the UK. Examples include:

- **smart cities**, which rely on ElecTech to power the communications and IOT, as well as smart transport systems, and even energy-efficient LED lighting
- **a smarter NHS**, serving people in their homes rather than hospitals thanks to the latest low cost, high capability electronics combined with advanced AI running on cloud datacentres built on ElecTech
- **smarter communications**, using ElecTech to deliver everything from advanced 5G communications to signage and energy-efficient LED lighting
- **smart manufacturing**, where ElecTech is at the heart of everything from energy efficiency to the latest robots, through to AI-based real-time management and AR-based factory design

10. Create the right institutions to bring together sector and places

With the many institutions already in place, the key is not creating more, but getting them to better communicate and align with one another to achieve well-defined objectives. However, one of our core recommendations is the establishment of a cross-industry Interoperability Institute.

ElecTech believes there is a crucial need to create a new Institute for Interoperability, to tackle the fundamental problem of ensuring that products and services from an increasingly diverse number of industry sectors, work together reliably, safely and easily. The global impact of standards and regulations on products and services targeting global markets cannot be underestimated – entire industries have been created around specific standards from communications and power to IOT and AI. Since ElecTech is at the heart of many issues of interoperability, from communications to power, from regulation and standards to software APIs (application programming interfaces), it makes sense for the ElecTech community to be a key player in such a new interoperability institution.

The ElecTech Council is already tackling the standards agenda through the recently announced ESSAC (Electro-technical Standardisation Strategic Advisory Council) initiative, a collaboration between the BSI, GAMBICA, BEAMA and The ElecTech Council. Since members of BEAMA and GAMBICA already provide more than 2/3rds of the people representing the UK on standards bodies world-wide, the ElecTech Council believes it should be a key player in the government's plans for tackling the future of standards and regulation, especially post-Brexit.

4 Recommendations by Category

The ElecTech Council summarises its key recommendations by category as follows:

Skills: ElecTech skills must be carved out for special attention and priority, from technician to PhD. Investment should be made to develop a comprehensive range of qualifications covering all aspects of ElecTech, and ensure vocational training (such as apprenticeships), academic research and skill development for ElecTech is encouraged in every region, led by local ElecTech companies combined with dedicated LEP investment

Immigration: non-UK people with ElecTech skills should receive priority and special support, to encourage them to remain in the UK, to ensure the growth of the sector. Furthermore, visas should be made freely available to non-UK students graduating with ElecTech skills from UK universities wishing to work in the UK for a period of up to 10 years, with options to become permanent residents after a qualification period (subject to suitable recommendations from their employer(s))

Skills promotion: An “ElecTech is Great” campaign should be developed and sustained for at least 5-10 years to encourage children, their parents and teachers to recognise the value of ElecTech as one of the best careers for their children, and one of the strongest contributors to the strength and competitiveness of the UK economy. This should double as a tool for DIT, DExEU and others to encourage greater inward investment in the UK

Procurement: Every significant government procurement tender, from all departments and institutions, shall include provisions, wherever feasible, to encourage UK-sourced ElecTech to be a key part of every part of the solution, with clear preference for companies designing and/or manufacturing in the UK. This should not just be for showcase “smart” projects, but should permeate every aspect of government procurement (large and small) in every department, for everything from IT to buildings, transport, communications and cloud-based services. For example, support to encourage more UK-based cloud data centres maximising the use of UK ElecTech would encourage more startups to target UK as well as non-UK customers, promoting UK companies and not handing all IT spend to established incumbents such as US IT suppliers

Strategic Investment: BEIS, DCMS, DIT and DExEU as well as DfE, DfH and DfT should each have an ElecTech strategy, which is co-ordinated across government to maximise leverage of UK ElecTech capabilities

Industrial Strategy Challenge Fund: As part of every industry-specific Sector Deal, ensure that associated Challenge Fund projects are included that create products or services featuring innovative ElecTech capabilities that inspire people, and are used to showcase UK ElecTech supremacy to stimulate both FDI and exports

Regulation and Standards: The UK should leverage its strengths in creating standards used globally to establish a cross-sector regulation and standards review leveraging work done in strategic standards organisations such as ESSAC, with the specific charter to maximise leadership in UK-led standards world-wide across all sectors. ElecTech, working alongside BSI, should be used as one of the leading horizontal sectors to demonstrate such leadership

Inward investment: DIT should showcase ElecTech capabilities in the UK through campaigns such as “ElecTech is GREAT” and a more strategic, targeted programme of trade show presence world-wide using UK ElecTech as a primary demonstrator of why the UK skills and business environment makes it the best place to invest

Exports: DIT should prioritise support for UK companies exporting products containing UK ElecTech, and use the UK ElecTech sector as a showcase to stimulate greater trade world-wide with the UK. Maximum support should be given through InnovateUK to ElecTech technology and product startups wanting to scale aggressively to compete globally, in close collaboration

with the UK's financial community. This approach will result in the fastest growth of business success due to the ability of the ElecTech industries to scale quickly once demand is established

Institutions: The UK should establish a new Interoperability Institute, which works closely with all industry sectors, standards bodies and peer organisations world-wide to ensure that the UK leads the world in interoperability standards that ensure products and services across all industry sectors work increasingly well together, and are reliable, safe and easy to connect to one another. This is key especially for emerging markets such as the Internet of Things, autonomous vehicles, smart manufacturing using Industry 4.0 and digital health. Indeed the Industrial Digitalisation Review (led by Juergen Maier) is ideally placed to spearhead the establishment of this, working alongside the BSI and ElecTech plus other horizontal industry sectors.

5 Responses to Questions

5.1 Are the pillars correct?

5.1.1 Q1 - Focus

Does this document identify the right areas of focus: extending our strengths; closing the gaps; and making the UK one of the most competitive places to start or grow a business?

In principle this document sets forth a useful framework that covers many of the key areas needed for a range of Industrial Strategies to be identified, refined and agreed. However we have several concerns:

1. The skills gap needs focus and prioritisation, followed by significant investment to change perceptions of parents and teachers as well as children of the careers that benefit the UK most
2. Insufficient attention is paid to bridging the well-known “trough of disillusionment” between completion of research and successful commercialisation. Too many innovations in the UK are either never exploited commercially, or acquired by foreign companies, due to a lack of commitment to investing in the product development through to initial production of innovative products

5.1.2 Q2 - Productivity & Growth

Are the ten pillars suggested the right ones to tackle low productivity and unbalanced growth? If not, which areas are missing?

The ten pillars set forth in the document are a useful structure on which to build dialogue with industry. Many of the key topics are contained within one or more of these pillars. However the government must not rely solely on industry to propose solutions: this needs to be an active collaboration, where government is prepared to identify areas of economic growth and longer-term capability that it wishes to prioritise.

The challenge within all of these ten pillars is therefore how to prioritise. What are the selection criteria used to discriminate between wealthy, more established industries and the smaller, newer industries that have no resources or track record to talk to government? What are the methodologies to be followed to ensure that the right sectors or skills are being invested in to improve productivity? What are the regional priorities for each of the pillars to ensure that growth is achieved across all regions and social groups? The government must embrace change to tackle productivity and growth, not perpetuating the status quo.

Relying on industry groups to make proposals is valuable, but not sufficient. This needs to be complemented by the government analysing the needs for a desired progress in the UK economy, and identifying areas where improvement is most needed. There needs to be clear guidance of where the government identifies the worst imbalances to be addressed, and where the worst productivity gaps exist. Government cannot just rely on responding to the loudest voices, which if allowed to dominate risk perpetuating regional imbalances, and ensuring little change in productivity.

By engaging with a horizontal industry sector like ElecTech, which touches more than one million people and 45,000 companies in the UK and which drives success in so many vertical industry sectors, the UK can ensure it maintains and extends leadership in the broadest range of industries. By investing in such widely-used skills as ElecTech, the government can ensure that its STEM-related investment is deployed for greatest impact on the UK economy.

5.1.3 Q3 - Institutions

Are the right central government and local institutions in place to deliver an effective industrial strategy? If not, how should they be reformed? Are the types of measures to strengthen local institutions set out here and below the right ones?

Many institutions exist already, both in government and in industry and academia, tackling many different aspects of industrial strategy. It is bewildering to many in industry to even know where most of those institutions exist and what they do in the context of Industrial Strategy. Therefore, a directory of capabilities should be created enabling every business and other stakeholder to ensure they know all the institutions addressing their interests.

ElecTech believes there is a crucial need to create a new Institute for Interoperability, to tackle the fundamental problem of ensuring that products and services from an increasingly diverse number of industry sectors, work together reliably, safely and easily. The global impact of standards and regulations on products and services targeting global markets cannot be underestimated – entire industries have been created around specific standards from communications and power to IOT and AI. Since ElecTech is at the heart of many issues of interoperability, from communications to power, from regulation and standards to software APIs (application programming interfaces), it makes sense for the ElecTech community to be a key player in such a new interoperability institution.

The ElecTech Council is already tackling the standards agenda through the recently announced ESSAC (Electro-technical Standardisation Strategic Advisory Council) initiative, a collaboration between the BSI, GAMBICA, BEAMA and The ElecTech Council. Since members of BEAMA and GAMBICA already provide more than 2/3rds of the people representing the UK on standards bodies world-wide, the ElecTech Council believes it should be a key player in the government's plans for tackling the future of standards and regulation, especially post-Brexit.

We also believe that the structure, management and direction of LEPs needs to change to enable them to invest in region-specific skills clusters.

5.1.4 Q4 - Lessons

Are there important lessons we can learn from the industrial policies of other countries which are not reflected in these ten pillars?

Few people believe that a government is ever good at choosing future business winners. Indeed, almost all leading companies in almost every sector have relied on their own product superiority and technology advantages to win business: government has rarely had a major role to play.

However, one big difference in countries such as the US and China is the development of aggressive policies strongly prioritizing the use of local companies' products and services, coupled with campaigns encouraging everyone to believe in their local industries. They sometimes go further and actively encourage new companies to be created specifically to tackle new opportunities.

Pride in UK-designed and UK-made products has been steadily diminishing for decades. This results in a lack of desire in all areas of the economy to use local products. A notable exception to this has been the food industry, where a growing culture of "food miles" and knowing the source of your food has led to significant growth in new businesses across the UK. The government needs to find ways to encourage national pride in local products as an essential part of any successful industrial strategy.

5.2 Investing in science, research and innovation

5.2.1 Q5 - Priorities

What should be the priority areas for science, research and innovation investment?

A key priority should be the development of ElecTech-related investment, both in research and innovation. The reasons are simple: investing in ElecTech research delivers intellectual property (IP) that is highly valued globally, thus maximizing ROI for every research pounds spent. As for innovation, ElecTech companies are some of the most innovative in the world, and can create wealth and growth faster than almost any other sector. Silicon valley companies such as GAFA (Google, Apple, Facebook and Amazon) are all built on ElecTech (they all built and/or rely on mobile phones; tablets, PCs as well as newer products like Alexa). More recent innovators like Nest and Tesla created entire new markets within a few years, then led them.

ElecTech is widely recognised as one of the leading skills-based sectors driving innovation in everything from autonomous vehicles to smart manufacturing. The UK investment programme in science and research must be better aligned with the projected needs of business, through closer attention paid to the “Impact” assessment for funded academic programmes. Collaboration between government and industry should also be actively developed to drive startups and industry adoption of the results of successful research, and close attention through regular, publicly visible review of how well research is being translated into economic success.

5.2.2 Q6 - Challenges

Which challenge areas should the Industrial Challenge Strategy Fund focus on to drive maximum economic impact?

The Challenge Fund needs to back specialised skills that have applicability in multiple industry sectors, and which enable a significant number of new companies to be spawned and thrive. The Challenge Fund also needs to consider how to invest in creating new industrial ecosystems that form unique technology clusters.

The following are but a few examples of challenges that would enable the UK to leverage and grow existing capabilities. The ElecTech industry is famous for creating new businesses that deliver real economic impact, so given UK strengths this should be exploited: Examples include

- a) **Robotics** for factory and process automation, including the creation of the underlying IP (intellectual property) required for them to be able to scale to significant volumes at low cost. The perception of robots is set to change considerably over the next ten years, from one of a humanoid taking jobs to an integral part of a smart society
- b) **Smart factories** using Industry 4.0 technologies to create the model for thousands of smaller, specialised factories across every region of the UK. Smart factories are not just about volume: they are about zero inventory, highly customised products built to order for anything from a mobile phone to a car. Creating a business template that enables startups to confidently build a factory in their region creates ecosystems of suppliers around them, leading to rapid growth while maximising productivity
- c) **AI for embedded applications** such as driverless cars and trucks and robotics
- d) **VR and AR hardware platforms** that, when combined with the UK’s strong creative gaming and film sectors, create complete solutions
- e) **Smart building and electricity infrastructure solutions for homes and offices**, enabling the UK to have some of the world’s most advanced housing and business accommodation, linked to a low carbon strategy making the UK the leading energy-efficient society
- f) **Low energy, high performance data centre servers**. The UK’s dominance in CPU (central processors), GPU (graphics processors) and advanced parallel processor design means the UK is ideally placed to create new players to displace existing giants like Dell and HP, leveraging UK know-how and technologies

- g) **Smart digitalised health** to promote the development and large-scale deployment of consumer and industrial grade electronics to accelerate the ability of the NHS to minimise reliance on hospitals and other medical facilities, and deliver the maximum amount of monitoring and care in people's homes

5.2.3 Q7 - Commercialisation of ideas

What else can the UK do to create an environment that supports the commercialisation of ideas?

Change the perception across government that once research has produced something, the private sector will commercialise it! The UK is one of the least pro-active countries in investing in commercializing research, and the startups that come from it.

This is where a pro-active approach to government procurement, coupled with strong pressure to create better financing through facilities such as "patient capital" are vital. One very key barrier here is securing funding for people rather than capital equipment or facilities. Many startups, the main challenge is getting sufficient skilled people to turn their concepts into reality. Funding a building is often far easier than funding the people to put in it – that must change.

The government needs to recognise that a significant and growing proportion of startups and smaller businesses developing products for a smarter, connected economy will either be developing ElecTech-based products or services, or relying on ElecTech for their product implementation. By investing in ElecTech skills, the government is investing in the future of the UK's dynamic business community across every region, city and town.

But beyond this, we need more businesses that scale into significant global players – and the ElecTech sector has demonstrated over many decades the ability for businesses in our sector to scale rapidly from small startups to major multinationals. This will come from a combination of increasing the number of startups, and finding ways to encourage existing companies to grow rather than be acquired. ElecTech companies are recognised the world over as shining examples of rapid growth, especially in the US and China. A focused agenda on creating and growing more ElecTech-based companies will ensure growth of businesses in the UK, and ensure their success trading with markets world-wide.

The decision for the UK to leave the EU also presents a set of major challenges for supply chains – issues that are being tackled by the EURIS group. Led by ElecTech, the EURIS group (European Union Relationship and Industrial Strategy) is focused on tackling post-Brexit strategies for growth and business success across every aspect of the supply chain. This new industry group represents the combined industrial membership of BEAMA and GAMBICA, with additional representation from other aligned Trade Associations. (EAMA, NMI, CESA) representing in total more than 2000+ companies. The ElecTech industries form an integral and substantial part of European industry, who care about all the political, legislative and regulatory aspects of EU membership. The ownership and management of member companies, EURIS leadership is split between UK, European and global entities.

5.2.4 Q8 - Leaders & Entrepreneurs

How can we best support the next generation of research leaders and entrepreneurs?

Doing more to showcase them as successful whether their companies have been or not. UK society still tends to punish those whose businesses fail; however many of the most successful entrepreneurs in other countries use experience of failure to go on to greater success.

We need programs that take strong academics and pair them with both highly experienced business people and young, enthusiastic business executives to create great new startups whose ambition is to scale to significant companies. At the moment, too many find the

challenge of being a small startup means it is a relief to achieve an early exit, or not start at all. Someone who is good at research is rarely the right person to lead a dynamic startup. The government must do more to encourage these companies to form, and get the funding they need to attract the best people.

As noted earlier, ElecTech is widely recognised as one of the leading skills-based sectors driving innovation in everything from autonomous vehicles to smart manufacturing. The UK investment programme in science and research must be better aligned with the projected needs of business, through closer attention paid to the “Impact” assessment for funded academic programmes. Collaboration between government and industry should also be actively developed to drive startups and industry adoption of the results of successful research, and close attention through regular, publicly visible review of how well research is being translated into economic success.

5.2.5 Q9 - Localised Research & Innovation

How can we best support research and innovation strengths in local areas?

The government needs to do more to encourage the establishment and growth of skills-led specialist technology clusters in regions across the UK, based on a detailed assessment of regional university and business strengths. LEPs should therefore be specifically incentivised to bid for managing such clusters, based on government analysis. By getting the LEPs to ensure such clusters are established and grown in their regions, they can augment their existing capital-centric investment by adding longer-term people-centric investment to their portfolio.

Highly focused regional technology clusters are one of the best ways to ensure growth in a region. By focusing on building ecosystems of complementary companies complemented by regional research aligned to them, centres of excellence are formed. This is a powerful way to focus and align academic institutions, LEPs and investors, and once established builds its own momentum. The creation of smart factories fits well into this ecosystem-led approach, creating complete supply chains from research through product design to manufacture.

Consideration should be given to how LEPs are structured to find ways for them to acquire access to sufficient technical know-how to confidently invest in local technology clusters. Many LEPs have told the ElecTech Council that it is easy to fund new buildings; but they can rarely fund anything to do with hiring people because of constraints on how they operate. We need to find a way for LEPs to have a startup creation agenda, and to drive their own regional academic institutions to align their work with that of regional businesses to create technology clusters. If this is complemented by a government plan for regional skills and capabilities, the two could be aligned to drive regional growth.

5.3 Developing skills

5.3.1 Q10 - Basic skills & qualifications

What more can we do to improve basic skills? How can we make a success of the new transition year? Should we change the way that those resitting basic qualifications study, to focus more on basic skills excellence?

The ElecTech Council believes that a more focused approach to fostering skills of greatest value to the UK economy is essential for post-Brexit success. We believe that by investing strongly in ElecTech skills to build a critical mass of capabilities in the UK will be far more productive than a more diffused approach to skills.

BEAMA, GAMBICA and the NMI – the trade associations driving the ElecTech Council - have been some of the most pro-active in moving forward with innovative new schemes such as the Trailblazers scheme, Already apprenticeships have been defined for ElecTech from technician

to degree level in a variety of subjects, with many more to follow. The ElecTech industry will move quickly if encouragement is given to the sector by government.

5.3.2 Q11 - Technical Education

Do you agree with the different elements of the vision for the new technical education system set out here? Are there further lessons from other countries' systems

We welcome the new initiative on Technical Education described in the document. Anything that improves the training of technicians and other non-degree people is going to help us build the resources needed to install, support and upgrade many major ElecTech projects from EV charging to smart energy grids through to next generation broadband and 5G.

However while we welcome the efforts to improve the education on offer, we feel that not enough is being done to convince children much earlier in their schooling that STEM and engineering are great things to do. The issue is particularly acute in the attitudes of both parents and teachers: if they don't encourage their children to choose subjects that lead to careers in areas such as ElecTech, then whatever education facilities are provided will be ineffective. We need to change attitudes across the UK population, to ensure that new education initiatives such as those for technical education in the document result in a significant increase in uptake for engineering and related careers.

We therefore need to not only provide the structures to train people; we need more to want to enter these professions. The ElecTech Council believes an "ElecTech is Great" campaign should be developed and sustained for at least 5-10 years to encourage children, their parents and teachers to recognise the value of ElecTech as one of the best careers for their children, and one of the strongest contributors to the strength and competitiveness of the UK economy. This should double as a tool for DIT, DExEU and others to encourage greater inward investment in the UK.

5.3.3 Q12 - Application Processes

How can we make the application process for further education colleges and apprenticeships clearer and simpler, drawing lessons from the higher education sector?

The proposal to build a new system around the existing UKAS approach clearly has merit, as it can then be seen by students as a "one stop shop" for finding out their options and find out more about how to apply for them, regardless of whether they are thinking of doing a degree, a vocational qualification or an apprenticeship. In principle, having one service that gives students all the options has to be a good thing.

5.3.4 Q13 - Skills shortages

What skills shortages do we have or expect to have, in particular sectors or local areas, and how can we link the skills needs of industry to skills provision by educational institutions in local areas?

Since ElecTech is a broad, horizontal industry sector, its skills base is relevant to many businesses in a wide range of industry sectors across the length and breadth of the UK. This is why we believe a government-led ElecTech initiative will benefit the UK long-term more than many other alternatives.

We believe that more needs to be done to encourage children in every region to see more of what is on offer from local as well as global companies – especially smaller startups and SMEs - to encourage them to remain in their region. However, the reality in many of the ElecTech industries is that they are highly global industries, so a balance needs to be struck between

building regional capabilities and ensuring the best students end up in the best companies across the UK.

For ElecTech, one way this can be achieved by working with existing regional skills clusters and developing them. However this has the danger of being far too restrictive, as startups and innovative companies need to be able to easily access students from across the UK. It is our belief that it is more important to focus on building successful companies wherever they wish to be based and find ways to encourage greater mobility of people to work in them, rather than trying to be too prescriptive in trying to build regional capabilities and skills.

Interestingly, this approach of encouraging mobility has worked very successfully for countries such as China and India. Both countries have many of their young graduates moving to the US or the UK to work with well-known companies for 5-10 years, then returning to their home countries to contribute to building the local business ecosystem.

If we consider a similar strategy for the UK, encouraging young people to travel across the UK initially to get the experience they need from companies wherever they may be based, then later incentivising them to return to their regions to build businesses there, a new business dynamic can be created that both ensures the best talent is available for UK businesses, and also drives regional growth. If this is coupled to a startup incentive scheme, the two could work together to maximize regional mobility and dynamic growth.

5.3.5 Q14 - Retraining and Upskilling

How can we enable and encourage people to retrain and upskill throughout their working lives, particularly in places where industries are changing or declining? Are there particular sectors where this could be appropriate?

In many parts of ElecTech, ongoing vocational training is an integral part of career progression, and has been for many years. However what we do need is to consider the ways to bring in people of all ages, not just those coming out of school, and getting them retrained regardless of age.

At the moment, few people would have the courage to be “the old person” in an undergraduate course. Through a pro-active program of offering retraining into higher-paid, more experienced staff, more people could be encouraged into ElecTech careers and other STEM subjects once they have proven relevant skills. By re-engineering apprenticeships or degree-based retraining, this could be a faster route to solve the substantial skills shortage we have today than focusing solely on new under-graduates.

5.4 Upgrading infrastructure

5.4.1 Q15 - Private Investment

Are there further actions we could take to support private investment in infrastructure?

It would appear from the report that funding for infrastructure, both public and private, is already reasonably strong. However what we feel is key is that investment in the various infrastructure programs identified in the document creates an ideal opportunity for the government to get far more creative in procurement for those projects. If for example a smart housing infrastructure project embraces the latest technology, and does everything possible to maximize UK ElecTech content to implement it, this will not only stimulate growth of companies in that sector, but also to help them export using their contribution to an upgraded UK infrastructure as a showcase.

Inevitably not all ElecTech can be supplied from UK companies, so by making more of the companies who participate, greater private investment could be encouraged. More UK companies could be encouraged to invest in UK infrastructure projects by putting greater

emphasis on showcasing their contribution - through advertising as part of the GREAT program for example. By regularly showcasing the UK companies developing leading-edge technologies used in UK projects such as the digital broadband infrastructure, electric vehicle charging, smart meters, smart ticketing etc, more innovative companies are likely to see this as a quick way to promote themselves, and thus do more to be part of UK infrastructure success stories.

5.4.2 Q16 - National UK Policy

How can local infrastructure needs be incorporated within national UK infrastructure policy most effectively?

The significance of the developing Internet of Things (IOT) industries relies far more than before on a sophisticated local communications infrastructure, complemented by an efficient national infrastructure. This gives an opportunity to encourage regional investment by ensuring some of the funds used for upgrades to 5G, Wi-Fi or IOT infrastructure are used to encourage rural infill, not just to deliver ever higher download speeds to city dwellers. Developing a UK policy for communications infrastructure that is all about ensuring national coverage through multiple standards (e.g. 5G/4G, long range Wi-Fi, low bandwidth IOT standards such as LORA), rather than treating each separately, could result in far better coverage for users much faster and lower cost than relying on, for example, 5G to be deployed nationally.

5.4.3 Q17 - International Benchmarks & Strategy

What further actions can we take to improve the performance of infrastructure towards international benchmarks? How can government work with industry to ensure we have the skills and supply chain needed to deliver strategic infrastructure in the UK?

The UK is recognised by many in the ElecTech industries as rapidly falling behind in even basic broadband provisioning compared to other countries such as Japan and China. A more strategic approach to planning national infrastructure projects using multiple technologies to ensure greater coverage by area, not just by % of population, should deliver far better results than just allowing market forces to prevail.

ElecTech is at the heart of many of these projects. Consulting with executives in companies across the ElecTech community, many of which have broad experience internationally, can help get a far more realistic picture of whether our infrastructure is indeed competitive or not. Of course, using recognised metrics is another key tool; however ensuring benchmarking is not taken advantage of by larger businesses (a surprisingly common phenomenon) is key.

Taking advantage of standards groups – such as the ESSAC group in ElecTech – could be another valuable tool for getting objective input. Standards need conformance testing to prove standards are being met – this is close to real-world benchmarking. So one way to create a more independent, balanced view of how to benchmark key infrastructure effectiveness could well be to consult and work with the key standards and regulation groups.

5.5 Supporting businesses to start and grow

5.5.1 Q18 - Fixed Capital Investment

What are the most important causes of lower rates of fixed capital investment in the UK compared to other countries, and how can they be addressed?

In our experience, the appetite is simply higher in other countries than here in the UK for investing in companies with some risk, especially technological. Our financial institutions, despite their international reputation, fall far behind other countries in their desire to fund anything that isn't absolutely safe, or whose returns can be measured monthly or even daily.

This is a major constraint for many businesses in the UK, especially those more specialized companies for whom B2B relationships are key.

Also, in many ElecTech-related industries, fixed capital investment is not the most important area of funding they need. Fixed assets are far easier to finance because the rules for return on investment are well known, and risks are lower. However for many businesses getting funding for non-capital items such as staff and services is far more difficult. We wonder if the government is not too focused solely on fixed capital investment, rather than taking a more holistic approach to the funding needed by businesses trying to scale up. We need a financial environment that is focused on businesses with growth potential, in people-based IP not just short-term sales, so they can attract and retain the the best talent, and grow their staff and other non-capital resources.

5.5.2 Q19 - Long Term Investment

What are the most important factors which constrain quoted companies and fund managers from making longer term investment decisions, and how can we best address these factors?

The UK investment community is increasingly focused on short term return, making it ever more difficult for a listed company to invest in longer term, more risky strategies. This not only results in fewer companies creating leading-edge products or services; it means that the senior management team too often is required to spend too much time justifying its more strategic actions to investors.

The need for “patient capital” has therefor never been greater. But it must reach beyond fixed assets – it must be prepared to invest in people needed to research and implement strategies that may take 5-10 years to mature.

Increasingly the use of crowdfunding, combined with “friends and family” funding, is seen as a way to avoid the impatience of traditional VC funding for smaller companies. By finding ways to avoid seeking funding too early from traditional investment sources - by growing organically for example – greater value can be built in a company before committing to the inevitable short-term constraints of larger-scale investment.

This is increasingly how silicon valley and some in China are funding new startups: people leaving previous acquisitions then funding themselves alongside some of their co-founders. Since the UK simply doesn't have that number of independently wealthy individuals, we need to come up with new and more creative ways of funding these companies. Only through breaking these traditional barriers will be create a dynamic startup and fast growth culture seen elsewhere.

5.5.3 Q20 - Equity Capital Outside South East

Given public sector investment already accounts for a large share of equity deals in some regions, how can we best catalyse uptake of equity capital outside the South East?

The ElecTech Council believes that by adopting some of the guidelines referred to elsewhere in our response, ElecTech-focused strategies will result in a far broader distribution of funds across the UK thanks to the vast numbers of companies it touches - more than 45,000 and growing.

5.5.4 Q21 - New Funding Opportunities

How can we drive the adoption of new funding opportunities like crowdfunding across the country?

Crowdfunding has become an exciting new dynamic for creating vibrant young startups. But it has now reached beyond that: companies now use crowdfunding to fund new products they

wish to develop as well. Indeed some UK companies (e.g. Imagination Technologies) have been recognised for their innovative use of crowdfunding to finance new products.

Since Crowdfunding platforms are run by private sector businesses, it is not clear that the government needs to do anything to further encourage this. However it may be worth considering ways for the government to actively and visibly participate in crowdfunding of businesses where they are clearly aligned to some core objectives of the government's industrial strategies. By showing publicly that the government is prepared to participate in the funding of new companies – however small the contribution – businesses would be more actively encouraged to target government strategies. The act of demonstrating government support is likely to incentivize many more people to invest in that company through whatever crowdfunding site they are using, thus helping them to grow faster.

Of course, any investment strategy should be based on a neutral and consistent methodology that does not require the government to ever choose who could be a winner. This can be achieved by, for example, offering a fixed investment to any startup arising from UKRI-funded research whose "Impact" rating is above a threshold. Another methodology could include any company involved in any InnovateUK-funded project, where the funding is to be used to enable them to develop technology or products targeting that project but intended for wider markets.

As a more radical measure, it might be possible to create a dedicated government-backed crowdfunding site for UKRI and InnovateUK-related companies. By having appropriate checks and balances on the terms by which companies can use it, this might encourage many more people to invest in the UK's innovation and future businesses.

5.5.5 Q22 - Scale-up and Business Networks

What are the barriers faced by those businesses that have the potential to scale-up and achieve greater growth, and how can we address these barriers? Where are the outstanding examples of business networks for fast growing firms which we could learn from or spread?

As explained earlier, one of the biggest challenges for businesses is finding finance for growing staff rather than capital assets. This is especially true where a small company with limited commercial success wishes to grow aggressively in anticipation of its product gaining market success. While such growth is common before significant revenues in other countries such as the US and China, in the UK this funding is very difficult to achieve in practice, resulting in CEO's seeking finance from outside the UK. Studying the terms by which these countries' investors are willing to invest in high growth, higher risk businesses and comparing them to UK investors would give valuable insight as to why we are not funding companies for global success.

Another method that is gaining increasing popularity is the contract manufacturing backed startup incubator. Some of the world's biggest manufacturers such as HonHai/Foxconn (Innoconn, Beijing) or Flextronics (Lab IX, Silicon Valley) or PCH (Highway 1, San Francisco) are offering incubation space complete with services to enable companies to manufacture to full production standards their first thousand products.

This "get real products to market fast" approach is very encouraging for startups making any sort of hardware. When coupled with an Industry 4.0 strategy to get more smart factories in the UK, this approach could be used to get a new wave of both contract manufacturing and bespoke manufacturing plants financed and exporting products quickly.

5.6 Improving procurement

5.6.1 Q23 - Innovation Through Public Procurement

Are there further steps that the Government can take to support innovation through public procurement?

The ElecTech Council has always believed that the scale of government procurement means it is one of the most powerful tools for stimulating growth of UK companies. However this should not just be for showcase projects, but should reach across every aspect of operations involving ElecTech. That means everything from smart energy in hospitals to the communications hardware security used in the IT in every government office; from the computers and hardware used to teach IOT and coding in schools to the lighting used in Westminster. Procurement of ElecTech needs to become a key part of government procurement everywhere – it will stimulate new startups and jobs across the country.

There are many ways in which public procurement can be used to make a substantial impact in the UK innovation and business scale-up landscape. Some of these are:

- a) Ensure that every public procurement tender includes a review of UK content for ElecTech and other technologies and components, and to ensure equivalent UK products get priority. Every time a suitable UK vendor is not found, the candidates and the winning suppliers' details should be fed back into a team who can assess whether having a more competitive UK supplier would be valuable. By looking for patterns where UK companies repeatedly do not compete, yet the value of good supplied is substantial, then strategies can be put together to stimulate more competitive UK suppliers in those areas
- b) Be more pro-active in making every major project a showcase for UK technologies. Government often does not appreciate that a showcase design win in an NHS hospital, in a UK smart city scheme, or a UK government national deployment of digital services creates one of the most valuable forms of promotion for any vendor world-wide. Many US and Asian companies already know this, and will work aggressively to ensure they win UK business that they can then use to win further business with similar products in many other countries. The UK is a very strong place to get a "reference" showcase design win – that should be used to stimulate UK business
- c) Procurement should look at everything that is purchased, not just the big projects. How much IT equipment or communications equipment is purchased every year for public projects? What equipment is being purchased for schools or government offices? If greater focus was placed on trying to use UK products, new suppliers would emerge. This approach has already been used in countries like China, resulting in some very strong new computer companies.

There are many more example of using procurement to stimulate UK business – but these must not be restricted to the "big projects" – it must be considered across every aspect of public procurement spend.

5.6.2 Q24 - Using Procurement to Drive Industrial Strategy

What further steps can be taken to use public procurement to drive the industrial strategy in areas where government is the main client, such as healthcare and defence? Do we have the right institutions and policies in place in these sectors to exploit government's purchasing power to drive economic growth?

Building on the previous answer, we believe that procurement in key areas like the NHS is not operated in a strategic manner. Furthermore, since the entire NHS management infrastructure is focused on innovation in drugs, not IT or ElecTech, strategic procurement is proving difficult in practice.

ElecTech spent considerable time in discussion with NHCIC as well as the NHS. Our conclusion was overwhelmingly that the moment any issue comes up that is not a key drug, it is passed on to the local trusts, who in turn hand it to their IT departments. These departments are not set up to work strategically, so few projects involving any form of smart electronics or other ElecTech get anywhere. We know companies that have been forced to do their trial deployments in the US as no hospitals in the UK would consider anything innovative. And even where companies have achieved successful trials in one hospital or trust, the difficulty of leveraging that to scale to other trusts is extremely difficult.

In particular, the NHS needs to recognise that by using the many different technologies and capabilities in the ElecTech community, from consumer data gathering devices to secure communications through to innovative real-time AI-base analytics, tackling the fundamental issue of getting an ageing population out of hospitals can be transformed. Our industry is swimming with proposals for helping in areas as diverse as basic social care, large scale drug evaluation, early identification of health degradation and remote access for people at home. But the ability of the NHS to leverage national deployment of ElecTech-based solutions remains simply too difficult a challenge for most of our industry. This needs to change!

5.7 Encouraging trade and inward investment

5.7.1 Q25 - Support for Businesses

What can the Government do to improve our support for firms wanting to start exporting? What can the Government do to improve support for firms in increasing their exports?

The DIT needs to do far more to showcase the skills of UK companies in different and more innovative ways. This could start by creating new programs encouraging companies to apply to “get recognised” by the DIT, for the significant prize of being able to access the value of the DIT’s marketing machine. The DIT has to think much more like an experienced business marketing its assets effectively. The “Britain is GREAT” campaign has been a useful step forward, but it is time to move on and find more engaging ways to reach new audiences with the UK technology messages.

For example, UK government hosted events – which our CEO and many of our members have been part of for many years – simply lack the commercial drive of other countries such as Israel, Germany or France. The UK needs to have a far stronger presence by investing in more impressive, better organized stands in key events like CES, MWC and other major international industry events. The ElecTech Council includes individuals and organisations with many years’ experience of this –we can help!

Furthermore, DExEU needs to ensure that UK ElecTech companies are able to continue exporting effectively in the EU, without having to resort to WTO rules. It is vital that BEIS encourages companies to invest in new factories and design facilities in the UK despite the ongoing Brexit rhetoric.

5.7.2 Q26 - Learning from Others and FDI Impact

What can we learn from other countries to improve our support for inward investment and how we measure its success? Should we put more emphasis on measuring the impact of Foreign Direct Investment (FDI) on growth?

FDI has the potential to deliver the fastest short-term growth in the UK while we do more to encourage UK-based high growth scale-up businesses. We have seen incentives from other countries for many years encouraging FDI – for example France was able to build a thriving and significant technology cluster in Sophia Antipolis for many years based mostly on investment from foreign companies. Given the number of leading companies that are not headquartered in

the UK, a strong focus on FDI ensure that the UK can benefit from the global message given by investment from companies like Google, Nissan and Softbank/ARM.

The ElecTech Council believes that ElecTech-based companies have the potential to attract more FDI than many other industry sectors, and that the results will be seen both in the UK economy and through export success of products, services and IP (intellectual Property).

5.8 Delivering affordable energy and clean growth

5.8.1 Q27 - Limiting Energy Costs

What are the most important steps the Government should take to limit energy costs over the long-term?

The government must recognise and embrace the fact that ElecTech lies at the heart of most aspects of upgrading to a smarter infrastructure. Every form of infrastructure involves a combination of smart technologies driven by ElecTech, combined with close attention to regulation and standards.

Parts of the ElecTech community, led by BEAMA and GAMBICA, have been leading the way in developing a series of low carbon economy proposals and initiatives. A significant percentage of the expertise needed to ensure progress towards reducing energy consumption resides in the ElecTech industries. Furthermore, more aggressive use of ElecTech technologies will enable far more efficient energy distribution and usage through smart meters, smart grids and smart buildings. Far more attention should therefore be paid not just to the major energy utilities, but to the vast ecosystem of innovators supporting them, many of whom are part of the ElecTech community.

The ElecTech Council therefore recommends greater leverage of the significant reach of trade bodies like BEAMA and GAMBICA to achieve more rapid progress both short and long term.

5.8.2 Q28 - Competition Without Subsidies

How can we move towards a position in which energy is supplied by competitive markets without the requirement for on-going subsidy?

BEAMA is leading the way in thought leadership for a more competitive, efficient and sustainable energy infrastructure.

The ElecTech Council, through BEAMA, is already closely engaged on implementation of initiatives such as “Each Home Counts”, as well as driving the cross-industry standards agenda through the recently announced ESSAC (Electro-technical Standardization Strategic Advisory Council) initiative, a collaboration between the BSI, GAMBICA, BEAMA and ElecTech.

5.8.3 Q29 - Working Together to Leverage Innovation

How can the Government, business and researchers work together to develop the competitive opportunities from innovation in energy and our existing industrial strengths?

We need to use showcase projects that capture the general public’s imagination – and ideally incentivise them to adopt new technologies earlier. Furthermore, every initiative for deploying new technology, from smart meters to smart grids, should try to maximise UK ElecTech and other UK technologies. The recent smart meter deployment for example relies extensively on meters coming from non-UK vendors – why not focus on UK-designed and UK-made meters for something so fundamental to the UK? A similar approach could be taken with BT regarding home access for broadband, maximising UK technology in their main home hub product. Through finding ways for government to ensure UK companies benefit from major innovative

deployments, the most innovative businesses, including those startups coming from our advanced research, can benefit from the more joined-up thinking.

The NMI is a great example of bringing together many different companies in the ElecTech community to tackle broader issues around innovation, from automotive electronics (AESIN) and Power Electronics through to IOT security (IOTSF). The government should focus on encouraging these industry-led initiatives, and ensure that the KTNs do not stifle their growth through having greater resources in overlapping areas.

5.8.4 Q30 - Cost Savings

How can the Government support businesses in realising cost savings through greater resource and energy efficiency?

BEAMA and GAMBICA have been working for many years to identify recommendations to help homes, offices and factories become more energy efficient. The government should leverage the skills in these organisations to help drive initiatives in this area. Relying on individual companies risks too much investment being accessed by too few companies. By using the breadth of membership of BEAMA and GAMBICA, the government can come up with policies that will reach a far broader cross-section of UK industry.

5.9 Cultivating world-leading sectors

5.9.1 Q31 - Identifying Sector Deals

How can the Government and industry help sectors come together to identify the opportunities for a 'sector deal' to address – especially where industries are fragmented or not well defined?

The ElecTech is a leading example of how to bring together an extensive but highly fragmented horizontal industry sector, and enable it to speak to government with one co-ordinated voice. The biggest advantage of engaging a horizontal sector like ElecTech is that investment in it reaches many more recognised vertical sectors. In other words, you get more bang for the buck! It is vital that the government recognises that it must do much more to engage with and encourage those sectors that are not so well represented in current Industrial Strategy thinking – these are where much innovation and growth resides, but does not have the support to make their voice heard.

5.9.2 Q32 - Incorporating New Entrants

How can the Government ensure that 'sector deals' promote competition and incorporate the interests of new entrants?

Sector deals have to expand to create marketplaces, not just encourage showcase products such as cars and jet engines from individual manufacturers to be built. Put another way, sector deals should be designed to focus on the creation of sector ecosystems, not just promote individual winning products or services.

BEIS engagement with industry also needs to do more to continuously bring in new industry players to work with them, not just a few of the best-known brands or individuals already known to them.

Too many projects are being led by large non-UK companies, resulting in smaller companies – both UK-based and multinational – finding it too hard to participate to the same level. While the participation of widely-recognised brands such as many non-UK companies is beneficial for engagement with the general public, there is growing concern in UK companies and smaller non-UK companies of the dominance in government programs of non-UK companies sponsoring and participating in BEIS-led activities. BEIS needs to find ways to get a better

balance between UK-based and major non-UK companies engaged in the work it does, to demonstrate commitment to growing UK businesses.

The playing field for government-related reviews, studies and projects also has to become much richer and more diverse than it is today, encouraging smaller and mid-sized companies, as well as the #2 and #3 competitors in key industries, to get more visibility.

5.9.3 Q33 - Collaboration for Growth

How can the Government and industry collaborate to enable growth in new sectors of the future that emerge around new technologies and new business models?

Existing methods used to encourage new sectors are focused on too small a number of entities – such as TechCity – that quickly become highly selective as to who can engage with them. The Catapults could provide opportunities to identify new companies, sectors and opportunities, but until a broader mix of companies across industry are seen to be benefiting through engagement with Catapults, this is unlikely to be successful.

In order for new sectors to gain competitive advantage in the global marketplace, early investment in projects that showcase innovation in technologies, business models and product capabilities must be found. This is unlikely to be solely government funded – but it could be multiple new government-supported investment funds (not just one large one), managed by the technology investment community supported by BEIS and tasked specifically with driving new sectors.

The sectors targeted for investment should already be mostly known to InnovateUK and UKRI. The key is to create something sufficiently lightweight that innovators will see new joint government + private funds as one of the best ways to get funding, not something too painful to try to access.

These funds must in themselves be competitive with one another! However these funds must be guided to deliver patient funding over at least a 5-10 year time horizon, so ensure innovation has a chance to succeed and make mistakes on the way. The government contribution should be there to ensure that such “patient funding” is truly “patient” in practice.

5.10 Driving growth across the whole country

5.10.1 Q34 - Are These the Right Principles?

Do you agree the principles set out above are the right ones? If not what is missing?

There are several things missing in these initiatives:

1. Get the public behind innovation and UK-made, UK-designed and UK-supported products. More must be done to ensure the general public are inspired by the initiatives behind the Industrial Strategy. The vast majority of individuals and businesses simply see this as benefiting a relatively small number of companies, many non-UK based (see comments in Q32, benefiting instead of creating more UK jobs and skills
2. Create highly visible projects that are designed to showcase UK companies and help them export and attract FDI.
3. Leverage regulation and standards driven from the UK through institutions like the BSI to maximise UK influence across all global markets, and use this to help negotiate trade deals and ensure UK companies are the leading developers of new products built around UK-led standards

5.10.2 Q35 - New Approaches and Investment in Skills

What are the most important new approaches to raising skill levels in areas where they are lower? Where could investments in connectivity or innovation do most to help encourage growth across the country?

We must start with the younger generation of children, to get them thinking about how they can be part of a new UK built on technology leadership.

We need to ensure that our communications infrastructure, for the Internet of Things as well as voice and video, reaches everyone, especially smaller, more rural areas.

And we need to find ways to create new factories building a wide range of new low to medium volume products leveraging Industry 4.0 technologies are happening in every corner of the country.

5.11 Creating Institutions bringing together Sectors and Places

5.11.1 Q36 - Working Locally

Recognising the need for local initiative and leadership, how should we best work with local areas to create and strengthen key local institutions?

The skills at the heart of the ElecTech industrial sector are at the heart of many regional initiatives around the UK that have the ability to generate jobs and growth in every city and town across the UK. Examples include:

- **smart cities**, which rely on ElecTech to power the communications and IOT, as well as smart transport systems, and even energy-efficient LED lighting
- **a smarter NHS**, serving people in their homes rather than hospitals thanks to the latest low cost, high capability electronics combined with advanced AI running on cloud datacentres built on ElecTech
- **smarter communications**, using ElecTech to deliver everything from advanced 5G communications to signage and energy-efficient LED lighting
- **smart manufacturing**, where ElecTech is at the heart of everything from energy efficiency to the latest robots, through to AI-based real-time management and AR-based factory design

We also need to rethink how LEPs operate, to get them behaving more strategically. They usually have little or no people with significant technology business experience, and their funding is often aimed at mainstream infrastructure or capital investment rather than building businesses, services or skills. They need the ability to invest in people more.

5.11.2 Q37 - Support for Institutions for Focused Growth

What are the most important institutions which we need to upgrade or support to back growth in particular areas?

We need to recognise the significant strategic value of standards and regulation in the creation of strong industrial strategies, led by the BSI, IET and other related organisations supported by the trader bodies as well as parts of industry. The UK already has great strengths in this area, with many other countries relying on, and often simply adopting, UK-led standards. We need to exploit this as a means of reaching global markets, by more closely aligning the role of standards with business growth and success through market leadership.

We also need to review the direction of UKRI to ensure much more is done to move our advanced research into innovative startup companies, and make sure they focus on growth to significant size exporting to global markets.

We also need to give greater support to InnovateUK to give it far more capabilities to enable it to bridge the “trough of disillusionment” between successful research and high growth new businesses. Greater investment must be given to helping individuals, universities and companies transition from research to business.

5.11.3 Q38 - Missing Institutions

Are there institutions missing in certain areas which we could help create or strengthen to support local growth?

We propose the creation of a new National Interoperability Institute, which can develop capabilities ensuring products and services from many different sources will always work with each other reliably. This will initially focus on industrial digitalization, IOT, automotive, smart energy and eHealth. By establishing UK leadership in this, many companies from around the world would be encouraged to have operations in the UK to ensure they tap into such a unique, cross-industry capability.

Related to this proposal, we need to leverage strategically standards and regulations developed and led by the UK. Many countries around the world rely upon UK standards, so we should leverage that and the reach of the BSI (in over 80 countries) to help us gain increased global success in both exports and FDI.

One way to do this would be to fully support the new strategic standards ESSAC initiative – a collaboration led by the BSI with ElecTech members including GAMBICA, BEAMA and the NMI . It is an innovative team with the objective to identifying cross-discipline, cross-sector standards and regulations that can deliver strategic benefits to the UK.