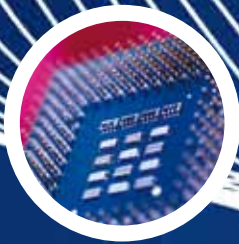
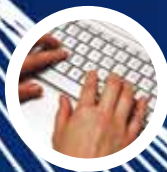


The ERA Foundation



The Sustainability of the UK Economy in an
Era of Declining Productive Capability

5th Report - March 2011

Contents

Introduction	1
The ERA Foundation response to the BIS Manufacturing Framework Consultation	2
Introduction	2
Barriers to growth	4
Innovation and knowledge transfer	4
Take up of new technologies	4
Accessing skills and training	5
Access to finance	5
Exporting	5
Regulatory issues	7
Energy costs and security of supply	8
Areas for consideration in the growth review	8
Supporting manufacturing productivity	8
Helping industry export more	9
Maximising market opportunities in manufacturing from Government activity	10
Showcasing manufacturing excellence	10
What advantages should we build on for the UK	10
Where are the future long-term growth opportunities	11
Growing global markets	11
Low-carbon and environmental market opportunities	11
The use of new technologies	11
New business models	11
The ERA Foundation Board	12

Introduction

Over the past four years the ERA Foundation has conducted a number of studies under the general heading of "*The Sustainability of the UK Economy in an Era of Declining Productive Capability*". Our first report, published in June 2008, looked at the serious deterioration in the Balance of Trade over the past decade, in large measure resulting from excessive imports and declining exports of finished manufactured goods. Our second report, published in February 2009, looked at the make-up of the nation's current account and within this the contribution of manufacturing. Our third report looked at the location of manufacturing capability and the impact of services. In our 4th report, published in February 2010, we identified the factors which needed to be optimised to enable productive industry to flourish in the UK.

We have concluded that there is no viable alternative but to rebuild a strong manufacturing capability in the UK. The concept that the UK economy can flourish with an almost total dependence on financial and business services has proved to be flawed. During the past 15 years manufacturing has been allowed to decline from over 20% to its current 13% of GDP with a disastrous effect on our Balance of Trade. The mantra that the UK is a post industrial society has encouraged the underinvestment in manufacturing industry and discouraged a generation from choosing an industrial career.

The ERA Foundation remains committed to promoting the importance of manufacturing to Government, policy makers, funders, opinion formers, professional organisations, "think tanks", the press and others. We therefore welcomed the opportunity to respond to the Government's recent consultation on a manufacturing framework – see <http://www.bis.gov.uk/assets/biscore/business-sectors/docs/g/10-1297-growth-review-framework-for-advanced-manufacturing>.

We decided to share our input to the Government with those with whom we have been working over the past four years in promoting the importance of UK manufacturing. Thus we have incorporated all of it here within our 5th Report, which builds on our 4th Report but adds new information. We are grateful to colleagues in Civitas, C V Simpson Associates, IET, RAEng, IMechE, Policy Connect, Oxford Innovation, and others who have been so willing to share information with us in our campaign.



A handwritten signature in blue ink, appearing to read 'Alan Rudge', positioned to the right of the portrait.

Sir Alan Rudge CBE, FREng, FRS
Chairman, The ERA Foundation

The ERA Foundation's Response to the BIS Manufacturing Framework Consultation

Introduction: The ERA Foundation has undertaken several studies in recent years relating to the importance of manufacturing in a balanced UK economy. The most recent report, with references to earlier reports, is "*The ERA Foundation's 4th Report on the Sustainability of the UK Economy in an Era of Declining Productive Capability*" available on-line at http://www.erafoundation.org/docs/ERAF_4thReport_March10.pdf.

Our 4th report, based on evidence from our studies and very wide consultation, highlighted various parameters requiring attention if the decline in UK manufacturing is to be reversed.

The ERA Foundation has used the analogy of a greenhouse to illustrate the situation. If just a few plants in the greenhouse die then one questions the health of the plants; but when many of the plants in the greenhouse are withering it is time to examine the greenhouse. The key parameters of our national manufacturing "greenhouse" can be identified and, with the future prosperity of the nation at stake, Government must take the lead in a campaign to optimise them to the greatest degree possible. Urgent action is needed. Twenty five years ago the UK was the world's 4th largest manufacturer (behind US, Japan, and Germany). It is now seventh having been overtaken by China, Italy and most recently France. (See OECD data at http://stats.oecd.org/Index.aspx?DatasetCode=SNA_TABLE1). More critically, UK manufactures contribute half of the nation's total exports and any further decline will add substantially to the already serious deficit in the balance of trade.

Top of the list of priorities in the ERA Foundation's 4th report was "*A long term, well publicised, Government commitment to manufacturing*". We have, therefore, been greatly encouraged by recent statements from Coalition ministers in support of manufacturing. This stance is welcome and in stark contrast to the mantra of previous administrations since the mid-1980s that the UK was moving "*into a new post-industrial era based on financial and business services*". However, while clear positive statements from Government are necessary, they are not of themselves sufficient and will need to be followed promptly by new policies and robust actions across a range of parameters affecting the competitiveness of UK manufacturing.

It is evident that the Coalition Government is seriously constrained by its inheritance of extremely poor national finances. Nevertheless, the only meaningful way to avoid a serious decline in the standard of living in the UK in the medium and long term is to restore the manufacturing base and this demands action now.

For the sake of completeness we list below the "Greenhouse Parameters" from our fourth report, and our assessment of their priority for action. It is reassuring to see that the vast majority of these parameters are mentioned in some form in the Government's recent consultation document ("*Growth Review Framework for Advanced Manufacturing*" – see <http://www.bis.gov.uk/assets/biscore/business-sectors/docs/g/10-1297-growth-review-framework-for-advanced-manufacturing.pdf>). In this document particular attention is given to provision of a competitive energy supply; the urgent need for technical skills; and the challenge of attracting young people into manufacturing. These requirements, with the need for a strong and public Government commitment to manufacturing, were at the top of the ERA Foundation list of Greenhouse parameters.

ERA Foundation 4th Report - Parameters identified as requiring urgent action:

- *A long term, well publicised, Government commitment to manufacturing.*
- *Competitive energy supply and costs.*
- *Availability of technical skills (non-professional).*
- *Encouragement especially of the young towards industry and manufacture.*

ERA Foundation 4th Report - Parameters requiring review and optimisation:

- *Government procurement policies and practices.*
- *Investment tax incentives.*
- *Capital depreciation relief.*
- *Research & Development Tax credits.*
- *Corporation tax.*
- *Business start-up support.*
- *Deregulation (and reduction of bureaucracy).*
- *Direct Government grants for specific industrial initiatives.*
- *Availability of engineers and other professional skills.*
- *Encouragement for Academic/Industry collaboration.*
- *Maintaining the science base.*
- *Regional Development.*
- *Infrastructure (transport and communications including broadband).*
- *Venture capital tax incentives.*
- *Bank for Industry.*
- *Accommodation costs/business rates.*

ERA Foundation 4th Report - Parameters judged to be in reasonable shape at the present time:

- *Foreign exchange rate.*
- *Interest rates.*
- *Labour costs.*
- *Flexibility of labour laws.*
- *Capital Gains tax.*
- *Capital controls.*
- *Intellectual property protection.*

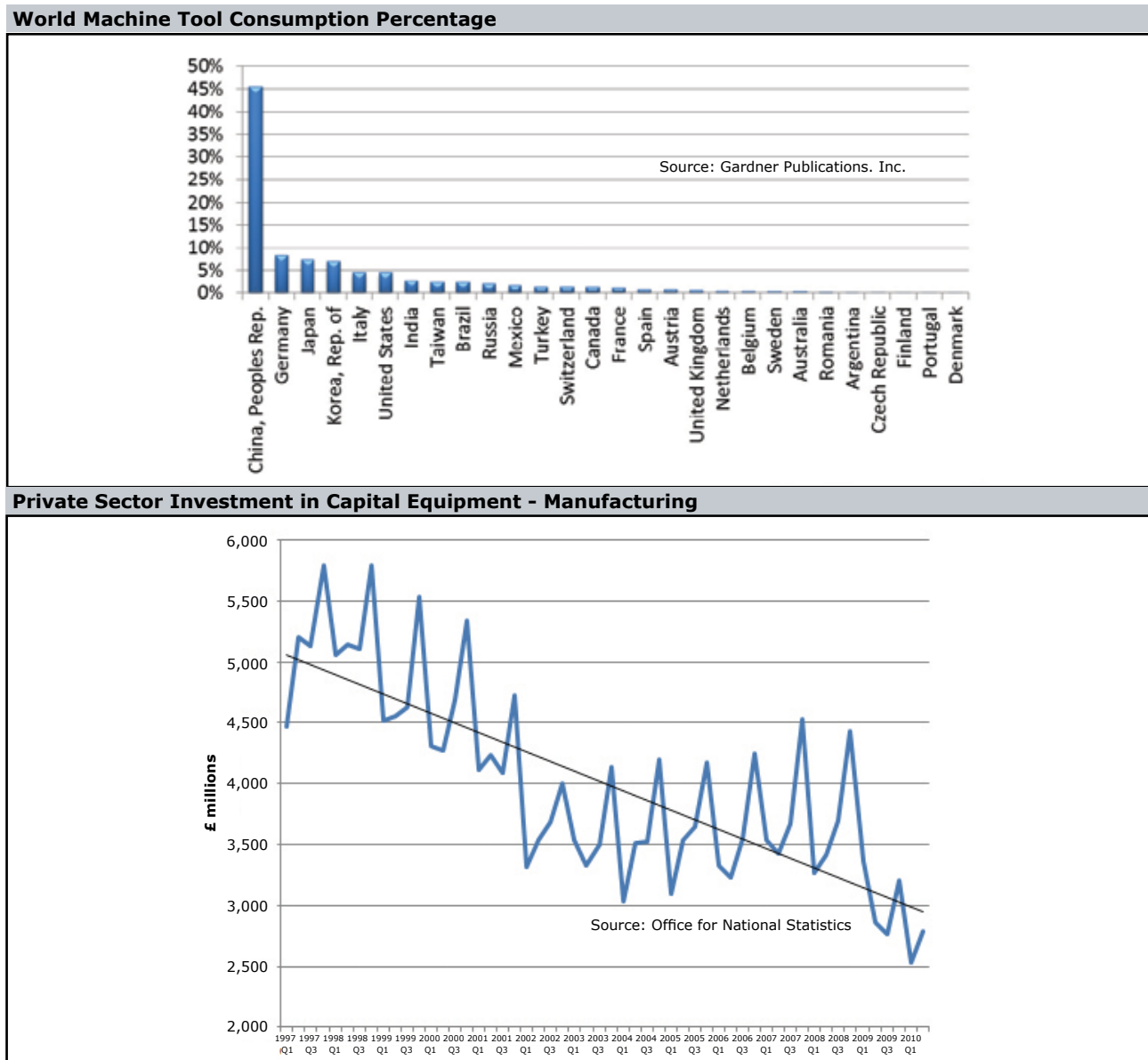
Barriers to growth

Building on our various studies we would like to comment on the various "Barriers to Advanced Manufacturing Growth" identified in the consultation document.

Innovation and knowledge transfer: Innovation in UK industry is not lacking, and is not in our view a major issue. There is always scope for improvement, but the best of UK manufacturing is world class. The UK's fundamental problem in manufacturing is that of *quantity* rather than *quality*. UK manufacturing has declined from over 20% of GDP to its current level of 13% since 1997. There is increasing evidence of successful horizontal knowledge transfer between sectors (e.g. the impact of manufacturing technologies on construction, and the increasingly widespread utilisation of digital technologies). Innovation can be catalysed by Government procurement policy and practice (see below), R&D tax credits, and grants for collaborative R&D with universities. But most innovation comes from within companies, down supply chains, or is driven by customers – without Government intervention.

Take up of new technologies: The take up of new technologies has been hampered by lack of investment tax incentives and unhelpful capital depreciation allowances. However, the main problem has been the reluctance of the banks to lend to the small and medium size manufacturers, thereby reducing their capability both to invest in new technologies and to expand their production.

The data below on machine-tool consumption are sobering and make the Government's decision to decrease the Annual Investment Allowance (AIA) from £100k to £25k difficult to understand.



What makes these data particularly disturbing is that the large manufacturing companies, such as Rolls Royce, JLR, GKN, JCB, BAe Systems, Cobham, and the major pharmaceutical companies, have invested heavily in new technology. To account for the overall trend, the failure to provide adequate finance must have largely affected the SME sector which provides one half of the UK's manufacturing capability. The failure of this sector to expand should come as no surprise.

Accessing skills and training: Our studies have revealed that although the majority of companies are comfortable with their access to high-quality engineering graduates from our top universities, there is widespread concern about skilled technicians. The recent announcement of an increase in Government support for apprenticeships is a modest first step – and the advent of the “Baker” University Technical Colleges should raise the profile and opportunities for those gifted in practical skills. Immigration caps could work in the opposite direction, at least in the short-term and pragmatism will be needed in their application if industry is not to be held back by key skills shortages.

Access to Finance: This is undoubtedly a major problem. Perhaps influenced by the mantra that the UK was a post-industrial society, or simply because of the lure of apparently easier profits elsewhere, the banks have failed UK manufacturing in recent decades and thereby contributed significantly to the unbalancing of the UK economy. A recent excellent analysis can be found in “*SME finance and innovation in the current economic crisis*” by Andy Cosh, Alan Hughes, Anna Bullock and Isobel Milner of the Centre for Business Research, University of Cambridge (available online at http://www.cbr.cam.ac.uk/pdf/CrCr_EconCrisis.pdf).

Another recent ACCA report “Improving SME access to equity finance” (see http://www.accaglobal.com/documents/acca_cga_cpaa.pdf) indicates that 80% of SMEs have now lost confidence in the major banks. New forms of community finance are being tried, but whilst these are to be applauded realistically they can only hope to make an impact at the margins. The plans of the six major banks to set aside a £1.5Bn Business Growth Fund is a step in the right direction, but establishing an effective process for considering and approving applications from SME's will not be a trivial task. The re-building of a national network of experienced bank managers, with good local knowledge and sound business sense, represents a formidable challenge which must be faced if this financing initiative is to be successful for the SMEs and the banks alike. See also “*Supporting UK business - The report of the Business Finance Taskforce*”, October 2010 (available online at <http://www.bba.org.uk/media/article/business-finance-taskforce>).

The various government initiatives (e.g. the Treasury's Enterprise Capital Fund, ECF) are of course to be welcomed. The proposal for a Green Bank for Industry should be broadened to an all-purpose 'Bank for Industry' along the lines of the Industrial and Commercial Financial Corporation, ICFC, set up in 1945. Regrettably this organisation eventually evolved to become 3i which ceased to perform the function for which it was created. This initiative is well covered in a Civitas study “*The Industrial and Commercial Finance Corporation: Lessons from the past for the Future*” (available online at <http://www.civitas.org.uk/pdf/ICFC.pdf>).

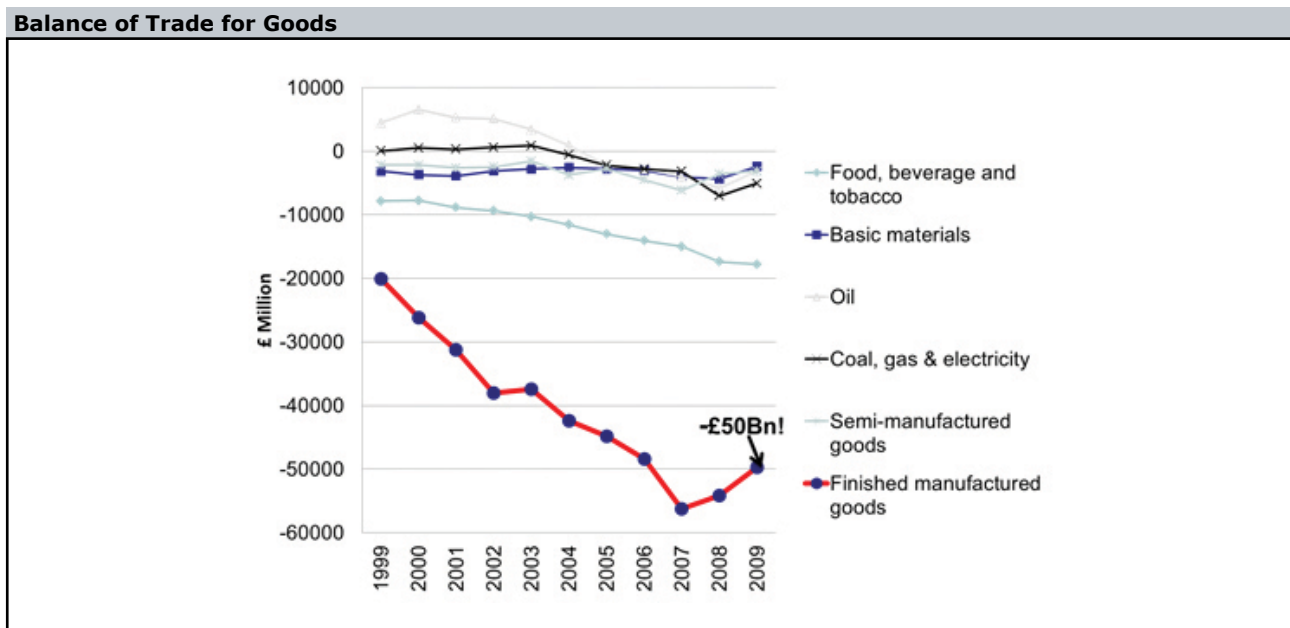
It is worth emphasizing that the national interest will be equally well served by companies which are capable of the export, or import-substitution, of manufactured products of any type. The artificial restriction of investment to an ill-defined class of 'Green' products offers no practical benefit. Commercial advantage can be gained in diverse ways and investments in high technology processes are no less important than high-technology or 'Green' products.

Some of the points highlighted here may well have been recognised by the Government and the response to the recent green-paper consultation on “Financing a Private Sector Recovery” is awaited with interest.

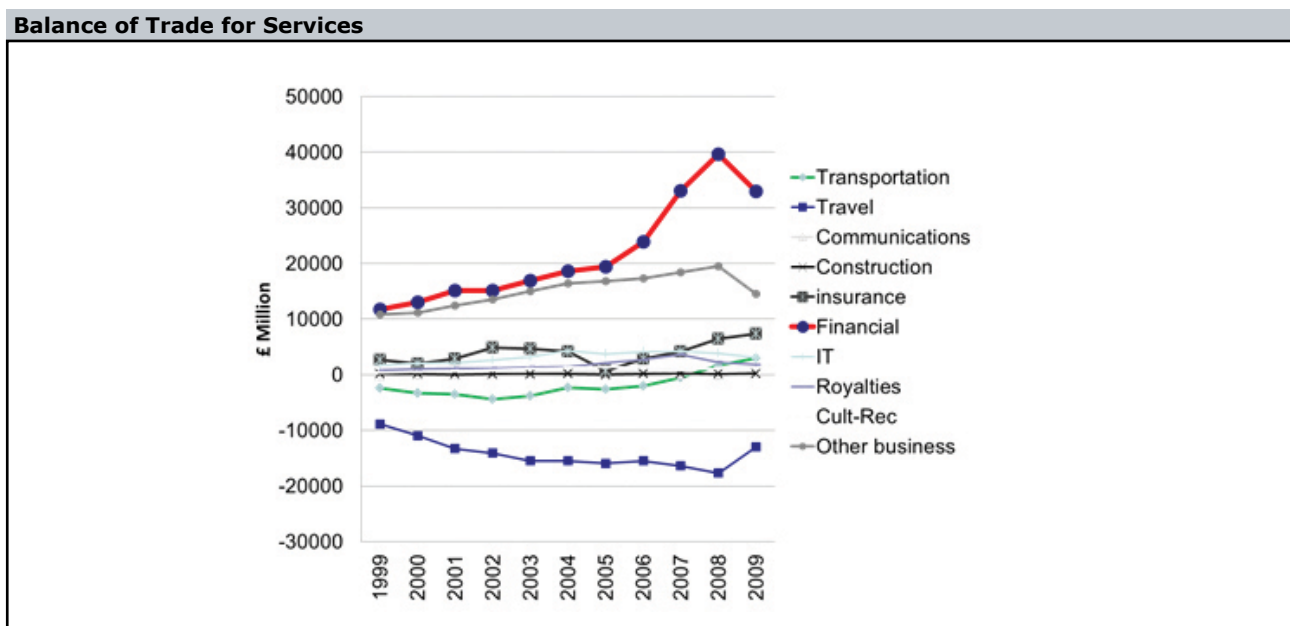
Exporting: The issue of exporting lies at the heart of the UK's economic problems. A decade ago, manufacturing contributed over 60% of all UK exports and there was only a small deficit in the balance of trade in manufactured goods. Today manufacturing still provides 50% of all exports but we have a massive deficit in the balance of trade, which is only balanced out ultimately by increasing levels of debt and the sale of assets.

The UK is not exporting finished manufactured goods at the level required to balance the national budget. Manufacturing suffered from an over-valued exchange rate for the decade prior to the financial crisis of 2008 and the more competitive exchange rate in force since 2008 has been a benefit - despite the down side of increasing the costs of imported raw materials, energy and sub-components. The decline in quantity of manufacture in the UK has been compounded by the sale of the majority of larger manufacturing companies into foreign ownership which has had a significant influence on their export and growth strategies and their choice of supply chains.

The Balance of Trade, which was last in-balance in 1998, deteriorated continuously by about 20% per annum from 2000. To balance the Current Account the UK has had to sell debt and assets amounting to £40 billion in 2007 alone. The source of the problem has been the growing deficit in finished manufactured goods (at ~£50Bn in 2009) and food and drink (~£18Bn in 2009), as the Office of National Statistics data below show.



The balance of trade for the service sectors shows a more reassuring picture, although the surplus of "other business services" is largely negated by the deficit on travel. It is noteworthy that at no time in the decade illustrated has the surplus in the service sector been sufficient to compensate for the deficit in goods.



In their recent paper "Prospects for the UK Balance of Payments" (available online at <http://www.cbr.cam.ac.uk/pdf/WP394.pdf>) the Cambridge economists Coutts and Rowthorn have predicted, using conservative assumptions, that the current account deficit will increase from 2% of Gross Domestic Product in 2009 to almost 5% by 2020. They make the point that empirical evidence indicates that a deficit of this magnitude is not sustainable and, if unchecked, will lead to a painful adjustment involving lost output and higher unemployment. Their paper calls for industrial and other policies to improve UK trade performance, including services but above all in manufacturing.

UK Balance of Payments 2008 (Main items only)

	£Billions			
	Credits	Debits	Balance	%GDP
Surplus Items				
Financial services & insurance	60.8	15.3	45.5	3.2
Knowledge-intensive services	67.0	39.0	28.0	1.9
Investment income	262.6	235.0	27.6	1.9
Deficit Items				
Manufactures	193.6	251.4	-57.8	-4.0
Food, beverages and tobacco	13.7	31.1	-17.4	-1.2
Transport and travel	40.5	57.6	-17.1	-1.2
Energy (oil, coal, elec, gas etc)	35.4	47.8	-12.4	-0.9
Current Account	700.6	725.7	-25.1	-1.7

The Table above, adapted from Coutts and Rowthorn, shows the main items in the UK Balance of Payments for the year 2008. Despite the large devaluation of Sterling, it can be seen that the trade deficit in manufactures remains stubbornly greater than £50 billion per year. While there are surpluses derived from Financial and Knowledge Intensive Services and Investment Income, these are not large enough to offset the deficit from manufactures and the other deficit items and the net effect is a negative balance of £25 billion. Coutts and Rowthorn's prediction for the future indicates a reduction in the deficit in manufactured goods under the influence of the recent devaluation and the recession - but then a resumption of the downward trend.

It can be seen from the Table above that the value of manufacturing exports is still three times that from financial services or all of the other knowledge intensive services combined. **Coutts and Rowthorn make the point that a 10% rise in manufactured exports combined with a similar fall in manufactured imports via import substitution, would generate a £45 billion improvement in the balance of payments, which is equal to the total UK net earnings from financial services and insurance - or more than 1.5 times that contributed by all other services.**

Investment income is the other large factor in the Table. However, this is a highly volatile item and the net income from investment was inflated in 2007-8 by the huge losses of foreign banks operating in London. Coutts and Rowthorn predict that the surplus derived from investment income will fall back to about half the current value.

Regulatory Issues: The Government's commitment to "one in – one out" for new regulations is deserving of "one cheer". "One in – three or more out" would have warranted "three cheers". The Federation for Small Businesses highlights the burden of regulation on its web site at <http://www.fsb.org.uk/regulation>. The current level of regulatory bureaucracy and its associated cost is a major burden to SME's and one that they can ill afford. We share their concerns.

Energy Costs and Security of Supply: In the Civitas report "*British Energy Policy And The Threat To Manufacturing Industry*" by Ruth Lea and Jeremy Nicholson, a publication sponsored by the ERA Foundation, the authors examine the impact of Government policy on energy prices. The costs of energy arising from current energy policies are set to increase significantly. Increased costs will hurt manufacturing at a time when much depends on the sector to generate the economic growth the country needs, and to rebalance the economy.

Energy intensive users, including steel, glass and ceramics, bulk chemicals, industrial gases and cement, are especially vulnerable. These are important contributors to GDP not only in their own right but also because of their inter-dependent relationship with 'downstream' industries (e.g. steel and glass in the automotive sector, steel, glass and cement in construction – and so forth). Britain is already losing energy-intensive businesses because of the lack of competitiveness. There is no doubt that high energy prices have already been a factor in industry closures.

It is noteworthy that the majority of larger manufacturing companies in the UK are foreign-owned and as such decisions on moving production to other countries is not moderated by any UK preferential bias. This increases the likelihood that if energy costs are not competitive here then the next major investment in plant will go elsewhere. The resultant damage to the UK economy of such relocations would be immense.

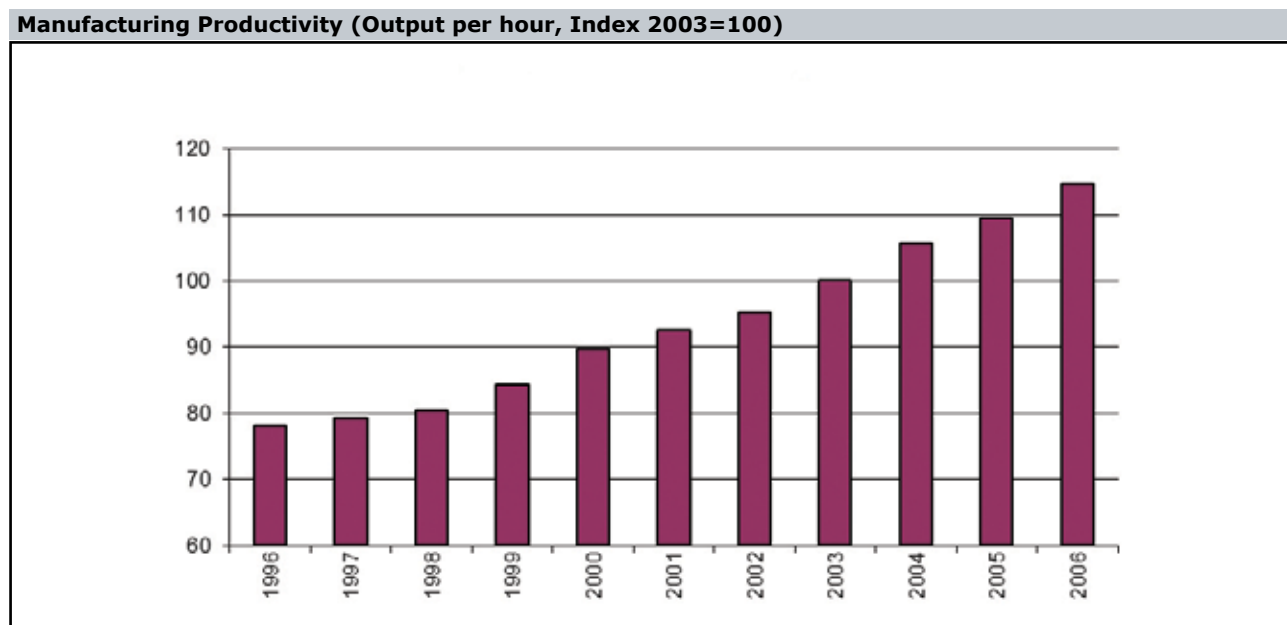
The Lea and Nicholson report calls on the Coalition Government to ensure that manufacturing industries are supported by energy policies that help rather than hinder their competitiveness to enable economic growth. Clearly industry needs to maximise the energy efficiency of their processes and their products; and indeed there are new business opportunities around the energy-efficient lower-carbon economy. However, UK industry has no special competitive advantage in low-carbon manufacturing and many of these products are only made viable by substantial Government subsidies. SME's venturing into these subsidy-driven fields do so at considerable additional risk.

All of the UK's industry, and the economy at large, is heavily dependent upon reliable and competitive energy in one form or another. It is vital to the nation's economic survival that energy costs and security of supply remain a top priority for Government, outweighing any other requirements which may be deemed desirable but represent unattainable or unaffordable goals.

Areas for Consideration in the Growth Review

The consultation document highlighted several areas for consideration and we would comment on these as follows –

Supporting manufacturing productivity: The BIS data on productivity (see diagram below from the BIS KPIs published in 2009) at first sight show a reassuring increase in manufacturing productivity and are often presented as "good news".



Conventional wisdom argues that a prime reason for increased productivity is investment in new technology. No doubt there are examples of genuine increases in productivity from some companies but the BIS data also reveal a substantial lack of investment across the sector. It is more likely that this apparent increase in productivity reflects in part the shrinkage of the sector and the impact of outsourcing. For productivity to improve markedly there will need to be greater investment in new technology - assisted by investment incentives, helpful capital depreciation allowances, the sensible use of Government procurement practises, and attention to many of the other "Greenhouse" parameters listed above.

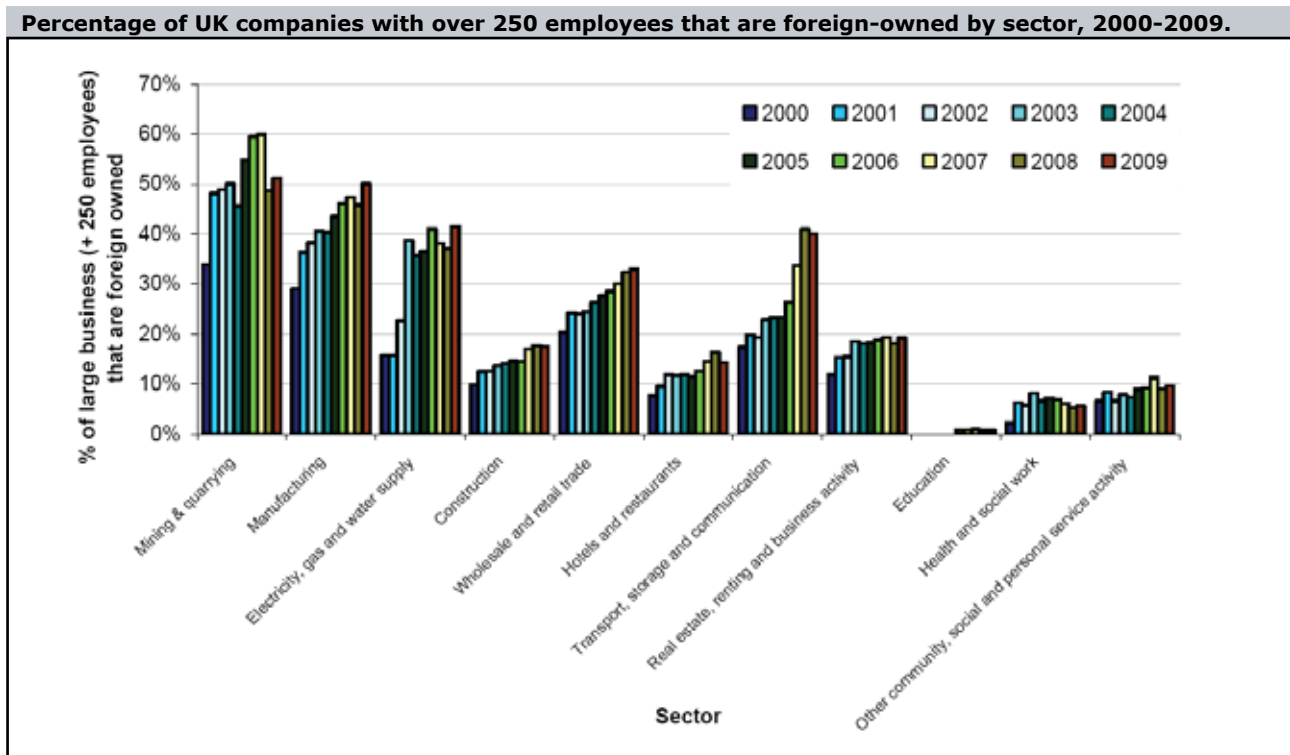
Helping industry export more: The Balance of Trade data makes it very clear that improving the UK's export performance is an essential and urgent requirement.

However, the policies and operation of UK Trade and Investment (UKTI) need a major rethink.

On the "trade" side of the UKTI remit the disastrous Balance of Trade data presented earlier speak for themselves. It is not clear whether the UKTI has a role monitoring and advising Government on the Balance of Trade position - given that the trade data seems to have been largely ignored for the past decade by Government Departments, opinion formers, policy makers and economists alike. There have been a few honourable exceptions such as Coutts and Rowthorn but their warnings have been largely ignored. ***The fundamental understanding that the UK has to pay its way in the world seems to have been lost and needs urgent restoration if the nation is to retain any prospect of future prosperity.***

By contrast UKTI has been very successful on the "inward investment" side of its remit. Some might argue it has been rather too successful when one looks at the increasing foreign ownership of the 6,000 UK companies which employ more than 250 staff (i.e. defined by BIS as the larger UK companies and not the SME sector.).

The data below were provided by ONS and form part of an on-going study by the ERA Foundation of the issue of inward versus outward investment. It is noteworthy that there is relatively little foreign ownership of companies with fewer than 500 employees and hence the percentage foreign ownership of large companies is higher than the graph indicates. ***More detailed analysis reveals that foreign ownership is now 62% for all manufacturing companies with 1,000 to 4,000 employees and is approaching 70% for companies in the range 3,000 to 4,000 employees. This very high proportion of foreign ownership and its continued increase has to be understood and appropriately dealt with in Government policy-making.***



Maximising market opportunities in manufacturing from Government activity: Government procurement can play a major role in driving innovation and growth in manufacturing, with a consequential impact on export opportunities. One need look no further than the influence of DoD procurement and DARPA "grand challenges" in the US (feeding through to major defence export successes for US companies) – or the procurement role of the French Government providing a major stimulus to their ICT, aero and automotive sectors. As the largest procurer in the UK the Government must seek to stimulate innovation and growth in UK companies whilst still adhering to commitments to free trade and value-for-money. It is reasonable to pose the question that if other (competitor) nations can be successful in the smart use of procurement to stimulate industrial innovation and growth, why is the UK lagging in this regard?

Showcasing manufacturing excellence: The ideas in the consultation document are to be applauded. One of our highest rated 'Greenhouse' parameters was that of attracting young people into manufacturing. The new actions the Government is taking to showcase UK engineering successes and to encourage companies to be even more active in promoting the excellence of UK manufacturing are welcomed. The general populace needs to be better informed on the UK's manufacturing heritage, the quality of UK manufacturing, and the importance of manufacturing for national prosperity. **"Made in the UK"** should once again become a source of national pride.

What advantages should we build on for the UK

The consultation document discusses and invites contributions on the advantages on which the UK can build. We would make the following observations on UK strengths

- The UK has an outstanding science base on which to draw. But more knowledge needs to be "drawn out" of our academic research labs by industry through collaborative R&D programmes. Too much of our scientific effort flows to our international competitors. The weakness lies in our industry rather than the science base. The very large companies have little problem interacting with the science base. **However, for SMEs it is a major challenge and intermediary technology organisations could help to make this more effective. However, the intermediaries need to be focussed upon effective technology transfer to UK SME's and not merely centres of excellence for research.**
- The report from the Intellectual Property Institute "*Exploiting University Intellectual Property in the UK*" (2008) gives a well-balanced assessment of the wide range of routes whereby the science base can assist industrial competitiveness and wealth creation. (See <http://www.intellectualpropertyinstitute.org/pdfs/Exploiting%20University%20IP%20in%20the%20UK.pdf>).
- The flexibility of UK labour laws helps manufacturers – although the regulatory burden still requires attention.
- Fiscal policies must maintain a competitive exchange rate – which is good for manufacturing exports.
- Low interest rates are beneficial although investment and finance in the SME sector remains a serious issue.
- Respect for IP and the UK legal system are strengths.
- The quality of engineering graduates from top universities remains very high; the challenge is to attract them into UK industry and especially manufacturing.

The Global Competitiveness Index (GCI) is produced annually by the World Economic Forum (see <http://gcr.weforum.org/gcr2010/>). The UK is ranked overall 12th in the 2010-11 Index; its main strengths are seen to be research institutions (ranked 3rd), university-industry collaboration (4th), interest rate spread (2nd), trade tariffs (4th), availability of financial services (5th), legal rights (6th), and market size (6th).

Where are the future long-term growth opportunities

We would argue that it is the role of Government to create the right environment within which manufacturing can prosper. That is, the Government must provide the well-designed "Greenhouse" – a fertile environment for manufacturing investment and operations. Then companies and entrepreneurs must be left with maximum freedom to identify their own market opportunities, to develop their own new technologies, and to evolve their own new business models. Government should not try to "pick winners". Often policy makers point to countries with highly-managed economies (such as Singapore) backing selected technologies with apparent success. The UK is not, and hopefully never will be such a managed economy and must play to its strengths. The past record for UK Governments attempting to pick winners has not been good and there is no reason why it would be any better today.

We offer the following observations on the particular issues raised in the consultation document.

Growing global markets: The fact that the UK exports more to Ireland than to all the BRIC economies combined indicates what opportunities there are for UK manufacturers. However, it must be borne in mind that many of the large foreign-owned businesses are here predominantly to serve the UK and European markets and will not usually be seeking to export to the BRICs from here. Growth in these markets will be dependent in considerable measure upon smaller UK businesses which will need considerable help.

Low Carbon and Environmental market opportunities: There are undoubtedly opportunities in low carbon and environmental technologies. But let industry identify them – let the market decide. Why should Government feel it is best placed to identify this particular "winner"? Manufacturers are well aware that consumers are becoming "greener" and demanding cleaner environmentally-friendly products. Consumer choice is a more potent driver of market opportunities than Government attempting to herd industry into a particular politically-favoured market while not equally aiding developments in other viable business areas. The nation needs to encourage more manufacturing and more exports; their 'colour' is unimportant

The use of new technologies: We have covered above the need to catalyse the use of new technologies by appropriate investment incentives. The major challenge here is to improve the availability of investment and finance for the SME sector.

New business models: Fewer regulatory constraints can allow new business models to evolve (as happened with, for example, low-cost airlines). But the market-place and such factors as competition, consumer choice, industry-led collaborative R&D, and company innovation will always be the main catalysts for the evolution of more profitable business models – not Government. We cannot emphasize enough that Government's first duty is to establish a fertile environment for business and especially manufacture at this time.

In summary, we commend the Coalition Government for giving overdue attention to manufacturing. Success will depend on the speedy implementation of new policies to create the right "Greenhouse" environment within which productive industry and entrepreneurship can flourish. However, to determine how this may best be achieved it is necessary to understand the fragility of manufacturing industry in the UK; the impact of energy policies on the choice of location for energy intensive businesses; the dominant foreign control of the larger companies; and the financial issues slowing growth among the SME's. The future for UK manufacturing is heavily dependent upon creating an environment which is globally competitive in terms of investment and operations.

The ERA Foundation Board

Board of Directors



Sir Alan Rudge
CBE FEng FRS
Chairman of the Board



David Wilson



Dr Tom Rowbotham
FEng



Fred Cahill



Professor Sir Richard Brook
OBE ScD FEng



Professor Sir John O'Reilly
DSC FEng



Professor Christopher Snowden
FEng FRS FIET FIEE FCGI



Bernard Taylor
FRSC

Company Secretary



Joe Fewtrell
FCMA

Executive Secretary



Dr David Clark
OBE

The ERA Foundation

The ERA Foundation contributes to the economic vitality of the UK by supporting activities that help bridge the gap between research and exploitation in electro-technology.

www.erafoundation.org