

ESCO

Electronic Systems
Challenges & Opportunities



Report Launch Event

*One Great George St
London
27 Jun 13*



Agenda

- 10:15 Arrival & Coffee
- 10:30 Welcome & Introduction
- 10:40 Overview
- 11:00 Government Response - Rt Hon Ed Vaizey
Minister for Culture, Communications & Creative Industries
- 11:30 Workstream Summaries
 - Workstream 1 – Economic Footprint of the UK Electronic Systems Community
 - Workstream 2 – Research, Development and Intellectual Property (IP) creation
 - Workstream 3 – Innovation climate
 - Workstream 4 – Manufacturing
 - Workstream 5 – Skills: Supply, Demand, Provision and Gaps
- 12:15 Taking it Forward & Driving Action
- 12:30 Panel Q&A
- 13:00 Networking Lunch

Why have we produced a report?

- ❖ Need to develop a strategic partnership with Government
- ❖ Vital for this community to think and act more cohesively and strategically
- ❖ We have a story to tell and actions to take

Why “Electronic Systems”?

- ❖ Recognise the way technology has developed
 - “Everything” is integrated into systems
 - Encompasses hardware, embedded software and the layers of technology between the base material and the end application
- ❖ A term that has one eye on a future where we see benefit in working together where
 - We take a broader view that combines messaging and resources
 - Working together and cohesively, we shape our own future destiny

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Challenges & Opportunities



Report Overview

Jamie Urquhart, ESCO Chairman

One Great George St
London
27jun13

For the Community By the Community

EXECUTIVE STEERING GROUP



STEVE BEAUMONT
University of Glasgow



JAMIE URQUHART
Pond Ventures



CHRIS CARR
Department for Business
Innovation & Skills



KEITH WILLIAMS
Altran



WARREN EAST
ARM



JOE WILLSON
Emerson Process Managem



INDRO MUKERJEE
Plastic Logic



SIR HOSSEIN YASSAIE
Imagination Technologies

MANAGEMENT GROUP



WOZ AHMED
Imagination Technologies



MARK BEGBIE
BIS



DEREK BOYD
NMI



PETER BROOKS
Electronics Yorkshire



TONY KING-SMITH
Imagination Technologies



ALASTAIR MCGIBBON
NMI



IAN OSBORNE
Intellect



IAN PHILIPS
ARM



GRAEME PHILP
GAMBICA



MARCO PISANO
Intellect



DARREN RACE
Semta



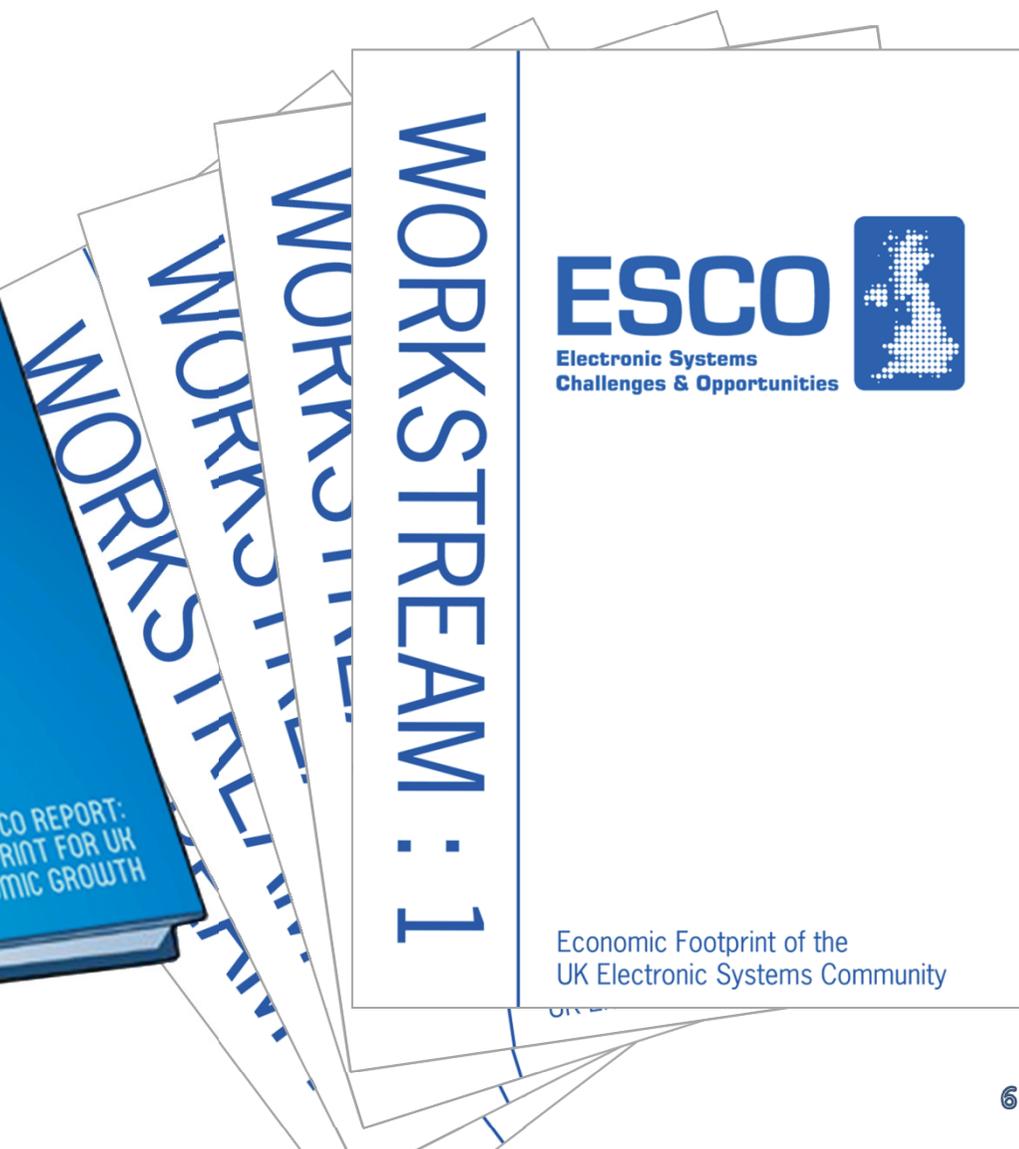
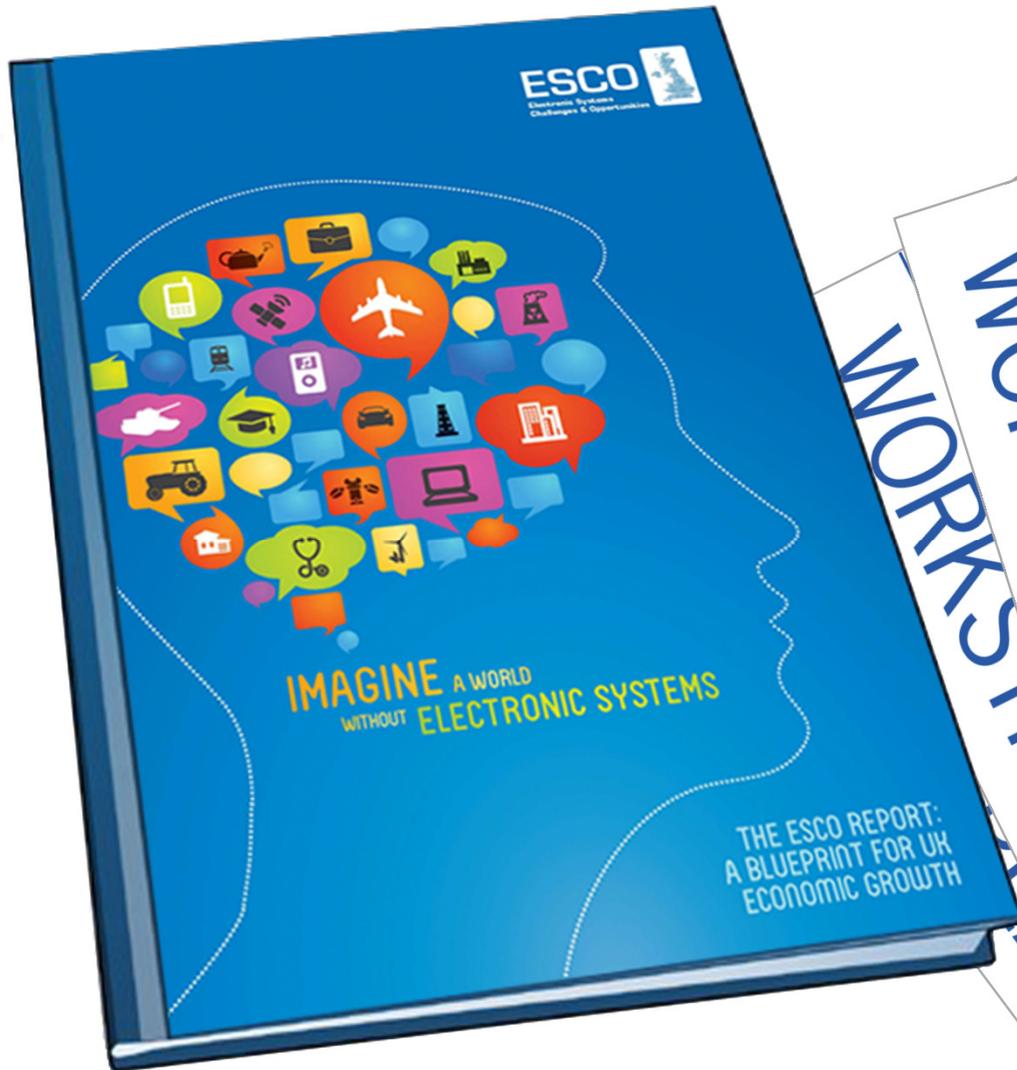
NIGEL RIX
ESP-ETN



ROGER ROGOWSKI
UKEA

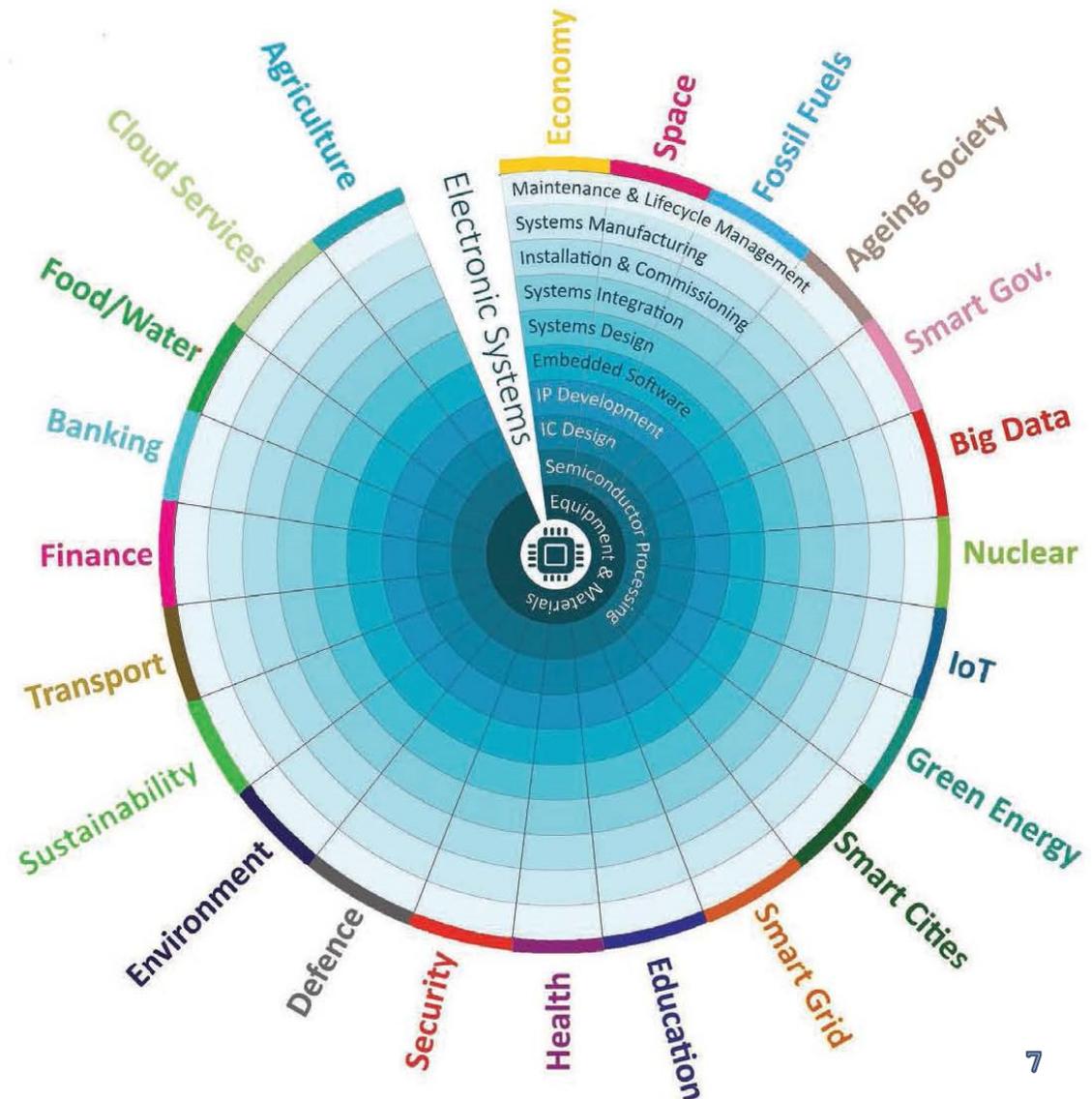
- ❖ *Broad participation from leading Executives*
- ❖ *Support organisations from across the industry rallied to the cause*
- ❖ *Thank you to the 150 organisations and leading individuals who also*
 - Allocated time & expertise
 - Contributed comment

The ESCO Report



Electronic Systems Technologies ... Are Key Enabling Technologies

- ❖ They are already fundamental to society and the solutions to society's challenges
- ❖ We are dependent on them today; and will become even more so in future
- ❖ We must develop a situation of mutual co-dependence
 - ❖ Within the UK
 - ❖ As a key node in the global ecosystem
- ❖ We start from a surprisingly good position today
 - But have significant challenges to overcome



Electronic Systems Everywhere - Visibly

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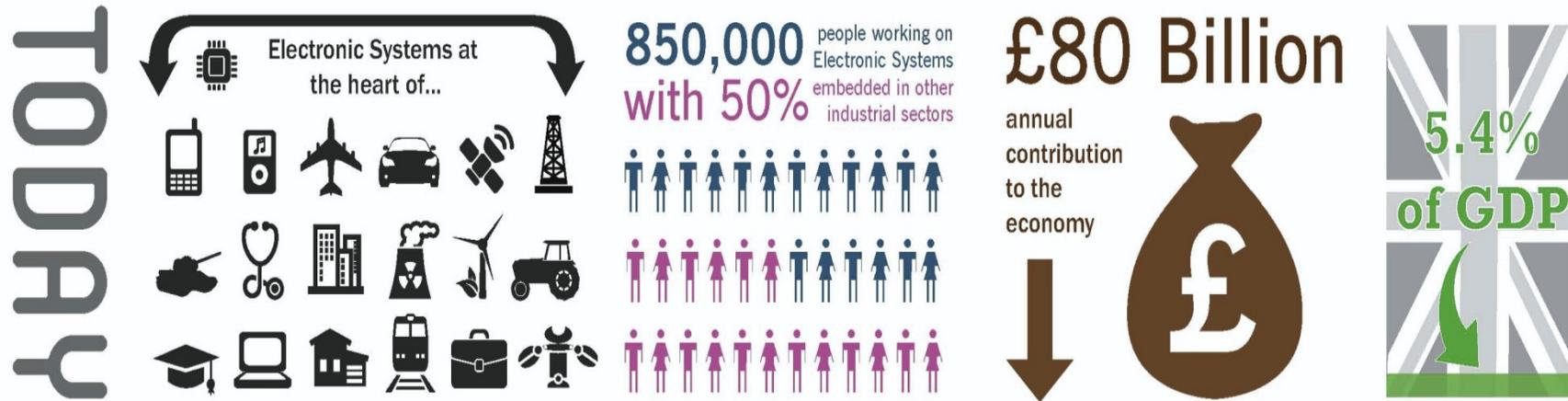
Electronic Systems
Challenges & Solutions



Electronic Systems Everywhere - Invisibly



Electronic Systems in the UK



- ❖ *Employs more than 850,000 in the UK today ...*
 - Half in 30,000 Enterprises working with ES Technologies
 - Half in Embedded in Businesses that depend on Electronic Systems
- ❖ *Directly contributing £78.5Bpa to UK GDP in 2012 (5.4%)*
 - With an indirect impact many times that
- ❖ *Working with technology that is mostly invisible to the end-user*

Report Conclusions

- The UK Economy is highly dependent on Electronic Systems today ... but doesn't realise how much more reliant it will become
- The Electronics industry did not leave the UK 20yrs ago ... but evolved into a different (invisible) but thriving 21C UK sector
- No nation is an Electronic System island; we are all inter-dependent ...but for economic security, must avoid over-dependence on others
- The UK Electronics Systems sector is a significant success, contributor and opportunity
 - Not optimised to minimise the UK's exposure
 - Nor optimised to maximise our UK Economic contribution
 - Has more to contribute tomorrow...but is under threat from economies who embrace this potential to a much greater extent than we currently do in the UK

The ESCO Report

- Provides an evidence base that substantiates our claims
- Builds a consensus from a broad consultation across industry and academia
- Presents an action plan that can lead to
- Renewed impetus in and from our industry and universities
- New opportunities for business growth
- A synergistic and lasting partnership with Government to realise our industry's and the country's economic aspirations

Workstream Summaries

Workstream 1 - Economic Footprint of the UK Electronic Systems Community

- Professor Ian Phillips

Workstream 2 - Research, Development and Intellectual Property (IP) creation

- Professor Steve Beaumont

Workstream 3 - Innovation Climate

- Sir Hossein Yassaie, Imagination Technologies

Workstream 4 - Manufacturing

- Peter Maxwell, Cooper-MTL

Workstream 5 - Skills: Supply, Demand, Provision and Gaps

- Indro Mukerjee, Plastic Logic

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Economic Footprint

Professor Ian Phillips



- ❖ *Substantiate the belief that (contrary to popular opinion) ...*
 - The UK Electronic sector did not go away in the late 90's ..but..
 - Underwent a substantive evolution to a modern business form, suited to the opportunities of globalisation in this domain

- ❖ *Identify and Quantify the UK-Electronic Systems Community ...*
 - Its Nature
 - Its Scale of Employment
 - Its Economic Contribution

- ❖ *Using a process that should be...*
 - Appropriate to the nature of the enterprises involved
 - Open, rigorous and believable
 - Facilitate progress monitoring and inter-sector comparison
 - As accurate as possible

WS1: Techniques

- ❖ *Initial work in 2007/8 under Electronics Leadership Council*
- ❖ *Used FAME & IDBR databases with assistance of BIS Analysts*
 - To identify the overtly Electronic Systems Technology businesses
 - To identify the actual UK employment figures for each of them
 - And to provide the raw UK economic data for the rest of the economy
- ❖ *Used University of Manchester Dept of Economics*
 - To develop the appropriate Economic Model for valuing our contribution
 - To find appropriate (ONS) data for calibration
- ❖ *Supplemented with data from other reliable sources*
 - All identified
- ❖ *With Excel to bring it all together*
 - Spreadsheet available at www.esco.org.uk

WS1: Key Findings

- ❖ *Electronics has not left the UK ...
... It has Evolved into the UK-Electronics Systems Sector*

Table 4: UK Electronic Systems Community Economic Impact ...

Total UK Employment	29,125,000
Total UK ES Employment	855,973
ES as % of Working Population	2.94%
Total ES Wages and Salaries (£m)	£34,790
Average ES Wages & Salaries	£40,644
Average UK Wages & Salaries	£26,623
UK GDP (£m)	£1,458,452
ES Direct Contribution to UK GDP (£m)	£78,354
ES as % of UK GDP	5.37%

- Bigger and more successful than it ever was ...
- 5.4% of UK-GDP, from 3% of its working population ... Highly Productive
- An 'Appropriate Shape' for the 21c Global Market Opportunity

WS1: Key Findings

❖ Value1: Electronic Systems Enterprises

Table 6: Overtly ES Enterprises (P+S) ...

EntSize	ES Enterprises	Dist'n	Employment	Dist'n	Wages (£m)	Dist'n
0-4	22,450	74.8%	30,021	6.9%	1,285	7.5%
5-9	2,894	9.6%	16,520	3.8%	707	4.1%
10-19	2,000	6.7%	23,994	5.5%	978	5.7%
20-49	1,388	4.6%	37,738	8.7%	1,537	8.9%
50-249	1,050	3.5%	92,740	21.3%	3,581	20.8%
250+	250	0.8%	234,441	53.8%	9,106	53.0%
	30,031	100.0%	435,454	100.0%	17,195	100.0%

- Electronic Systems employs 435k people in 30k ES Enterprises
- ~50% of employment is in 250 companies with ave. size of 1,180
 - Nationally only 22% of employment is in 250+ category
 - These are very successful ES businesses!
- ~80% of ES Enterprises are <10 employees
 - These a tremendous growth opportunity for the ES Sector

WS1: Key Findings

❖ Value 2: Embedded Electronic Systems

Table 7: Embedded ES (K+E+I) ...

EntSize	Enterprises	Dist'n	ES Employ't	Dist'n	ES Wages (£m)	Dist'n
0-4	1,718,235	67.5%	--	0.0%	--	0.0%
5-9	386,096	15.2%	--	0.0%	--	0.0%
10-19	213,370	8.4%	35,362	8.4%	1,413	8.0%
20-49	140,533	5.5%	63,890	15.2%	2,553	14.5%
50-249	74,400	2.9%	161,922	38.5%	6,774	38.5%
250+	11,565	0.5%	159,277	37.9%	6,852	38.9%
	2,544,199	100.0%	420,520	100.0%	17,596	100.0%

- Employs 420k in 440k businesses
- ~40% of employment is in 250+ companies
 - Nationally only 22% of employment is in 250+ category
 - So is a Key Enabling Technology for successful companies
 - But ~2m businesses in the Community have no ES roles!

- ❖ *Publicise the nature and success of the community*
 - To develop public understanding and career opportunities
 - To maximise its success and its contribution to the UK economy
- ❖ *Establish Income Method as basis for all sector metrics*
- ❖ *Process 2013 Data-Point*
 - 5 July 2013: Anniversary of this data-collection
 - Lets see where we are headed ...
- ❖ *Improve Metrication & Accuracy*
 - Publicise 'Electronic Systems SIC Codes' and encourage their use
 - Even if not appropriate; better to be identified!
 - Establish use of '#Tags 'in all (ES) Corporate Descriptions
 - To enable much more useful data extraction
 - Link IDBR to HMRC data-bases
 - Establish Actual Cost of Employment figures for UK Employees

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Research Development & IP

Professor Steve Beaumont OBE



Key Findings – R&D

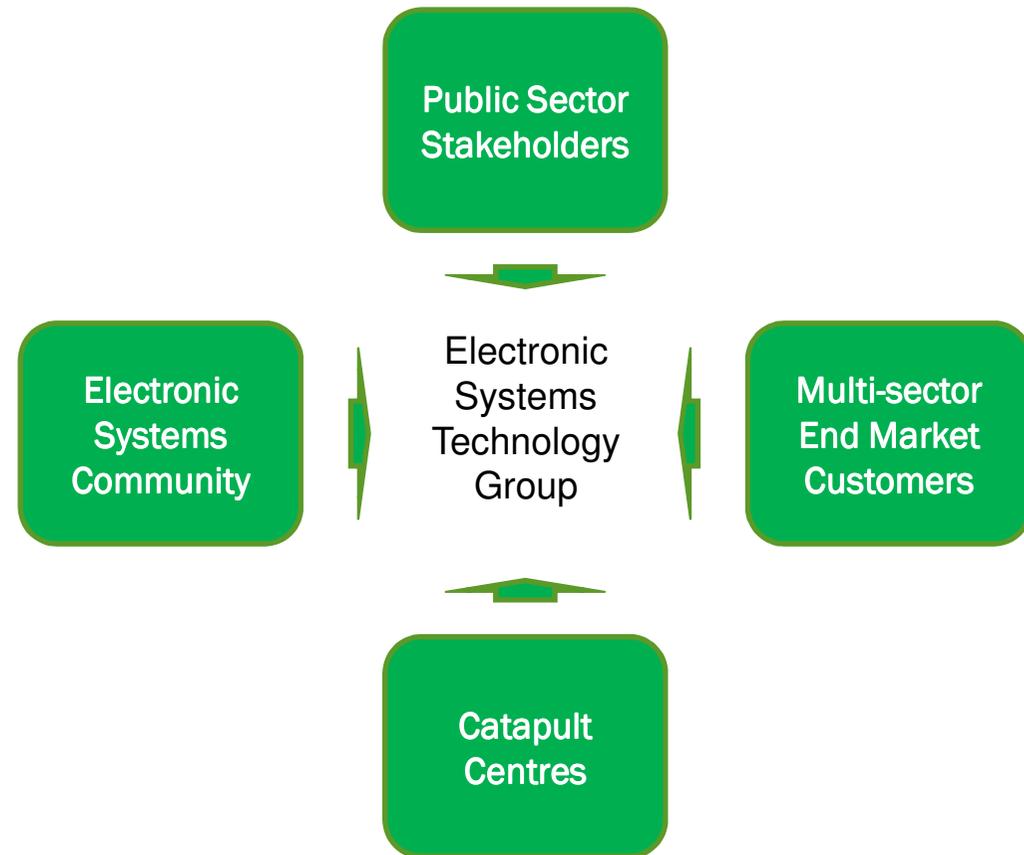
- ❖ *Electronic Systems company R&D as a percentage of turnover is high (typically 10-20%) and growing in real terms*
- ❖ *R&D is often naturally focussed towards product development – highly innovative systems thinking gives business advantage.*
- ❖ *Better Industry - Academia alignment is needed to help define a common technology direction and build business R&D capability.*
- ❖ *R&D supply chain behaviour is complex and feeds into multiple end markets. Activities can be defined in term of ecosystems.*
- ❖ *Public Sector intervention is at about the right level, but better public-private partnership is required to focus on key areas such as European Programmes and Systems Integration*

Key Findings - IP

- ❖ *The need for mature patent thinking is becoming pervasive across the Electronics Systems Supply chain, covering Design, Manufacturing and Systems alike.*
- ❖ *IP is as much about know-how as it is about product*
- ❖ *IP development is a contact sport - ideas mature and develop through collaboration*
- ❖ *Patent trolls work against IP development and are a major industry issue*
- ❖ *No silver bullet to solving trolling, but industry is keen to work with government*

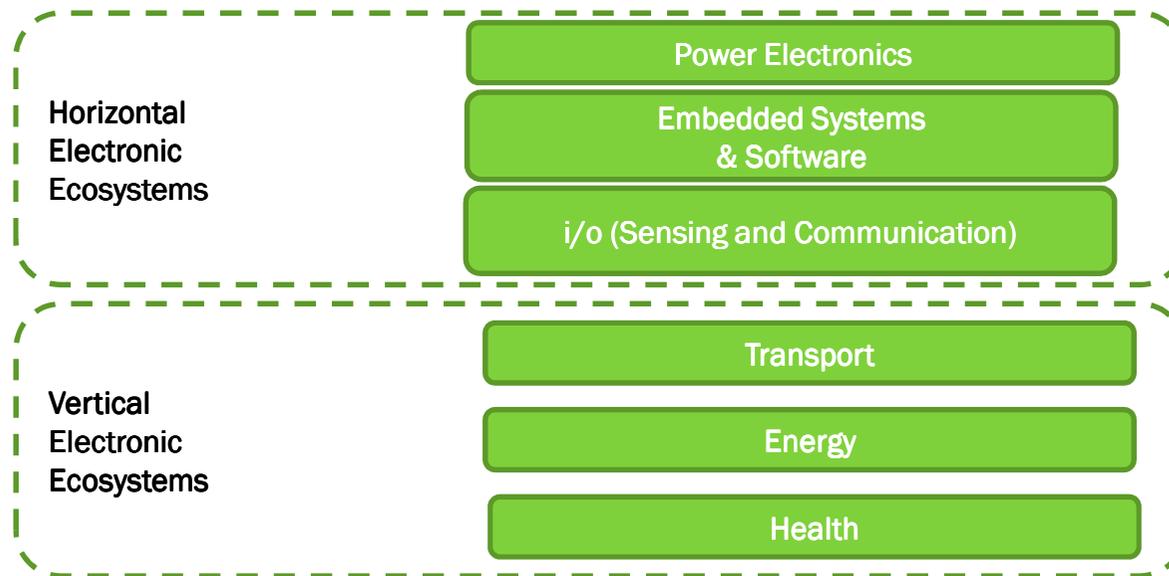
Outcomes

- ❖ *Electronic Systems Technology Group*
- ❖ *Facilitated by ESCO Associations, bringing Industry and Academia together*
- ❖ *Create strategic research agendas, address system thinking & R&D skills transfer*
- ❖ *Work in partnership with TSB, EPSRC, BIS and the Catapults*



Next Steps

- ❖ *Form an ESTG and establish key goals and outcomes*
- ❖ *Prioritise areas of focus:*
 - Ownership of tasks based on the capacity to deliver
 - Understand what the ecosystems are, and how to support them
 - Develop Strategic Research Agendas in priority areas



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Innovation Climate

Sir Hossein Yassaie



❖ *Objectives*

- Understand the competitive position of the UK ES industry
- Assess the impact of external factors
- Discover how strategy & policy support for innovation can be improved

❖ *Methodology*

- Primary research
 - CEO roundtable forum
 - Semi-structured qualitative interviews with ES executives in UK, USA, Taiwan and China
- Secondary research
 - Industrial policy
 - ES industry dynamics

- ❖ *UK ES industry is very innovative with a unique DNA*
 - IP, embedded software, communications, real-time systems

- ❖ *UK has many globally successful ES companies*
 - Success is due to powering US and Asian end product brands
 - Key enabling technology; mostly invisible to end users

- ❖ *£100 RRP product: £22 goes to brand & £1 to IP creator*
 - UK ES firms are not operating in every stage of the value chain

- ❖ *Markets of tomorrow will be driven by megatrends such as global warming & societal ageing*
 - New markets & applications lead to products, services and jobs
 - Smart grid, integrated transport
 - Health & wellbeing, Internet of Things

❖ *The brakes on success*

- Access to capital is restricted
 - UK ES firms lose first-mover advantage – vital in winner-take-all markets
- ES firms cannot recruit enough engineers in the UK
 - ES firms prefer the quality and skill set of UK engineers
- Engineering is not seen as cool in UK society
 - The consumer society is the biggest threat to British industry
- Immigration restrictions encourage reluctant off-shoring
 - UK universities are potentially training talent for our overseas competitors

❖ *Innovative SMEs seldom scale*

- Lack of global focus
- Support ecosystem (industry and government) limited
- Co-creation with customers is inadequate (cooperation & procurement)

❖ *State-driven approach*

- Japan (post WWII revival)
 - MITI forced companies to collaborate
 - Benefited from import protection and very low cost capital
- South Korea (lower population and GDP per capita than UK)
 - Chaebol (Samsung, LG) leveraged state funding for high risk R&D
 - SMEs perennially starve
- Taiwan ('low-cost fast-follower' against USA & Japan)
 - ITRI begat TSMC & UMC, which begat MediaTek, etc
 - Now relying more on corporate venturing and investment tax credits
 - Focus is on scale (TSMC, MediaTek, Foxconn)
- China ('low-cost fast-follower' against Taiwan)
 - Massive investment wasted; still importing vast majority of semiconductors
 - Incremental innovation
 - Price competition engenders race to the bottom

❖ *Entrepreneur-led approach*

- USA
 - Early-stage capital (SBICs, angels) & corporate venturing (Big Co's & US Gov)
 - Tolerates failure & pro-immigration
 - Education, clusters/ecosystems/networks & government procurement

Recommendations I

- ❖ *Ensure ES innovation leads to scale*
 - Facilitate strategic alignment with vertical markets , including workshops & showcasing
 - Access to government procurement , e.g. health
 - Aim global

- ❖ *Encourage innovation in every part of the value chain, including brands*

- ❖ *Enlarge the talent pool*
 - Direct the right messages at kids, parents and teachers early on through mass media and grassroots outreach
 - Align industry and academia
 - Industry and government form 1:1 matching fund to pay university fees for ablest home students in ES
 - Fine-tune immigration policy to address critical areas

Recommendations II

- ❖ *Encourage culture shift to create entrepreneurs & investors*
 - Moving away from celebrity culture towards pro-tech, pro-business orientation with a healthy risk appetite

- ❖ *Access to capital*
 - Investigate community-based approach to corporate venturing, further tax credits
 - Joint R&D in verticals

- ❖ *Improve alignment between ES industry and UK Gov (inc. TSB) through a long-term partnership and industrial strategy*

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Manufacturing

Peter Maxwell

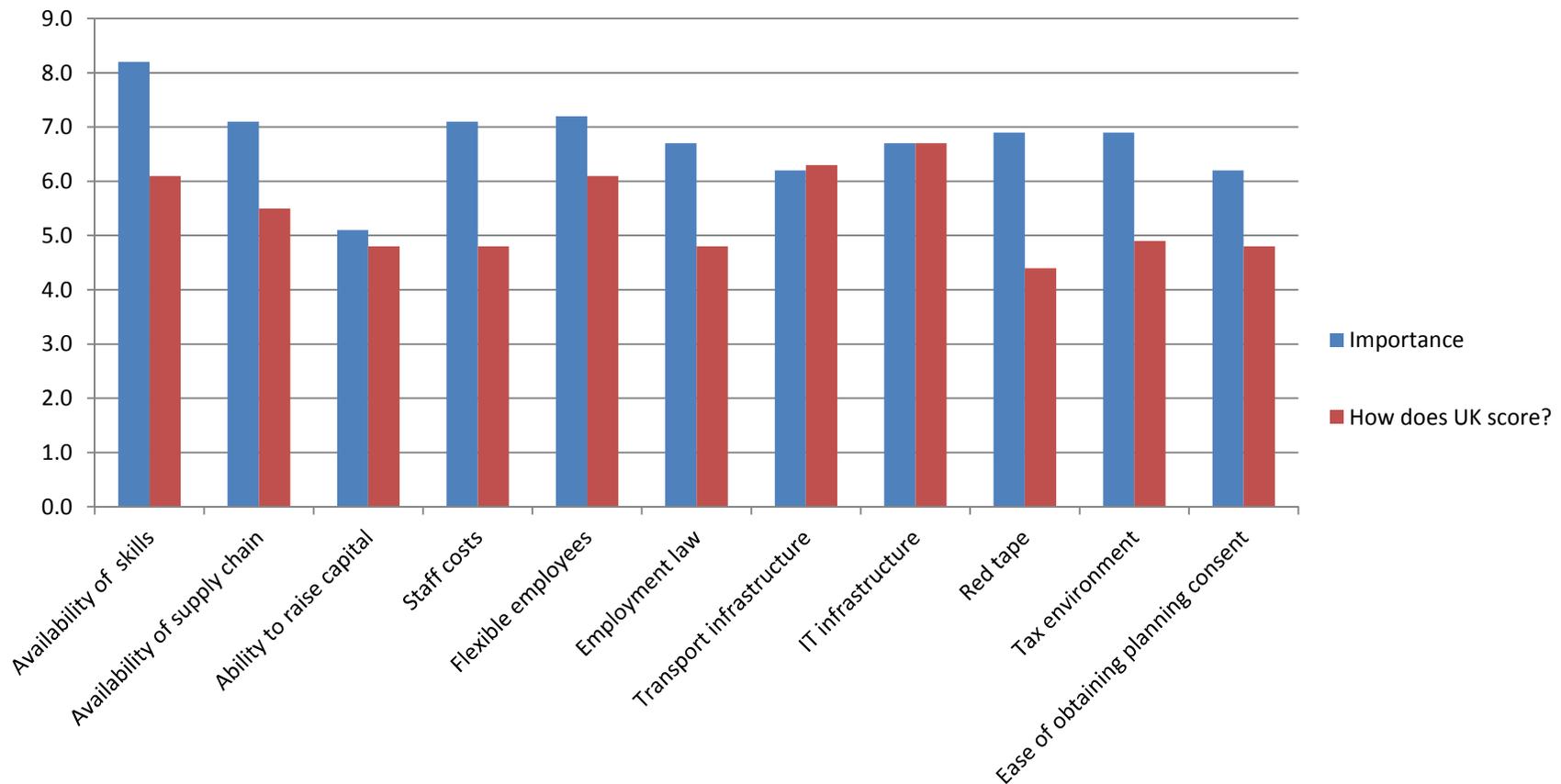


Things that might surprise you

- ❖ *There are over 5,500 Electronic Systems Manufacturers in the UK*
- ❖ *Together these employ 228,000 people in the UK*
- ❖ *They are significant exporters – 72% of output is exported according to ESCO survey*
- ❖ *25% of companies who had previously off-shored manufacturing have now re-shored back to the UK*
- ❖ *85% of Electronic System Manufacturers intend to increase the number of products they manufacture in the UK in the near future*

The UK as a centre for Electronic Systems Manufacturing

How does the UK score against other potential manufacturing geographies on key issues and how important are these issues? (out of 10)



Main themes emerging

- ❖ *Availability of UK engineering skills is the biggest concern*
 - Industry stands ready to partner with government and academic and vocational educational and training establishments to produce more readily employable graduates and school leavers.

- ❖ *UK Staff costs are high but industry accepts that it has to work with this*

- ❖ *UK industry will work to rebuild the electronic systems supply chain*
 - Government can help by encouraging public procurement to act as “lead customers”

- ❖ *Industry needs a world-class business environment and if that means paying more tax, then it is better than the alternative*

Recommendations from the Manufacturing Workstream

- ❖ *R&D tax credits are valued and should be retained and possibly extended*
- ❖ *Red tape challenge well received, but more needs to be done*
- ❖ *The industry welcomes recent commitments on transport infrastructure*
- ❖ *Recent improvements to the UK's digital infrastructure are widely praised, but we should not rest on our laurels*
- ❖ *The industry also welcomes government moves to relax unnecessarily restrictive planning rules*
- ❖ *Recent developments to encourage Apprenticeships are welcomed but there needs to be more emphasis on combining a university degree with an apprenticeship for the brightest A-level students*
- ❖ *The newly established High Value Manufacturing Catapult Centres are a big step in the right direction, but it is still difficult for existing SMEs to extract maximum value*

Conclusions from the Manufacturing Workstream

- ❖ *Electronic Systems manufacturing is an excellent example of high value manufacturing thriving in the UK*
- ❖ *It is a significant employer with 228,000 employees*
- ❖ *Companies that previously off-shored are now re-shoring*
- ❖ *Increasing automation and new techniques such as 3D printing will further encourage this trend – de-manning the factory but building employment and economic contribution in the supply chain and associated business and local services*
- ❖ *The shortage of engineering skills in the UK is the biggest threat to its future growth*

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Skills: Supply and Demand

Indro Mukerjee



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Driving Action

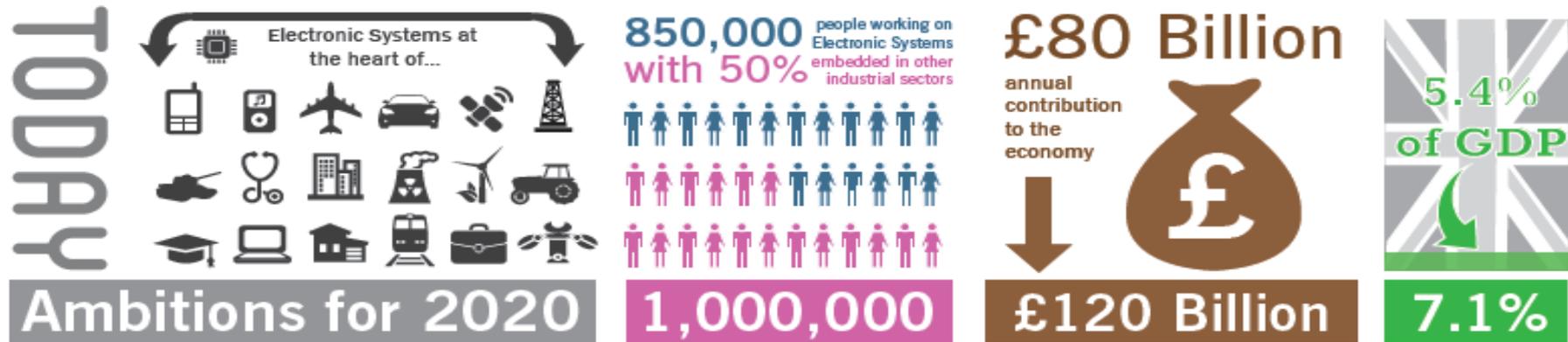


- ❖ *Key is the formation of an Electronic Systems Leadership Forum*
- ❖ *A Core Group that has been established to drive the Action Plan*
 - Warren East (Chairman)
 - Juergen Maier, Siemens
 - Indro Mukerjee, Plastic Logic
 - Keith Williams, Altran
 - Sir Hossein Yassaie, Imagination Technologies
- ❖ *To be co-chaired by Rt Hon Michael Fallon*
- ❖ *Will develop into a wider, inclusive and representative Forum*
- ❖ *Is supported by a strong collaboration across the industry's Trade Associations & other stakeholders*

Ambitions & Strategy



A blueprint for success



ENABLED THROUGH

- >> Building recognition of this strategically important key enabling technology sector
- >> Accelerating growth in UK vertical sectors as a result of the use of UK Electronic Systems
- >> Developing and exploiting UK Electronic Systems capabilities, nationally and globally

STRATEGIES	SMART LEADERSHIP & ENGAGING THE COMMUNITY	SMART SUPPLY	SMART INDUSTRIES DELIVERING SMART JOBS	SMART UK TO GLOBAL UK	SMART BRANDS, KNOWN BRANDS	DEVELOPING SMART SKILLS	SMART SUSTAINABLE GOVERNMENT PARTNERSHIP
	<p>Have a clear structure to provide leadership and a focal point for the UK Electronic Systems community</p>	<p>Ensure UK verticals can source UK electronics and attract systems integrators.</p>	<p>UK at the forefront of creating new Electronic Systems-based industries.</p>	<p>Ensuring the UK continues to create great electronics technology, but striving for more UK-led global players and export.</p>	<p>Create the environment to grow globally dominant electronics brands from the UK.</p>	<p>Develop a skills base that provides UK industry (horizontal and vertical) with the resources required to take advantage of future markets.</p>	<p>To be recognised by government as an important economic and strategic contributor to the UK economy.</p>
ACTIONS	<p>Establish Leadership Forum</p> <p>Engaging the sector</p>	<p>Leadership Forum connected to key verticals</p> <p>Strategic on-shoring</p> <p>Building UK ecosystems</p>	<p>Markets of Tomorrow</p> <p>Electronic Systems Technology Group</p> <p>The heart of Smart Healthcare</p> <p>The hub of Smart Transport</p> <p>The intelligence in the Smart Grid</p> <p>Encourage and support university research, development and innovation</p>	<p>Promoting UK Electronic Systems capability on global stage</p> <p>Taxation as a strategic incentive</p> <p>Government procurement driving innovation</p> <p>Intellectual Property – recognition and protection</p> <p>Catalysts – recognising importance of Electronic Systems</p> <p>Helpline – support through the funding maze</p>	<p>UK B2C brands study</p>	<p>Graduates: Develop the role of the UK Electronics Skills Foundation</p> <p>Increase the range of available craft and student apprenticeships</p> <p>Post-Graduate skills prioritisation</p> <p>Refining migration policy support needs of UK Electronics</p>	<p>Setting joint strategic objectives</p> <p>Adopting the economic model</p>

- ❖ *A lot of work done in getting us this far*

- ❖ *Doesn't stop here*
 - Need to develop action
 - By taking steps forward and repeating the process, we WILL make progress

- ❖ *We ask for your commitment to this process by*
 - Getting involved in the work plans
 - Adding your endorsement and advocacy to the report

- ❖ *“Thank you”*