

Robbins Rebooted

How We Earn Our Way in the Second Machine Age

The Rt Hon Liam Byrne MP

Robbins Rebooted

How We Earn Our Way in the Second Machine Age

by The Rt Hon Liam Byrne MP

Kindly Supported By



FIRST PUBLISHED BY

The Social Market Foundation, August 2014

ISBN: 978-1-904899-95-2

11 Tufon Street, London SW1P 3QB

Copyright © The Social Market Foundation, 2014

The moral right of the authors has been asserted. All rights reserved. Without limiting the rights under copyright reserved above, no part of this publication may be reproduced, stored or introduced into a retrieval system, or transmitted, in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), without the prior written permission of both the copyright owner and the publisher of this book.

THE SOCIAL MARKET FOUNDATION

The Foundation's main activity is to commission and publish original papers by independent academic and other experts on key topics in the economic and social fields, with a view to stimulating public discussion on the performance of markets and the social framework within which they operate. The Foundation is a registered charity and a company limited by guarantee. It is independent of any political party or group and is funded predominantly through sponsorship of research and public policy debates. The views expressed in this publication are those of the author, and these do not necessarily reflect the views of the sponsors or the Social Market Foundation.

CHAIR

Mary Ann Sieghart

DIRECTOR

Emran Mian

MEMBERS OF THE BOARD

Lord Charles Falconer

Daniel Franklin

Baroness Olly Grender MBE

Nicola Horlick

Graham Mather

Sir Brian Pomeroy CBE

Peter Readman

Baroness Gillian Shepherd

Professor Alison Wolf

DESIGN AND PRODUCTION

Pistachio Design

www.pistachiodesign.com

PRINTED BY

Diversified Global Graphics Group

www.dg3.com

CONTENTS

Foreword	4
Acknowledgments	6
About the Author	8
Introduction	9
Chapter 1: A 1964 moment	13
Chapter 2: How we earn a living in the second machine age	21
Chapter 3: The Five Tests?	30
Chapter 4: Robbins Rebooted	47
Conclusion	86
End notes	89

FOREWORD

Last October, we marked the 50th anniversary of the Robbins report on higher education by publishing an essay by David Willetts, then Minister for Universities and Science. Higher education has provided a leading example of reform in this Parliament, just as it did during the Blair years, and it remains a focus of attention. It is a sector where public and private funding combines, by design, and the role of public funding combined with regulation is to ensure that a group of basically private actors - the higher education institutions - meet public objectives. It is no wonder that a think tank like ours, interested in how market mechanisms can contribute to the pursuit of social justice, has always done a lot of work on higher education.

In this pamphlet, Liam Byrne uses his own reading of Robbins to set out a vision for higher education. While Willetts focused on the Robbins themes of improving teaching quality and expanding higher education, Byrne predicts that the leading challenge for universities is supplying knowledge and higher level skills in “the second machine age.” Just as Robbins’ report was shaped by the “white heat” of technological change in the 1960s, Byrne is writing about the challenges of today - the automation of more and more tasks and processes, intense global competition for investment, rapid change in all of the above - and what those mean for the task of university reform as well as the opportunity they provide for improving productivity.

In Byrne’s view there are exemplary universities that are responding to the changing landscape and he provides case studies from a selection of these. Nevertheless he argues there is a task for policy – a task that a Labour government would prioritise – to drive “vertical integration” into the system, that is, to encourage universities to develop links down through the education system into colleges and schools as well as up into the labour market. If social mobility is declining, as Byrne argues it is, then universities can create some of the new ladders of opportunity, for example from apprenticeships through to degree level qualifications and then into jobs with leading firms.

Crucially, this change is not to be achieved by universities acting solely on their own initiative or driven by the needs of their students. On Byrne's view, higher education fits into a broader industrial strategy directed by the state. He makes a strong case that the UK's peer economies have higher ambitions in this regard and our investment in research and development in particular is low. As a consequence, he argues, we will encounter limits to economic growth unless we change approach; and, given that our competitive strengths are in sectors that require the creation of knowledge and the supply of higher level skills, then the role of universities in achieving a new strategy is vital.

There are a number of challenges associated with this view. It is far from clear that government-directed knowledge creation has a better record in generating economic value than curiosity-led research. And the rise of the robots may mean that universities should focus on teaching the ability to adapt to the future rather than the skills to manage the present. Nevertheless I suppose that Byrne is adopting one of the maxims of Silicon Valley, namely that the best way to predict the future is to invent it.

By necessity the inventions have to be cost effective too. This suggests there will be trade offs to be made between agendas for fundamental research; in the field of innovation, a government pursuing industrial strategy will have to pick races if not winners per se; and, while the original Robbins ambition of increasing student numbers in higher education remains in this reboot, expansion will be focused on technical degrees. These are hard choices to deliver though having the broader strategy provided by this pamphlet to guide them is a vital first step.

Emran Mian
Director, Social Market Foundation

ACKNOWLEDGEMENTS

Literally hundreds of people have helped assemble the ideas set out in this short paper, inspired as a response to David Willetts' excellent precursor, Robbins Revisited.

Most of the country's Vice Chancellors and further education Principals have helped me at some stage or another to test an idea or develop a thought. I have simply done my best in this note to bond those ideas – and ambitions – to a broader analysis of how our country needs to change.

So many have helped, it would be invidious to single out too many for special mention. But, a few obligations I cannot avoid. Without Lord Bhattacharyya, KB CBE FREng FRS, this project would simply not have been feasible. Sir Trevor Chinn, Lords Sainsbury, Drayson and Adonis have been immensely kind in sharing their thoughts and experience of business, science and government.

Much of the early thinking for what is here was born in the Youth Jobs Taskforce, which I chaired with the leaders of Britain's ten biggest authorities between 2012-13. I owe them greatly, especially Cllr Keith Wakefield, Leader of Leeds and Cllr Sue Murphy, Deputy Leader of Manchester who worked together with Stephen Timms, Rushanara Ali and me on our Skills Taskforce.

Universities UK, the university mission groups and think-tanks have all worked with me with incredible generosity. Nicola Dandridge at Universities UK, Libby Hackett at University Alliance, Pam Tatlow at Million+, Andy Westwood at GuildHE, Nick Hillman at HEPI and Wendy Piatt at the Russell Group have been tremendous in helping me develop thoughts, meet HE leaders and organise a hugely influential series of round-tables on the question of universities and the regional economy.

Nigel Thrift at Warwick and Sir Keith Burnett at Sheffield both developed in detail the idea of technical universities which I examine here and Martin Bean, Vice-Chancellor of the OU helped me tease through implications. Anne-Marie Canning from King's College London provided a unique insight into the world of widening participation post-Browne. The West Midlands

Vice-Chancellors, especially David Eastwood, Cliff Allan, Julia King, Geoff Layer along with Mike Hopkins at South and City Birmingham College, were all patient and generous with the extra obligations that come with having me as a local member of parliament.

Sir Paul Nurse, and the heads of the National Academies, together with the team at the Parliamentary Office of Science and Technology, the teams managing both Harwell and Daresbury and friends in Rolls Royce, BAE, BT, GSK and the Wellcome Foundation were, quite simply, inspiring.

Stephen Benn at the Royal Society of Biology, and my friend Andrew Miller MP, chair of the Science and Technology Select Committee, have been constant companions on my intellectual voyage. The Association of Colleges, led by Martin Doel, and superbly advised by Pirandeep Dhillon, together with Peter Roberts and his colleagues at the 157 Group have steered me throughout, and I owe massive debts to David Cragg, former head of the Skills Funding Agency and our dinner partners.

The paper draws widely on my international research work; Ulrich Storck and the team at Friedrich Ebert Stiftung helped significantly with first-hand research in Germany as did old friends, Mattias Machnig and Jakob von Weisicker in Thuringia. HMA Nick Bridge and the superb UK embassy team at the OECD provided an absolutely invaluable research programme, and HMA Peter Ricketts and his team in Paris were generous in helping my study of HE trends in France. Andrew Tuggen at the Commonwealth Parliamentary Association and the British High Commissioner, Sir James Bevan and his team in Delhi and Bangalore helped me understand current developments in India. Sir Trevor Chinn unlocked first hand research in Israel, where the Chief Scientist, Avi Hassan, Erul Margalitz, at Jerusalem Venture Partners and Dan Singer, co-author of Start-up Nation were brilliant. Richard Pascoe's team at the Great Britain China Centre have worked with me over the years to better understand innovation in China, and I draw heavily here on work from Geoff Mulgan's team at NESTA and James Wilsdon's colleagues at SPRU at University of Sussex. In Brussels, Marion Dewar was a constant source of advice and EU commissioner Maire Geoghegan-Quinn, a huge inspiration;

I owe my friends and colleagues at Oxford University a great deal, especially Eric Beinhocker at INET and Ian Goldin, Director of the Oxford Martin School. The business of sharing stages with Will Hutton, principal of Hertford, sharpened much of the thinking here and Prof Birgitte Andersen at the Big Innovation Centre opened several new horizons. Finally, Emran Mian at the SMF has been an enthusiastic backer of this project from the word go. This paper would not exist without him and my simply brilliant Parliamentary team, James Pignon, Charlie Samuda and Ryan Wain. All that said, any errors are mine and mine alone.

ABOUT THE AUTHOR

The Rt Hon Liam Byrne MP
Shadow Minister for Universities, Science and Skills

Liam Byrne is the Member of Parliament for Birmingham, Hodge Hill and Shadow Minister for Universities, Science and Skills.

Over nine years, Liam has fought tooth and nail for new investment in his constituency, helping secure £167 million for new schools, health-centres, libraries and housing. He helped build a network of social entrepreneurs and community activists – and by competing in triathlons and half marathons, has raised thousands for local police and cancer charities. He doubled his majority at the last election winning the biggest Labour vote in Birmingham.

In Westminster, Liam has been asked to do some of the hardest jobs in government – in the Home Office, Downing Street and HM Treasury, creating the UK Border Agency, reorganising No 10 for Gordon Brown, and drawing up Labour's deficit reduction plan for Alistair Darling. As the West Midlands first regional minister he helped deliver £400 million for the new New Street station. In Opposition, Liam has chaired Labour's policy review, led the Shadow DWP team and is now Shadow Minister for Skills, Science and Higher Education.

Liam is the author of over twenty books and pamphlets about Britain's future and is a passionate advocate of closer ties between Britain and Asia. He is also the author of the Road to Full Employment (Fabians 2013), Reinventing Government Again (SMF, 2009) and Local Government Transformed (Baseline, 2005). He is governor of the Institute of Government and lives in Birmingham.

INTRODUCTION

This paper is a serious effort to return our higher education system to the centre-stage of the political debate, and begin to set out the choice at next year's election.

My reasoning is simple.

The defining challenge of western politics today is how to reconnect the wealth of the nation as a whole with the fortunes of ordinary families. The only way we end today's cost of living crisis is with growth that is more inclusive, based on more high skill, more high wage jobs and fewer low skill, low wage jobs. Higher education is critical to turning this idea into reality. It is as simple as that.

Inclusive growth will require Britain to raise its productivity and to ensure that wealth is more fairly shared. No one actor on the stage can conjure this alone. Success demands new "win-wins"; new ways of government, business, unions, and civil society rowing together in the same direction. More inclusive growth needs new supplies of skill and science; a new competitive intensity and new enterprise in industries new and old. It will demand bigger markets abroad and a more patient capital market here at home.

Universities, invented centuries ago, are part of the solution. They are no longer remote debating chambers. They are the classrooms of global citizens. They are no longer ivory towers of the medieval landscape. They are the power stations of the knowledge economy.

And we need a bigger knowledge economy.

Britain is trapped in a cost of living crisis. Next year we all fight for the votes of families who are on average £1,600 a year worse off than they were in 2010.

If we're to earn our way to a better standard of living in the world that is coming, if we're to connect a mission of national renewal to a plan to help families get ahead, then quite simply we need a bigger knowledge economy.

Today, our knowledge economy is a third of output, a third of businesses - but under 20% of jobs.

If a third of us enjoyed jobs in the knowledge economy, that would equate to 2.4 million extra jobs paying 40% more - £161 a week - over and above the average pay-packet¹. That is a powerful exit from a life of falling pay-packets.

And there is a bigger prize for social democrats.

In the post-war years, Britain enjoyed a revolution in social mobility. Research tells us why. Two things changed. There was a huge boost in good new, white collar jobs - and the creation of a strong new "education escalator" that lifted millions of people into the skills to do those jobs, no matter where they were born in life.

The Robbins Report of 1963, and the huge expansion of higher education which Harold Wilson delivered was a major part of this change.

That's why it was so important to honour Robbins' anniversary last year; to celebrate, yes but more importantly, to re-dedicate ourselves to a plan for the future that matched Lionel Robbins ambitions to establish an education environment that "...provides for those who [have] the qualifications and the willingness to pursue higher education" and which "...encourage[s] the cultivation of high excellence."² History can teach us so much. It can inspire us to great things.

But our universities now face a bleak future under this government; an ethos of "dog eat dog" and "survival of the fittest" that is failing our science base, doing little to remedy our chronic skills shortages or provide students a real choice of paths to the top, that is failing to fuel any real advance in social mobility, and above all, simply isn't fiscally sustainable in the years ahead.

The hundreds of thousands of people who work in higher education, the millions of students they educate and their parents, the millions who work in the knowledge economy - or want to work there - want a better choice than this. And we are determined to offer it.

So, this paper draws together hundreds of conversations and case studies, and presents ten ideas for debate.

1. How can we support the growing global network of research - “Star Alliances” – that connect our universities and researchers, in international networks of the best?
2. How can we support bigger, stronger global science hubs here in the UK, around which the world’s best businesses will foster entrepreneurial networks of companies?
3. How do we build a research department for the UK “mittelstand” that better connects SMEs and our brilliant universities to power more R&D in regional economies?
4. How do we boost equity of access to university, learning the lessons of Aim Higher with a new 21st century way of doing business?
5. How do we ensure that post-graduate study does not become the new barrier to access?
6. How can we encourage university applicants from low income backgrounds?
7. How do we boost the new University-Schools and University-College movement that is emerging across the country, hard-wiring the creation of clear pathways of learning from primary to tertiary?
8. How do we create a gold standard vocational route to degree level skills by fixing the “broken bridge”: the “L3 gap” for 19-24 year olds?
9. How do we ensure clear pathways through technical education, and back reform with a drive to foster Local College Partnerships on the lines of the US community college partnership model?
10. How do we expand “earn while you learn” or “technical degrees” supported by a new generation of partnerships, connected to regional economies with far more University Enterprise Zones?

This paper then is not about the past. It is about the future. The world that is coming and how we earn our way in it. How we restore a sense of both optimism and ambition, not just for the few, but for the many. Its argument therefore is simple. We need more than Robbins revisited.

We need Robbins rebooted.

CHAPTER 1: A 1964 MOMENT

We mark this year a very special anniversary: half a century since one of the most important moments in Labour's history.

Harold Wilson did not learn he had become Prime Minister until 3.50pm on Friday 16 October 1964. His office took the call from the Queen's Private Secretary, Sir Michael Adeane, who politely asked if it would be convenient for Mr Wilson to come and see the Queen. And so Mr Wilson changed his jacket and trundled off to the Palace.

That Friday afternoon, Labour became the first opposition since 1906 to evict a sitting Conservative government and though Wilson's win – on a 3% swing – was narrow and his majority thin, his victory was the triumph of the bold and optimistic story he told about how Britain could face the future and master what it saw. When he arrived back in Downing Street from the Palace, Wilson had a very clear sense of his direction.

Key to his political sizzle and the palpable sense of change he embodied was the remarkable speech he had made in Scarborough the year before. There by the seaside he offered Britain for the first time the prospect of harnessing the “white heat of the technological revolution” to create a different kind of country.

It was an electrifying moment. It epitomized Wilson's ask of Britain: to cast out the privileged old boy's club running the show, led by the “14th Earl”, Sir Alec Douglas-Home, and put in its place a government prepared to drive through the reforms Britain needed to win a race to the top. Wilson's speech to Scarborough captured not merely the spirit of the moment, but the spirit of the future. Not merely 1963 but the 1960s. Not the world that was passing, but the world that was coming.

Wilson said bluntly: nostalgia won't pay the bills; the world doesn't owe us a living; and we must harness the scientific revolution to win in the years to come.

“This scientific revolution” he said “is making it physically possible, for the first time in human history, to conquer poverty and disease, to move towards universal literacy, and to achieve for the whole people better living standards than those enjoyed by tiny privileged classes in previous epochs.”³

But, he warned change would have to reach every corner of the country:

“The Britain that is going to be formed in the white heat of this revolution will be no place for the restrictive practices or for outdated methods on either side of industry.”

His agenda was bold: a new ministry of science; a university of the air; a revolution in education and apprenticeships; radical expansion of Further and Higher Education; action to stop the brain drain; the appointment of the first Government Chief Scientist, Sir Solly Zuckerman. Re-reading it now, it reads like it could have been delivered last week.

When Robbins published his report, advocating an unprecedented expansion of higher education, his paper was nectar for a large and thirsty audience in the Labour party. Indeed, the audience had been growing in number and enthusiasm for several years. The notion of a “scientific revolution” had been slipped into the Party’s veins amidst the debate over unilateralism in 1960.

Searching for a few connected principles around which to fashion a “package deal”, Labour’s director of research, Peter Shore and General Secretary Morgan Phillips had secured “by acclaim” agreement to *Labour in the Sixties* at the 1960 conference⁴.

Painfully aware of “de-industrialisation” and the demographic shifts threatening Labour’s traditional base, Shore-Phillips called for closer links to scientists, administrators and professionals and those “disgusted by the Tory view that status-seeking and ladder-climbing are the most important human activities.” Their paperwork was the foundation for *Signposts for the Sixties* and in turn, the seminal *Labour in the Scientific Revolution*.

Wilson was quick to pick up this science notion after his leadership win in February 1963; “We must harness Socialism to science” he promptly declared, “and science to Socialism.”⁵

A higher education policy was soon supplied to help Wilson turn ideas into action. Under Lord Taylor, the party had produced for Labour’s National Executive Committee, *The Years of Crisis: report of the Labour Party’s Study Group on Higher Education*, informed by access to some of the evidence presented to Robbins. Its foreword afforded Wilson the opportunity to fill out his positioning with a policy:

“higher education is facing a crisis of unprecedented severity, and if, if disaster is to be averted, vigorous action will be essential the moment a Labour government is returned to power.”

The Years of Crisis is a rather magnificent document and if there is a spirit to it, it is this:

“Our forefathers were not afraid to build splendidly for the young: we must be no less courageous.”⁶

It methodically stapled together a project for national renewal with a policy for bigger, bolder higher education.

“Today, a nation’s primary asset is the brain-power and skill of its scientists and engineers, research-workers and technicians, administrators and professional men and women.”

The report drew on a long Labour tradition pioneered by Wilson’s colleagues in the years 1945-51.

Both the *Percy Committee on Higher Technological Education*⁷ and the *Barlow Committee* reported to the Atlee government; both drew an explicit connection between the future of British science and the future of British prosperity.

Percy noted that American universities served a population three times bigger, with ten times more money and recommended full-time technological courses of university degree standard at selected Technical Colleges, and Colleges of Technology to be treated as a group, amongst them, university institutions, with some as Faculties of Technology of a neighbouring university.

“The parallel needs of the special Technical Colleges must be met and a regional and national system developed for knitting together the Schools, the Technical Colleges, the Higher Technical Institutes, the universities and industry.”⁸

Without “absolv[ing] the universities from their responsibility for training a high proportion of the nation’s first class technologists”⁹ Percy noted the need for more institutes of technology.

In 27 May 1946, Sir Alan Barlow presented his “British Report on Man-Power”, informed by, amongst others, CP Snow and Solly Zuckerman. Barlow made, as Herbert Morrison explained to the House,

“a strong case for a very substantial expansion in the output of qualified scientists from the universities at the earliest possible date...the government are in general agreement...which we recognise will involve a substantial liability on the Exchequer.”

Projecting a shortfall of 24,000 scientists on existing provision, Barlow recommended a doubling in the annual output of scientists from universities to 5,000 a year¹⁰.

Throughout the Tory years of the 1950s, pressure on Britain’s skills gap grew and substantial new resources were provided – and the government did act, a little.

As David Willetts noted¹¹, the expansion of higher education was already underway before Robbins reported. In September 1951, another white paper on *Higher Technological Education* was produced, rejecting the foundation of a big new institution but proposing 66 technical colleges

that were better resourced and a Royal College of Technologists founded by Royal Charter. In 1953, the decision was taken to found Imperial and a year later, to pump in funds for further expansion totalling £6.5M, and in 1956, Sir David Eccles presented yet another white paper on technical education, arguing:

“We need all the additional scientists and technologists that we can get.”

It noted that between 1938 and 1955, the number of science and technology graduates had doubled. “But this is nothing like enough.”¹²

A five year plan was presented to boost student numbers on advanced courses at technical colleges by 50% with £70million thrown in to help. A “national system” with UCAS and a national grant regime evolved along the way.

But by the early 1960s, the authors of the *Years of Crisis* concluded that “there are more young people with the capacity to benefit from higher education than ever before”, it rejected the segregation and “docketing” of young people in both the school and higher education system and proposed university status was conferred on a wide range of institutions. It flagged the imminent “battle of the bulge” as the baby boomers reached adulthood, and clocked that over 5,000 perfectly qualified young people were denied a university place.

Despite the development of seven new universities already underway, the *Years of Crisis* argued that “it will almost certainly be necessary to create more completely new universities”, along with big expansion of existing institutions.

Its call was bold: 100,000 more teachers by 1970 and 45 new university sites, taking the total number up to 80. This boost of places would be complemented by the conversion of Colleges of Advanced Technology into universities, and a Minister for Education to take over policy responsibilities from the Treasury.

As the summer of 1963 wore on, Wilson signalled his desire to lead the science debate at party conference, and Richard Crossman duly parked a draft science paper with Peter Shore for summer reading. It was readied for Conference and Wilson was armoured to arrive at Scarborough, in the words of his biographer, as the “herald of a coming age.”

Richard Crossman had urged a morning at conference on “Labour in the science age” but at 9pm the night before his speech, Wilson’s paper was still blank¹³. He and Marcia Williams worked through the night. They finished typing at 6am as the press officers banged at the doors asking for the galleys.

Conference triumphs are awfully rare in political history. But this was one of them.

“He spoke beautifully, completely collectedly, carrying the whole Conference with him”, wrote Richard Crossman. “He had provided the revision of Socialism and its application to modern times which Gaitskell and Crosland had tried and completely failed to do.”¹⁴

“Wilson opened brilliantly” recorded Tony Benn¹⁵ and the next day, it was “hard not to sniff the scent of electoral victory in the air.”

In the press gallery, some journalists had to be restrained from applauding. Bernard Ingham, then on the Guardian was, according to some, “visibly moved.”

The election campaign of 1964 opened with the memories of the Profumo scandal still alive in the popular mind, and in the minds of thinkers, the arguments of Arthur Koestler’s book, *Suicide of a Nation?* loomed large. Koestler had flagged the dramatically falling UK share of world trade – down as much in a decade as in the previous half century. If there was a culprit, he said, it was “amateurism” with class privilege at its root.

In the months after Scarborough, Labour published *The New Britain*, a 7,000 word essay on growth, innovation and efficiency. In his first campaign speech at the Empire Pool, Wembley, Wilson demanded a dynamic,

expanding, confident and above all “purposive new Britain.” In a blistering, personal campaign around the country, he attacked stop-go, high prices, regional stagnation, and the spread of a “get rich quick” mood. The party’s ideas for a ministry of economic affairs, a ministry of technology to bring advanced technology into industry, regional planning boards and short term action to close the trade gap struck a chord, captivating a feeling that “...it was time for a change.”¹⁶

THE IMPORTANCE OF ROBBINS

The Robbins Report, published in 1963, called for an expansion of universities, and at its heart was the principle that university places “should be available to all who were qualified for them by ability and attainment.”

The report set out four main objectives for universities that were “essential to any properly balanced system.” These were “instruction in skills; the promotion of the general powers of the mind so as to produce not mere specialists but rather cultivated men and women; to maintain research in balance with teaching, since teaching should not be separated from the advancement of learning and the search for truth; and to transmit a common culture and common standards of citizens.”¹⁷

While it was one of Macmillan’s last cabinets which accepted Robbins conclusions¹⁸, it fell to Harold Wilson and his Secretary of State for Education, Anthony Crosland to make Robbins a reality.

And so on 27th April 1965, Crosland, without perhaps quite enough thought, set out in a speech at Woolwich Polytechnic the argument for the “binary divide”; an autonomous university sector and a public sector, rather than a “unitary system, hierarchically arranged on the “ladder” principle.” “Let us now move away” he declared “from our snobbish caste-ridden hierarchical obsession with University status.”

In May the next year, a white paper was presented with “A plan for polytechnics and other colleges.” It noted the transfer of the Colleges of Advanced Technology to the university sector, the foundation of the CNAA

to accredit degrees, and committed the government to expansion even in excess of Robbins' proposals. Key to the plan was a clear connection between the new polytechnics and the universities¹⁹, and the list of the first 28 polytechnics was duly presented to the House of Commons, on Wed 5th April 1967.

Guiding policy was a simple principle, the Robbins principle: that anyone so inclined and appropriately qualified should have the chance to study at the highest level.

WILSON, ROBBINS AND THE SOCIAL MOBILITY REVOLUTION

Looking back, it is easy for us to see the absolute centrality to the boom in social mobility enjoyed by the baby boomers.

Before I left my time in the Cabinet Office, I had the chance to understand it better.

In a Cabinet Office review²⁰, we surveyed the evidence for social mobility since the war and set out for the first time in a long time, the key ingredients. On the one hand, there was a huge expansion in better paid, higher skilled jobs, and on the other, a revolution in the ladders that took people to those jobs no matter where they started off in life.

The long boom in higher education was critical both in providing the intellectual fuel for companies and the public sector creating those new opportunities, and in offering the ladder that helped people climb into them. The result was the creation of millions of opportunities for a new middle class, including I might add, for my parents.

CHAPTER 2: HOW WE EARN A LIVING IN THE SECOND MACHINE AGE

The Robbins Report rejuvenated a powerful marriage in British public policy; the coupling of a project for national renewal and a policy for university growth. It is one of the oldest alliances in British democracy.

The debates about the future of our country and the future of our universities were first entwined as Britain passed through the high noon of the Victorian age into the era when postbellum America and a new united Germany began to develop apace and challenge our first rank status.

In 1842, Charles Dickens on his first visit to America had labelled Washington DC, a “City of Magnificent Intentions” such was the contrast between the grand ambitions of its architect Pierre L’Enfant and the muddy suburbs. Yet, less than a decade later, *The Economist* was asserting “the superiority of the United States over England is ultimately as certain as the next eclipse”²¹ and sure enough, by 1866, the United States surpassed the United Kingdom as the largest economy in the West.

Over the decades that followed, America became the world’s most productive economy blessed with the most productive workers on earth²² and by the eve of World War One, a few years before the British Empire reached its zenith, the average American was wealthier than the average Brit.

Britain never lacked a shortage of entrepreneurs in the new science-based industries²³. Abroad, Britons built great trading multi-nationals amidst a world of rapidly rising tariff walls while at home new entrepreneurs from the Cadbury Brothers to the Lever Brothers built burgeoning new consumer businesses.

But, exports remained rooted in the old staples of the first industrial revolution, and in new science based industries like automotive, or electrical engineering or chemicals, Britain produced no match for Ford, Westinghouse, BASF, Hoechst, AGFA and Bayer.

As early as the Great Exhibition, men like Charles Babbage were warning that the country needed; “a more intelligent and better educated class of foremen, managers and workmen.”²⁴

Over the next fifty years, some nineteen enquiries were undertaken into the state of elementary schooling, public schools, secondary schools, universities, scientific instruction²⁵ and technical instruction and the emerging themes were clear; science teaching was poor to non-existent throughout the school system; the achievements of British science were largely the achievements of great men, not institutions.

There was reform; from the 1850s, scientists and engineers became determined to agitate for reform; the “Cambridge network” of scientists pleaded for more science in university curricula; a Parliamentary committee was formed; the magazine *Nature* was founded in 1869; and the National Association for the Promotion of Technical Education in 1887. Eleven universities were opened between 1851 and 1902. Amongst the first, Manchester, opened in 1851, there was real empathy for the German model, and “teaching [the people] things which would help them in their occupations.”²⁶ Universities like Sheffield were founded on intimate links to the needs of local industry; indeed, posters in factories across the city urged workers to make penny donations to support the founding of a university that would help educate “the child of the working man.”²⁷

The nation’s Mechanics Institutes, born in the 1820s, numbered some 700 by 1851²⁸ but it was not until the 1880s that the landscape really accelerated; City and Guilds was founded in 1879. Polytechnics multiplied in the decade thereafter. In 1889, councils were finally allowed to levy rates to build technical colleges, augmented by “whiskey money” in 1898. But supply of students through the secondary system was rather haphazard until the Education Act of 1902, when public subsidy for secondary education was finally introduced²⁹, and while by 1903 most English cities could boast a red-brick or a University college, the reality remained that as a Departmental Committee reported in 1906;

“England compared not unfavourably with other countries in the provision made for...lower and intermediate grades of technical education...[But] the principle deficiency...appears to lie in the sphere of the highest technical education.”³⁰

The US and Germany were streets ahead³¹. On the eve of war, the US boasted enrolment rates in secondary education that were twice the UK level, while in industry, Britain simply lacked the large scale industrial research and development of mighty American firms. There was no British equivalent of Bell Telephone Labs, or General Electric or Eastman Kodak.

The war changed everything. The terrible shortcoming of the industrial base in the early years forced British policymakers, so disdainful of the new capitalists before the war, to see that a new alliance between government, industry and science was now vital to victory.

The Department of Science and Industrial Research was founded in 1916. University College pioneered the process for fixing nitrogen, the key to TNT. Manchester pioneered mass production of acetone. Bristol and Oxford perfected both the gas mask and the mass production of mustard gas. St Andrews perfected mass production of novocaine³². Queen Mary invented the hydrophone, the key to winning the battle with the U-boats.

Together British universities, industrialists and civil servants laid the foundations for ICI (the British Dyestuff Corporation), a doubling of electrical engineering capacity, the modern British aeronautical industry, and engines of a better quality than anyone else. By war-end, policymakers saw the fortunes of the country in some part depended on the fortunes of our universities, and every twenty to thirty years, they remember it.

This was the echo sounded in 1945 by the Percy Committee and then Barlow;

“If we are to maintain our position in the world and restore and improve our standard of living, we have no alternative but to strive for that scientific achievement without which our trade will wither.”³³

It was a sentiment echoed again in Labour's paper, the *Years of Crisis*;

“Britain's economic stagnation is a direct result of neglect of higher education. Economic expansion is only possible if university and technological education expands rapidly and continuously to provide the necessary brain power and skill.”

What was true after World War One, World War Two and throughout the Sixties is true again today.

INNOVATION IS THE ONLY WAY OUT OF AUSTERITY.

And that is why we need a bigger, stronger university system.

In my bones I know this “Westminster argument” about universities and science (in this paper, I use a broad definition of “science” to include social sciences) sounds too instrumentalist, far too devoid of the sheer nobility of scientific endeavour.

It is true too that some of the greatest contributions from science have arisen when those practised in research are left to their own devices.

Yet, in an era where there is less money around, we must spend taxpayers' money sensibly, effectively and efficiently. Our approach will be one of big reform rather than big spending. This means maximising the contribution of science and universities and further education to growth and inclusive growth.

I feel this strongly because I played a small part in surfacing the challenge that we now call the “squeezed middle” and the “cost of living crisis.”

During my time as Immigration Minister between 2006 and 2008, I introduced wide-ranging changes. Yet, as I was investigating a total overhaul of citizenship law – “earned citizenship” we called it – I sensed that frustration with immigration reform was perhaps not reducible to merely an emotional insecurity; it was an economic insecurity too.

When I became Chief Secretary to the Treasury, I set off a small team which uncovered some crucial patterns, which I wrote up shortly after the election³⁴.

During the 1970s and 1980s, decisions on four continents established a global marketplace creating the conditions for the long, prosperous boom in world trade in the US, China, India and Europe. During this period the UK grew faster than either Continental Europe or Japan for the first time in a century.

But beneath this happy arc of rising average incomes something else was going on, especially for those families on low and middle incomes. The 1980s saw a huge increase in low pay and inequality; in the 1990s average wages began to fall behind productivity increases.³⁵ As is now very well established, these trends were not unique to the UK³⁶; in America, *Time* Magazine christened the phenomenon, “the death of the American Dream” as gigantic growth in American productivity barely produced any improvement in the real incomes of the average American family.

The Labour Government took steps to ameliorate the challenge; the National Minimum Wage and tax credits were introduced to help working families. In the next Parliament, we know reform will need to be more profound; we need nothing less than a different kind of economy. In an age of fiscal austerity, a new inclusive growth model is needed if the wages workers enjoy before tax and benefit changes are to rise in line with national economic growth.

Before the summer, in a speech to the Oxford Martin School at Oxford University³⁷, I sketched out a basic model for thinking through the panoply of policy that is needed. This included demand side reform like new free trade agreements in this post-Doha world, along with trade-enhancing infrastructure; more “patient capital” markets; more competitively intense markets that are more open to high performing market challengers, like the vital 6% that create lots of new jobs³⁸, and an additional two policy spaces to which higher education is critical - supply side change that grows the contribution of science and innovation, and second, labour market reform that solicits a greater supply of higher level skills.

Critically we have to transform our national productivity because what we used to call the “British disease” is back³⁹. Since the election, output for

every hour worked has not gone up – it’s gone down, whilst output per worker has followed the same trajectory. We’re actually less productive than we were in 2010. This appalling record is far worse than the last years of the 1970s, long deemed the moment when “British disease” reached its peak. Yet, in this period output per worker and output per hour worked actually rose by over 5%.

Worse, we’re now falling rapidly behind our competitors. The gap in productivity per hour between the UK economy and G7 average is now 21% – the widest gap there has been since 1992⁴⁰. What the G7 finishes making on Thursday night, takes us until the end of Friday.

The result? Nearly 80% of the jobs created since the crash are in low skill and low paid sectors⁴¹.

Yet, here’s the really bad news.

Technology and trade may be about to make the problem even tougher.

Technology may prove the more important short term force because of the way it is simply transforming the future of work. Technology has now automated huge numbers of what were once reasonably skilled, reasonably paid jobs. It’s a long trend, treated extensively in *Labour and the Scientific Revolution* back in 1963, but the pace feels like it’s getting faster. In America, economists Autor and Dorn⁴² are amongst many who’ve reported there’s been massive substitution of those:

“low skill workers performing routine tasks – such as book-keeping, clerical work and repetitive production and monitoring activities – which are readily computerized because they follow precise, well-defined procedures.”

This is creating what some call the hour-glass; high skill jobs, and low skill jobs and very little in between. The “hour-glass” in Britain is certainly more and more pronounced. Indeed, the Resolution Foundation tell us that jobs in sectors with a high concentration of routine tasks fell by 5% between 2007 and 2012.

But guess what: there may be an awful lot worse to come.

One book that makes precisely this argument is Erik Brynjolfsson and Andrew McAfee's *The Second Machine Age*⁴³. It is a positive book and its argument is a simple one:

Our ability to combine technology – processing power, cheap sensors, robotics, networks, social media, big data – means we're now at an inflection point in our ability to combine and recombine technologies to do new things, revolutionising technology from Google's driverless cars to better diagnosis of diseases. Viz:

- There's now enough technology in a Nissan LEAF to render the car a fly-by-wire robot, the kind of technology that could revolutionise the logistics industry.
- GE already makes robots that can climb and repair wind turbines.
- Future Advisor already uses Artificial Intelligence that's strong enough to offer personalised financial advice.
- Algorithms are taking on tasks once performed by paralegals, contract and patent lawyers.
- Oncologists at Memorial Sloan-Kettering Cancer Care use IBM's Watson computer to provide chronic care and cancer treatment diagnostics.

What's does this mean for jobs?

Well, at the Oxford Martin School, academics estimate that as many of 47 per cent of the jobs in our economy today may be automated.

First technology took the blue collar jobs. Now it's the white collar jobs as well. The lesson is simple.

If we want a model of more inclusive growth, where more people earn more – at the top of the hourglass, then we need a higher education system that helps to build better jobs and equips people with the skills for high skilled, high value-added, non-routine jobs.

THE RACE TO THE TOP

There is an added pressure.

The Prime Minister used to use a phrase he was rather fond of: “the global race.”

Well, if the global race is anything, it is a science race and right now there is a very real danger that Britain is falling behind. Let me illustrate with a couple of stories. In Bangalore earlier this year, I had the pleasure of spending time one Saturday afternoon with the Chief Executive of a major British manufacturing company on the shop-floor of his Indian joint-venture.

“Here in India” he told me “I’ve the choice of 850,000 engineering graduates every year. Let’s say 15% are fit to hire – actually the real number is 50% – but let’s say its 15%. It means I have hundreds of applicants for every job. Quality wise they’re just as good as my apprentices in [the Midlands].”

“What are they paid?” I asked.

“About £5-7,000 a year” came the reply. Gulp.

Or have a look in China. China is spending \$2.15 trillion on R&D over the course of this five year plan. And as Nesta’s brilliant report, *China: The Absorptive State* illustrated, many of the world’s leading science and technology businesses – and clusters – are no longer Western, they are Chinese. I write a lot about this in my book, *Turning to Face the East*.

Now, most other Western nations are highly alert to this. They realise, as Marianna Mazzucato and others have argued, that public finance tends to “crowd in” private investment. In some countries today, investment in knowledge-based infrastructure (such as data, software, research and patents) already exceeds investment in physical infrastructure.

Over the long term, innovation is what drives the bulk of economic growth. This is how America’s scientists expressed themselves in their landmark publication, *The Gathering Storm*⁴⁴, back in 2005:

“Without high-quality, knowledge-intensive jobs and the innovative enterprises that lead to discovery and new technology, our economy will suffer and our people will face a lower standard of living. Economic studies conducted even before the information-technology revolution have shown that as much as 85% of measured growth in US income per capita was due to technological change”

The Royal Society has expressed the same sentiments. Introducing its brilliant paper, *The Scientific Century*, Martin Rees of the Royal Society left us with the fine phrase “unless we grow smarter, we will grow poorer.”⁴⁵

It reminded me of something blunter that Paul Hofheinz, President of the Lisbon Council said to me in Brussels earlier this year: “if we want to live better than others, then we will have to be better than others.”

What is the way through this?

There is only one way. To build a bigger knowledge economy with more high skill jobs and fewer low skill, low wage jobs.

Let me offer a few numbers to illustrate the point.

The House of Commons library has set out just how important the knowledge economy is for earnings.

Today, knowledge intensive industries accounted for around a third of UK economic output (£350bn), a third of businesses (650,000) and a fifth of employment (4.2m) in the UK. But if the knowledge economy made up one-third of jobs in Britain, that would equate to 2.4 million extra better paid jobs to go round.

How much better paid, I hear you ask? Well, earnings in the knowledge intensive sectors are £161 a week higher than the average for all employees in 2013. That is a pay-packet that is 40% bigger.

So our goal is bold and simple: to build a bigger knowledge economy.

CHAPTER 3: THE FIVE TESTS?

A bigger knowledge economy which employs more people on better wages needs a different sort of higher education system.

So the debate now needed is about the right but realistic level of ambition, the right pace of change and the design features of a new system. I use the word “system” deliberately. We need great people and great institutions. No argument there. But in a globally networked knowledge economy, we need great people and great institutions to work together, like cylinders in an engine.

You will have your own check-list of virtues for what makes a higher education system great. My “system” has five basic virtues;

1. it should allow our science base to grow ever more excellent, more globally competitive and connected;
2. it should offer potential students a genuine diversity of choice over how they progress to higher level skills, including those wishing to progress along the vocational track;
3. it should remedy the deficiencies in our skills base;
4. it should promote social mobility;
5. it should be sustainable; underpinned by a public finance system that is affordable without loading young people with unsustainable levels of personal debt and is affordable.

I think today’s system risks failure on all five tests. Zero out of five.

First, let’s examine the state of science and science spending.

At the beginning of this Parliament, science capital was first removed from the budget ring-fence and then savaged. Ad hoc top-ups followed in a somewhat haphazard way. Decisions reflected ministers’ discretionary choices, not a bigger blueprint for sustained investment.

This uncertainty has knock-on effects. It hurts the crowding in of private investment. The evidence? Nationally, research and development as a percentage of GDP is now at its lowest level since the turn of the century. Last year it fell for the first time since 1986.⁴⁶

This lack of certainty is incredibly dangerous because of the way that science and innovation strategy is changing, especially in major companies. The scientific problems we tackle today are too big for one country or one company to crack. And so over the last twenty years, we have seen huge new global science platforms emerge. Like a great, global Lunar Society, they bring together brilliant partnerships and package major budgets to build massive instrumentation. Some of these platforms are public ventures like CERN's Hadron Collider, or the ESA's Gaia, Billion Star Surveyor. Many others are public-private-philanthropic centuries, like the Diamond Light Source at Harwell, just outside Oxford. This equipment allows us to gather data on an unprecedented scale. For instance, the data needed to decode vitamin b12 took around 12 years to gather. At the Synchrotron in Harwell, you could today gather the same data in an afternoon.

Britain needs to be able to participate in these global ventures, and indeed offer a home to as many as possible, not least because it is around these shared, global science platforms that private sector companies are clustering, with some novel organisation.

As Prof Peter Nolan points out, today about half of private sector R&D is in the hands of 1,400 companies⁴⁷. Underway around the world today is a massive consolidation in the commanding heights of the global economy and these new global behemoths are using giant spending on branding and innovation to create huge barriers to entry in their markets.

But to lower risk, maximise speed and lower cost, these companies are clustering their R&D around global science platforms with some novel organisation. I call this the shift from the "cathedral" to the "campus" model.

Once upon a time, big companies like GSK or BT piled a load of research scientists into a big building and prayed for the best. Now, they're building

business parks – campuses – around shared science. Look at BT's new facility in Adastral Park (now home to fifty plus companies) or GSK's Catalyst Park out in Stevenage. These are the signs of things to come. As GSK noted in recent evidence to Commons⁴⁸;

“A strong SME sector is an essential component of the UK's innovation system... [so] more needs to be done to ensure the establishment and sustainability of such smaller companies”

We can see the examples of these new ecosystems future in BT's Adastral Park, the Stevenage Bio-science Catalyst, or Boeing's sponsorship of the Advanced Manufacturing Research Centre in Sheffield.

Case Study: GSK Stevenage Bio-Science Campus

Bridging the gap between industry and innovation, GSK have built a Research and Development Centre to co-locate with the Stevenage Bioscience Catalyst, the UK's first open innovation bioscience campus.

Opened in 2011, the centre reflects the pharmaceutical giant's belief in open collaboration. In the space of three years, there has been a proliferation of SMEs, large research-active companies and academics arriving on site, including rivals Johnson & Johnson. Academic representatives include UCL and Cambridge University, who have each committed to a programme of scientific open collaboration to advance drug discovery and the development of new medicines.

GSK's business rationale reflects a trend for research beyond company limits. The removal of physical barriers and a commitment to co-location enables scientists who might not ordinarily have interacted to build relationships, share ideas and seek advice.

Case study: Sheffield's Advanced Manufacturing Research Centre (AMRC)

Established in 2001, the AMRC with Boeing is a world-class centre for advanced machining and materials research for aerospace and other high-value manufacturing sectors, enjoying close collaborative links with Sheffield University, its academic partner. The centre has over 70 member companies, from global aerospace giants to local small businesses; and employs over 200 people, from apprentices to PhDs.

Based in two purpose-built factory-scale facilities on the Advanced Manufacturing Park in Catcliffe, including the recently extended Factory of the Future, the original AMRC building has been expanded and redeveloped to create a new Design Prototyping and Testing Centre. Every aspect of research is led by industrial partners, ensuring that work provides lasting value and is relevant to the aerospace market from the beginning.

The AMRC has received numerous awards, including Boeing Supplier of the Year 2010.

A multi-tiered membership system enables companies of all sizes to contribute and collaborate, thereby harnessing the important research prowess of SMEs in addition to the industry trailblazing of bigger aeronautical companies. All members are represented on the board.

Case Study: BT Adastral Park

Perhaps the best embodiment of the shift from the “cathedral” to the “campus” model is BT’s Adastral Park. The site, based at Martlesham Heath near Ipswich, was originally called BT Research Laboratories. It has since evolved in name and nature, reflecting a growing presence of the other research activities and companies present.

The park is a research success story. Much of this is down to a combination of the co-location and proximity of excellent world-class postgraduate research, which has previously allowed for collaborations with the likes of UCL’s Engineering Department.

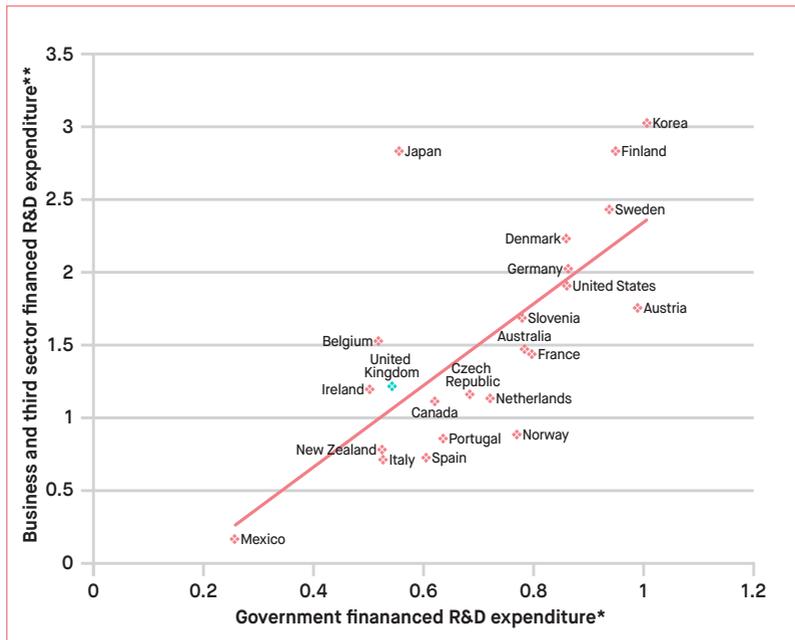
Since opening up to companies beyond BT, 43 businesses have moved on site representing the biggest names in technology: from Fujitsu and Ericsson to Samsung to Cisco. The site is also one of two worldwide Network Management Centres for BT Group, providing a 24-hour “follow-the-sun” service – the other being in El Segundo, California.

The site home to approximately 4,000 technology professionals, working across research, design, operations and consultancy. Their work allows BT and others to take innovative technology and develop it into products that meet consumer need in the real world.

Without globally excellent shared science platforms – aka “universities” – we will lose these clusters and the innovation that goes with them. Not everywhere can be like Cambridge, which can now boast hundreds of multi-million pounds new firms, but almost every university today is a hub of some kind to a knowledge intensive cluster around it.

A lack of long term certainty in the science budget, where science capital decisions are made short-term by ministers, is disastrous for our ability to plan big science infrastructure ahead with certainty and speed or attract private investment. Compared to the OECD group of developed nations, Britain’s private and public science spend is 7th in absolute terms but only 25th in percentage terms.

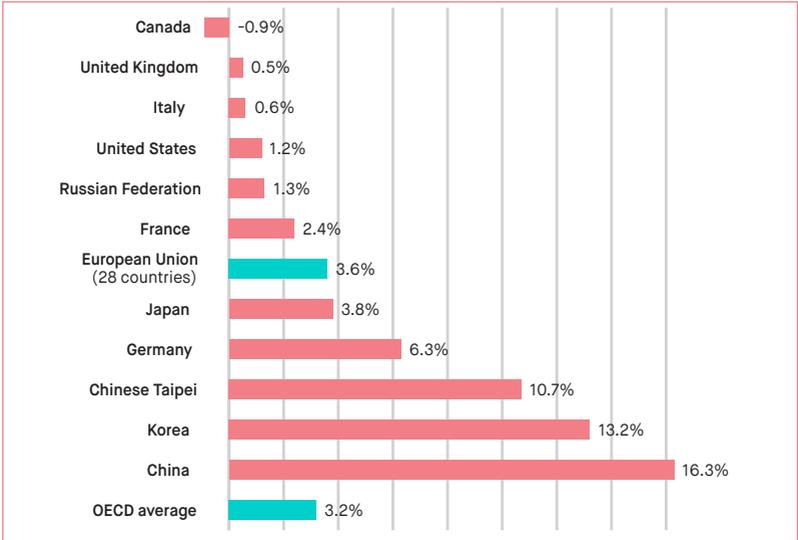
Figure 1: Government and Private Sector Financed R&D as a % of GDP in 2011



Source: Department of Business, Innovation and Skills (January 2014)

Other countries are increasing R&D spend much faster than us

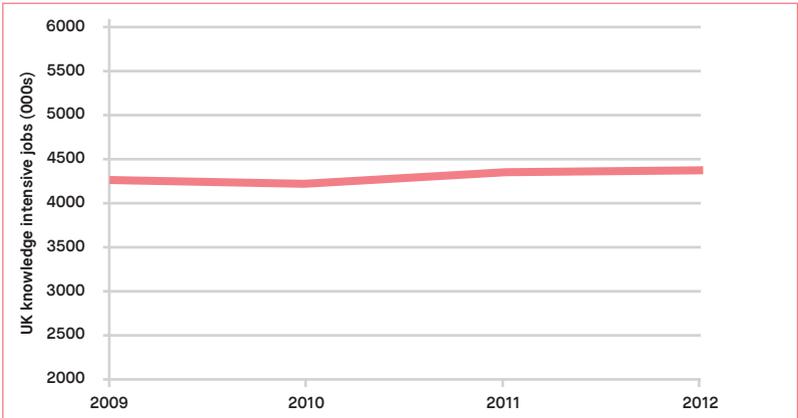
Figure 2: OECD average annual growth in science spend 2008-11



Source: OECD Library, May 2014

This is part of wider story where growth in knowledge economy jobs is flat, R&D is falling and exports are weak

Figure 3: UK Knowledge Intensive Jobs 2009-12



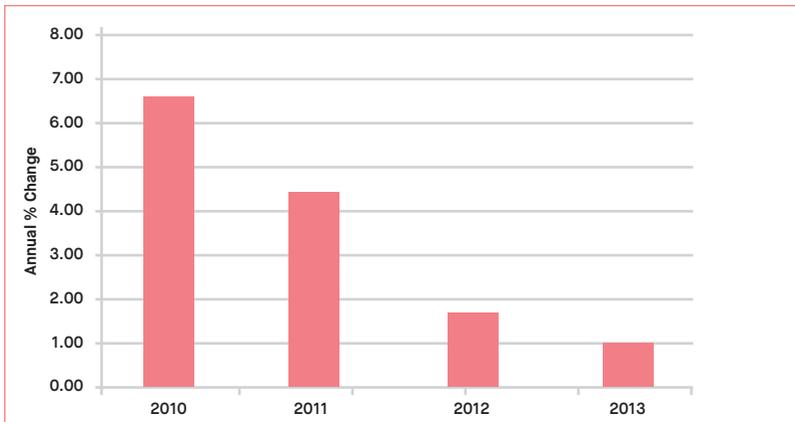
Source: ONS, Business Register and Employment Survey 2013

Figure 4: UK Spending on R&D as a % of GDP 2005-12



Source: Gross Domestic Expenditure on Research and Development, 2012, ONS

Figure 5: UK Export Growth 2010-13



Source: ONS Series KH2R and OBR Fiscal Outlook, March 2014

Real choice

Second, potential students need a genuine choice about how to progress to higher level skills. For young people following the traditional academic route there is a clear route from age 14 through GCSEs to A' levels and on to university. But not enough attention has been paid to the options available to young people that do not currently go to university. This “forgotten 50 per cent” of young people face a confusing mix of vocational courses, many of which fail to offer progression to good jobs or further study. This situation is failing young people and holding back businesses that can't get the skills they need to succeed.

In our country we ask young people and their parents to make irrevocable choices at an awfully young age.

Options are taken at thirteen, another choice of paths at sixteen and then one more at eighteen.

The result is that it is very easy to get locked into a path aged thirteen with very limited options to escape or switch into a path that is different. This is stopping young people and mature workers from realising their potential.

Today, while we do a decent job of getting A level students or those on an academic route to university, we do a terrible job of lifting apprentices up to the same standard.

While great firms, like Rolls Royce train fifty per cent of their apprentices to degree level skills, as a country we manage just two per cent. That's right, two per cent. The grand total of 9,800 people in 2012/13. It's not good enough. It's not good enough for the future.

The result is that young people feel they face a Hobson's choice. That is, no choice at all. They feel that unless they go to university they really are stuffed in today's jobs market. But they are highly anxious about taking on an average of £44,000 worth of debt⁴⁹ in an uncertain job market where nearly half of employed recent graduates are in non-graduate jobs, up ten percentage points since 2001⁵⁰. In fact, more than a quarter (27 per cent)

of employed graduates earn less than the average hourly wage achieved by former apprentices.⁵¹

What young people want is a genuine choice of an earn-while-you-learn route to degree level skills. Too many people are being pushed down a one-size-fits-all route, where the only way to a degree is a full-time, three year programme. Young people want a better choice than this, which is why the Jaguar Land Rover apprenticeship system – which takes workers to degree level skills and beyond while they’re working - is more competitive than Oxford University.

Our skills base

Giving young people a real choice of pathway – a real choice of the “royal road” to university and a “prestigious path” to degree levels skills on an apprenticeship track – is closely linked to the challenge of fixing our skills base.

All over the economy, business is saying that a lack of skills is holding us back.

As the IPPR pointed out, over the next decade, a large number of jobs will be created in sectors that rely on vocational education and qualifications. A staggering 39% of vacancies in skilled trades are caused by skills shortages.

In a globally mobile marketplace, employers will move to where they can find high quality labour pools. And right now, nearly a third of high-tech manufacturing firms say they import labour from overseas due to a skills shortage here⁵².

Indeed, the Migration Advisory Committee has added 117 high-skilled roles to the shortage occupation list. British business has had to sponsor over 282,000 skilled people into Britain - that’s around the same number as the population of Newcastle - because they couldn’t find the skills here.

But look at the future and the skills crisis looms larger still.

In the UK, between 2012 and 2022, it is projected that we'll need over a million more people in professional occupations and nearly 600,000 new managers, directors and senior officials⁵³. The Royal Society of Engineering tells us that we're delivering 36,000 too few engineering graduates every year. Mike Wright says that the country's automotive and aerospace industries will suffer if there isn't a greater focus on improving the level of domestic engineering skills in the future. Andrew Adonis describes the skills shortage as the "single most important impediment" to British businesses.

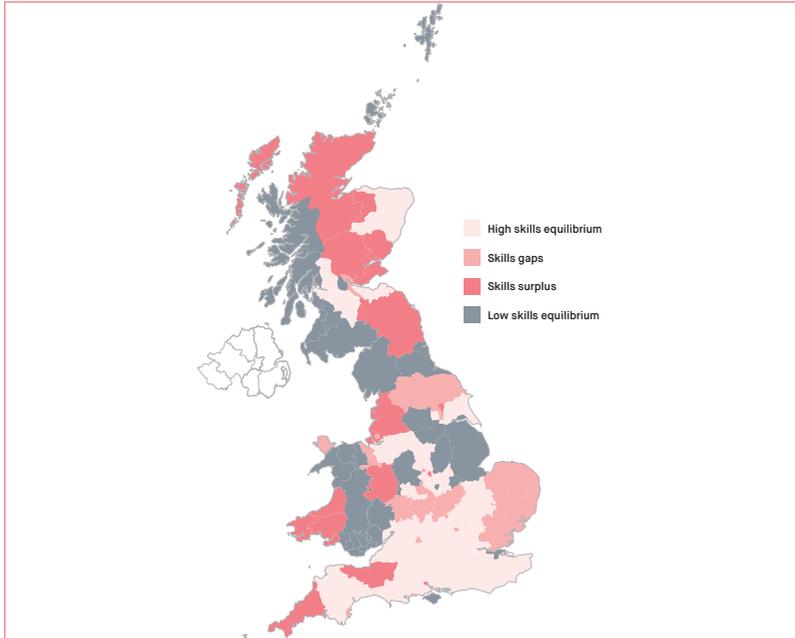
Yet, skills shortages now sit alongside sky-high youth unemployment as the serious issues affecting future growth and shared prosperity.

I'm a firm believer in education for education's sake. But as the Member of Parliament who serves the constituency with Britain's highest youth unemployment, I know too that a good job is fundamental to the way we flourish.

The challenge is that our schools and skills system are simply not forecast to supply the quantity of skills we need.

It will be hard for us to win these “global hubs” unless we strengthen the science base **and** tackle our regional skills shortages

Figure 6: Skills supply and demand at the local level



Source: “Strengthening Local Skills Strategies”, OECD Skills Strategy Spotlight No. 5 , OECD, 2013 <http://skills.oecd.org/developskills/documents/strengtheninglocalskillsstrategies.html>

Figure 7: Supply of STEM apprentices, per year, anticipated demand on apprentices per year (until 2020)



Source: *In the Balance: The STEM human capital crunch*, SMF, 2013

This is not just a challenge for higher education policy because the government is damaging every rung on the ladder up for potential STEM graduates.

- On the first “rung” at school, there has now been a 16% rise in unqualified teachers in our children’s classrooms. Funding for Initial Teacher Training (ITT) through universities was cut by 15% last year. The latest data shows⁵⁴ that just 560 postgraduate ITT places for physics were filled against an overall target of 990. In mathematics the number of filled places is 550 short of the target. Yet, demand for teachers, particularly in STEM subjects is greater than ever and graduate qualified teachers are key to inspiring young people into STEM subjects.

- The decision to remove the examination of practical work from A-level science grades means that crucial aspects of a scientific education will go missing in school labs. And we do not require young people to study English and maths up to the age of 18.
- The wholesale destruction of Information, Advice and Guidance services for school leavers and young people is also putting the UK on the wrong track. Organisations like the Institute of Career Guidance warn that fewer young people are getting crucial face-to-face career counselling. The CBI says the careers service is “on life support”.
- Over the past year apprenticeship numbers for the under-25s have fallen by 11,400, with the vast majority of the increase in apprenticeships since 2010 taken up by older workers. There is also a lack of higher level vocational courses, with just 2% of apprentices studying degree-level skills and since 2010, a 40% fall in the number of people studying for HNCs, HNDs or foundation degrees.
- Yet, there is a huge appetite among young people for a vocational path to the highest level of skill; it is now harder to get an apprenticeship in this country than it is to get into university. It is now harder to get into BAE Systems’ apprenticeship programme than to get into Oxford. It is harder to get into Rolls-Royce than to get into Cambridge.

That is why Labour has set out the need to offer a different way forward; a vocational technical education system with a clear line of sight from the age of 14 to 21, where it becomes easy to work *and* study to degree level skills.

It’s a vital reform because other countries are not making the same mistakes. They are already further ahead than us – and they are not standing still. They are speeding up.

In February, I stopped by OECD HQ for a chat with Simon Field in the Education Directorate. Sadly, there is no internationally comparative data on vocational paths to higher level skills. The OECD will soon publish work on what other countries are up to. It is a little frightening for a British policymaker, but I will not hide the facts:

- In the Netherlands, about half of the graduates from the highest initial VET track (MBO 4) continue into professional bachelor's degree programmes in HBO institutions⁵⁵.
- In Germany, access to university for students without the normal higher education access qualification was substantially enhanced in 2009, with record numbers advancing on this type of programme (in addition to the smaller number of young people).
- Switzerland has been relatively successful at opening universities of applied science to graduates from the dual apprenticeship system through the creation of a specific vocational matriculation examination (the Berufsmaturität), to be completed in parallel to an apprenticeship programme, and that provides access to tertiary education. Today, around 12% of all apprentice graduates obtain the Berufsmaturität and they represent half of the students in the universities of applied science⁵⁶. As benchmarks, in Switzerland, around 15% of the adult workforce have this type of qualification as their highest.
- Austria introduced a similar exam (the Lehre mit Matura) in 2008. In Austria the five year vocational colleges provide an important route into tertiary education: one in four university students, and almost one in two university of applied science students are now vocational college graduates.
- In South Korea, although vocational high schools are designed for direct labour market entry, around three quarters of graduates immediately enter tertiary education, a statistic which challenges the design assumption (Kuczera, Kis and Wurzburg, 2009).

The point is clear. We need a revolution in access to higher level skills if we're not to be left behind.

Social mobility

Social mobility and access to university will always run through the heart of the Labour Party like a thread of steel. We will always be the party that champions the Robbins Principle and ensure that those who have the ability also have access to higher level skills. We believe our public universities are civic bodies. The widest possible social engagement should be part of their core purpose.

This is a crucial point: access is not just about getting young people into the most elite universities. It's about a system that's adaptable and meets the needs of a variety of learners: mature students, those with dependents and students who have other responsibilities. It's a system that caters for those that wish to progress along the vocational - not just the academic - track, and allows people to study whilst they work and access essential courses closer to home. It's also a system that raises aspiration amongst young people.

When Labour's Aim Higher was closed in 2012 the sector lost something unique and the real sense of collaboration in access was gone. Individual institutions, such as King's College London have pioneered new approaches to access through their K+ programme; their efforts should be applauded and shared – and not dismantled. Instead, we should take these innovations and support them with a renewed national vision and purpose that reflects the principle of Aim Higher: a collective, holistic approach to access that ensures different institutions work together. Only by doing this can we ensure that we're truly acting in service of all young people.

As well as considering **access to** higher education, crucially we should also consider what happens **within** higher education. This longstanding debate has been brought to life by passionate advocates of social mobility, like Professor Geoff Layer, Vice Chancellor of the University of Wolverhampton.

Geoff rightly points to HEFCE Circular 01/36 and the importance of the student lifecycle, including when a student is *at university*. This reminds us there is a need for support services within HE to make timely support interventions; we must do more to address the appalling gap nationally in degree attainment between white and BME students, as well as the under employment of disabled students.

The UCAS evidence on university participation by boys is particularly arresting. Well inside a generation, we are told, in terms of participation the gap between girls and boys will exceed that between the top and bottom quintile, whilst girls are still less likely to study STEM subjects . Our attitude towards social mobility must, therefore, be one which allows us to address the problems of the past and present, but also readies us to prevent social problems of the future.

Sustainability

Finally, there is the question of financial sustainability.

I have said a great deal about this over the last 9 months, so I won't labour the point here. Good research, good teaching, needs good and sure foundations. The decision to triple tuition fees was justified on the basis that it would provide financial sustainability. Yet what is now clear is that the Tories' student loan system that finances our universities, voted through by the Lib Dems, is a time-bomb waiting to go off – significantly increasing student debt, while saving hardly any money. This is due to the fact that the Government now expects to write off nearly half of all the money it lends.

This debt explosion has been accompanied with a free-market experiment gone wild. Since 2010, the amount of taxpayers' money that goes straight into the pockets of hundreds of for-profit private providers – without anything near proper regulation - has increased from £30 million to £850 million a year in public subsidy.

Today's system with tripled fees and big debts for graduates is almost as expensive as the system where students were charged a third as much. It has become an indefensible system.

CHAPTER 4: ROBBINS REBOOTED

Higher education needs to become a bigger part of Britain's future. This is no new insight. Ron Dearing famously reminded us:

“Just as castles provided the source of strength for medieval towns, and factories provided prosperity in the industrial age, universities are the source of strength in the knowledge-based economy of the twenty-first century.”

It's a theme that's been echoed in public policy since at least the 1960s.

In the 21st century, higher education has a key role to play in building a bigger knowledge economy, where prosperity is more inclusive, where there are more, better paid jobs and where social mobility is higher. But our challenge is not simply to foster world-class institutions. We need these world class *institutions* to be part of a world class *system*.

Today, we have the institutions. But we certainly do not have the system.

Our aim should be for a higher education landscape that includes large, small, specialist and technical providers. A real choice and diversity of institution and mission as well as provision.

PA Consulting's survey of Vice Chancellors this year found, “most [Vice-Chancellors] believe the current system to be unsustainable” and quoted one saying;

“I don't think the government knows what it is doing and, worse, it doesn't seem to care. It views the market as sovereign and seems not to be bothered about the consequences.”⁵⁸

I've heard the same sentiment in conversation after conversation:

“We simply don't collaborate any more. Collaboration is gone. It's dog eat dog.”

We have to be thoughtful about how we develop policy to fix this.

At a recent ceremony to install a prominent Chancellor, I caught up with a Vice-Chancellor with whom I often enjoy conversations about policy history.

“Higher education is a highly complex system” he reminded me
“the key is how you carefully evolve it.”

I think that is wise advice.

So one approach is to recognise that universities are globally competitive, autonomous institutions that are highly innovative. We should observe the innovation we like the look of, and ask: how can reform clear away obstacles to further, faster progress – and at the same time solve our wider policy priorities?

As I set out in my acknowledgements, I have, over the last nine months enjoyed hundreds of conversations, debates and visits, and what has struck me is the way that further and higher education leaders are building a “new model university” for a networked age, distinguished by innovation along six fundamental dimensions.

This is not an exhaustive analysis. Many universities are strong on a handful of these dimensions; others are strong across the waterfront.

But reformers would do well to ask: how do we recognise “excellence in mission” in a way that helps universities strengthen the dimensions that are priorities for them?

Figure 8: The “new model university” - innovation across six dimensions

	Local	Global
Teaching	‘Escalator trusts’	Foreign students
	MOOCs	
Research		Newton Funds
	SME platforms	‘Star Alliances’
Development	UEZs	Global hubs

Let me start my discussion with research.

RESEARCH

In Jenny Uglow’s wonderful book, *The Lunar Society*, we read first-hand how a group of friends, scientists, entrepreneurs and manufacturers transformed their wine-fuelled debates held on the nights of the full moon into a force that helped spark the industrial revolution. Science and innovation are a collaborative business and today that collaboration – or open innovation – is not city-scale but global-scale.

Alongside, our new generation of global science platforms like the ESA or CERN, our leading universities are creating “Star Alliances”⁵⁹; global research partnerships that bring together some of the best minds in the world to collaborate.

We need to find ways to support this.

British scientists are amongst the most effective global collaborators in the world. In a world where other nations are growing science spending much faster than us, global collaboration is one of the ways we can grow our share of the “global lab.”

Case Study: University of Southampton

Southampton University is at the forefront of global research collaboration.

EpiGen

In 2006, they established *EpiGen*: a research consortium made up of 6 member organisations across 3 countries. Each member has complementary world academic leadership in applied epigenetics, enabling them to accelerate translation of basic science and more effectively partner with commercial entities.

To-date, the consortium has fostered major collaborations with a number of multinationals including Nestle, Abbott and Danone, contributing to key development in the field of mother and infant health.

A*Star Singapore

More recently, in early 2014, the University joined forces with the Agency for Science and Technology Research (A*Star) in Singapore to open a laboratory in the A*Star building in Singapore.

Physically staffed by a small number of Southampton academics, the mission of the joint lab is to build capability in Singapore to attract new business – particularly those bidding for overseas contracts working with companies such as Keppel and Semcor.

Initially, projects will include offshore structures for oil and gas, tidal turbines, shipping and sport, although plans are for the collaboration to evolve and include Management (logistics and supply chain management), Maritime Law and Oceanography.

Case Study: Warwick University

Monash-Warwick Alliance

Launched in 2012, the Monash-Warwick Alliance is a lesson in how Universities can seize the opportunities a globalised future has to offer.

Both Monash and Warwick are young, ambitious, research-led institutions. The Alliance empowers them to meet the needs of industry, government and globally mobile students, who require international experience to exploit new opportunities and tackle world-relevant and strategically important problems.

Through this collaboration, the two institutions have been able to accelerate the exchange of people, ideas and information, as well as offering deep research associations, staff mobility and cooperation across every aspect of the two universities. Expanded research capabilities afford new capacity to tackle complex global problems particularly in fields such as sustainable chemistry, nanomedicine, advanced imaging and materials, and understanding cultures.

Warwick – Centre for Urban Science Progress

The University of Warwick is the only European institution to have partnered with universities like NYU, Carnegie-Mellon and Toronto to set up an applied sciences campus in New York. The new Center for Urban Science and Progress (CUSP) is seeing universities, global technology corporations and city government partners working together to create new solutions to the pressing and complex challenges confronting the world's cities. There are plans for a branch of CUSP to open in London in 2017 in collaboration with King's College London.

To boost out universities' "Star Alliances", we need to solve five priority policy questions:

- First, how to put research funding on a long term footing. Putting together international partnerships is difficult and takes a long time. Long-term certainty in both research and revenue funding helps get global deals done.
- Second, we need a new conversation about "strategic research" and how we back journeys of pure curiosity in multi-disciplinary research. There is a real sense in the UK university community that we have real potential in this endeavour and therefore it is something that makes us globally attractive; but people say to me that the current structure of research councils and the funds they run is a challenge. One prominent former research council chair said to me:

"I found that we could just about channel 10% of our budget into 'strategic research' before the purists started screaming. But in the future this may be the most fruitful field of endeavour"

Other Vice Chancellors have said to me;

"This is the one field where the UK may need a really radical approach."

- Third, the great "kit" that we put into "Star Alliances" is not much good if we can't run it or keep the lights on. As the chief executive of one research council tells me, the challenges in today's approach to research capital is that the "batteries aren't included." This is a particular challenge given the expense of running some of our very large platforms like the Diamond Synchrotron. In our roundtables on Labour's science and innovation green paper, I have been made very aware that maintenance of new facilities is paramount, not just the building of them. Badly maintained facilities are not a great foundation for global partnerships.
- Fourth, effective "Star Alliances" need back up with scientific diplomacy to help unlock more economic value. I owe Prof. Ed Peck, the new Vice Chancellor of Nottingham Trent a huge debt for talking me through the

intricacies of research partnerships in countries like China. I was struck by how hard it can be to repatriate the fruits of one's labour. This is the kind of detailed issue, a little like reform of higher education rules in India, where we need sustained ministerial pressure.

- Fifth, global research funds are going to be incredibly important in the future. This is one of the key reasons our membership of the EU is so vital but it is also why we should explore expanding initiatives like the Newton Fund⁶⁰, in the way I suggest in my book, *Turning to Face the East*.

Finally, to build global partnerships you need to be able to get foreign visitors and students into the country. Labour has said that legitimate international university students should be removed from the Government's net migration target so we can help our universities compete in a growing global market.

DEVELOPMENT: TURNING IDEAS INTO CHANGE

A bigger knowledge economy needs more than research. It needs research *and* development.

The "Star Alliances" developed by Britain's great universities *abroad* will be fundamental to building a bigger knowledge economy here at *home*. Why? Because their epicentre will be "global hubs" here in the UK, around which great R&D driven businesses will build their research eco-systems in the shift I described from the "cathedral" to the "campus."

Businesses like GSK point out that "the UK's extraordinary talent in science, in skills and in knowledge are its key strength." This basic strength is critical in a world where just 1,400 companies control half of global R&D spending, and in so much of their work, are prone to concentrate activities where it makes most sense to do so.

To support these global hubs over the years to come, the UK will need to ensure that UK universities, which are crucial to globally significant clusters, have the right policy support and the right incentives to work harder attracting the world's R&D leaders to work with them, sometimes as part of international networks organised from the UK.

We need the UK to be the best place for firms to be able to access a global science base; that means universities and government departments working with global firms to build global science partnerships together, maximising the economic impact of research in world class universities. I am told by universities and industry alike that several key issues are frustrating faster progress:

- First, is the uncertainty around funding for science and innovation, and in particular, the lack of any long-termism. As GSK pleas; “Government investment in science and innovation [that] is sustained...is pivotal.”
- Second, public procurement needs to be smarter. We still need far more thought about industrial policy in both life science and defence where we have departments that spend a huge amount of money, but where industry reports to me a host of frustrations in working with government departments.
- Third, the Higher Education Innovation Fund, is generally thought to be a great model and the freedom it affords researchers has much to admire. We should listen when Andrew Witty says we need to look at using HEIF better – including a rethink about the £2.85 million allocation cap for any single institution that risks limiting support for globally important clusters.
- Fourth, the lack of “proof of concept” funding to span the famed “valley of death” is an issue people raised with me a lot. The Russell Group argue that the shortage of proof of concept funding “remains a real challenge in the UK to secure investment in new technologies”, not least because proving a concept works can unlock millions more in follow-on funding. The Technology Strategy Board does offer SMART funding to support proof of concept and proof of market but only SMEs, not universities can apply. Lord Mandelson pioneered the idea of Catapult centres to help with this, and there is a need to support universities to play a stronger role in supporting product and service innovation.
- Fifth, there remain a long list of smaller issues from the detail of Intellectual Property agreements and how they might need to differ in different industries, through to full cost recovery regimes, which may require rather more sustained ministerial attention.

Strong research in strong universities is critical not only to our position in the global economy, but the strength of our regional economies too.

As the OECD⁶¹ has illustrated all too well, the UK is bedevilled with large parts of the country trapped in a low-skill, low-pay equilibrium, where demand for skills is low and supply of skills is low. The UK has the widest output gap between its strongest and weakest areas, equivalent to 260% of EU per capita GDP⁶².

Surely, universities need to be more powerful engines for these economies?

Part of the challenge is tackling educational inequality among graduates in different parts of the country; Million+ cite research that shows a one percent rise in the share of graduates in the local labour market enhances wages by 0.4-1.9% at a city level⁶³ and graduates working outside London tend to work in the region where they graduated. But there are huge gaps in university attendance rates, between, for instance, London at 43.5% and the South West, at 30.3%.

But raising demand for science and technology whether in the form of graduates or not, especially amongst SMEs, is the second half of the challenge. As Richard Jones at Sheffield University points out, demand for R&D amongst SMEs in the UK is generally very low and SMEs make up a tiny fraction of UK R&D spending⁶⁴.

Case Study: Huddersfield /3M Buckley Innovation Centre

The University of Huddersfield has established the independent 3M Buckley Innovation Centre (3M BIC), encouraging start-ups to co-locate with the institution. This allows for closer collaborations between companies and the University's research base, whilst also allowing SMEs to avail themselves of a comprehensive package of support including access to markets, finance, technology and skills.

The ground floor of the 3M BIC houses an "Innovation Avenue" which provides access to a suite of shared open access facilities such as: 3D printing, high performance computing, visualisation, design and modelling capability, surface metrology and machine tool precision measurement etc.

Research teams provide the expertise and skills to support companies and enable them to see the benefits which new technologies and approaches can offer the business.

This approach equips SMEs with expert support, high-end equipment and importantly with no capital outlay.

Case Study: Aston University – Innovation Vouchers

The innovation voucher scheme was designed to facilitate knowledge transfer between academics and SMEs in order to stimulate innovation.

Aston Business School (ABS) designed and managed a brokerage that distributed 661 vouchers, worth £3,000 each to West Midland SMEs, who used the voucher to purchase academic expertise. The brokerage recruited SMEs and facilitated the selection of an academic from one of the thirteen universities in the West Midlands region.

The scheme achieved new innovations by way of knowledge transfer between university academic expertise and SMEs, thereby meeting the main objective of the Innovation Voucher scheme to increase interaction between universities and SMEs in the West Midlands to boost firms' innovation capability.

Evidenced from 3 independent evaluations showed that the scheme had produced 661 innovations through knowledge transfer relationships, with over half of the SMEs reporting that they had never worked with a university prior to the scheme.

Case Study: Plymouth University – Growth Acceleration and Investment Network (GAIN)

Founded by Plymouth University with Plymouth City Council and Tamar Science Park as partners, GAIN brings together more than £120m of business infrastructure, world-class research facilities and expertise in a network focused on growth and investment.

The initiative allows Plymouth University to work closely with the business community, creating opportunities for those involved and supporting the start-up and growth of a range of determined and ambitious companies. In turn, this will lead to the creation of jobs and growth in the local economy.

Case Study: Liverpool John Moores University – “Liverpool Telescope 2”

Liverpool John Moores University (LJMU) are in the process of developing a new £15M 4-metre class robotic telescope (“Liverpool Telescope 2”, LT2) dedicated to time domain science, superseding the existing 2-metre Liverpool Telescope (LT) as the world’s largest robotic telescope dedicated solely to scientific work.⁶⁵ The time domain is a recognised UK scientific strength, and building on LJMU’s capability in this area will maximise the potential for the UK community to take a leading role in big data, robots and advanced materials and provides great potential for engagement between the university and industry in the Merseyside region and throughout the UK. LJMU has a strong track record in this area, with the original LT project safeguarding jobs and driving upgrades in skills and machinery for local precision engineering SMEs.

To foster a debate on how we remedy this, earlier this year I asked a number of University mission groups⁶⁶ to convene roundtables on the subject, and so in the interests of debate here is the read-out of ideas I captured:

- BIS and the Department for Education should involve local and regional stakeholders, including universities and colleges, to develop strategies and set targets to tackle variations in regional educational attainment, including participation in higher education.
- Suggestions were made that tax credits and vouchers could be designed to better help small businesses to:
 - o benefit from the talents of undergraduates and postgraduates for short-term projects and provide students with the opportunity to enhance their employability skills;
 - o recruit graduates on to 3-6 month paid internship programmes; and
 - o employ recent graduates for at least one 12-month period.

- In comparison to other countries, translational research funding has been undervalued in the UK and we should examine the ways in which this imbalance can be redressed, especially given its relationship with regional and national economic growth.
- An innovation voucher scheme could allow universities to respond to priorities and needs identified by small businesses in their regions.
- Capacity building in all universities should be promoted by examining the right threshold for HEIF allocation.
- A new formula should be adopted to ensure that interaction with the creative and cultural sector is valued.
- Government should learn the lessons from the small business agency in the US to explore how best to support small businesses across the country and promote partnerships between small businesses and the research, knowledge and expertise available in universities.
- BIS should encourage federations and collaborations of Local Enterprise Partnerships to ensure coherent coverage and activity across and between regions, in addition to guaranteeing adequate university representation on LEP Boards

Listening to the debate over the last six months, I know too that Britain has yet to really capture the real essence of the Fraunhofer model that works so well in Germany, despite notable good examples in Sheffield, Warwick and Strathclyde. What's more, we need to do a far better job of building a new relationship between "town" and "gown", connecting universities and city economic development strategies.

Like many politicians before me, I too have taken the journey to Germany to see the marvel of the Fraunhofer [Institute]⁶⁷. Catapults are obviously a step towards importing the model, but I am conscious that we still lack local institutions based at universities and research centres, which are federated together into a national organisation that draws in funding. Nor do we have the same clarity and simplicity of the mission. Germany's mission - "to provide the R&D department to Germany's Mittelstand" - is compelling. And finally, the basic funding model in Germany more strongly

incentivises researchers to go and hunt research contracts from SMEs knowing that in effect there is a 2:1 funding match from the public sector.

It will also be easier for universities to transform relationships with SMEs if the strategy is rooted in a wider local plan for economic development that draws on the convening power and wider resources of the LEP and local council.

That is why University Enterprise Zones are a compelling idea. Or they would be if there were more than four of them.

Launched on the 13 December 2013, with £15 million of capital funding over three years to support work in four areas, UEZ status was recently awarded to Bradford, Bristol, Nottingham and Liverpool for some highly imaginative projects.

I am fascinated by the idea – and the frustration that I encountered amongst Vice-Chancellors and local government leaders that the idea was so constrained. Earlier this year, I asked Key Cities to host a summit on the idea, and after a wide discussion, three basic ideas emerged as the key to scaling-up this project;

- First, colleagues were naturally interested in any capital money going to support new business-university projects and people liked the idea. In a review to the Labour Party, Andrew Adonis recommended that control over the revenue from any growth in business rates should be given to powerful new city and country regions that come together in combined authorities. Labour readily accepted the proposal and the principle is already evident in Birmingham, in the form of a Tax Increment Finance Model, where the extra business rates generated by new economic activity flowing from the UEZ are retained locally to reinvest.
- Second, people like the idea of aligning both business support and support for entrepreneurs with good ideas that might flow out of the university. Many universities, like University of Bedfordshire, are making significant investment in supporting their students to set

up shop on their own. Providing strong local support makes sense, especially if it contributes to encouraging local graduates to stay on in the place where they studied.

- Third, there was wide acceptance that the development of a UEZ allowed a new conversation about *what* was being taught at the university in order to foster a better alignment between the needs of the local labour market and what might be available to study locally.

I shall return to this potential shortly.

TEACHING

Let me turn now to teaching, and first quickly cover off our position on international students.

British universities are now our seventh greatest export industry and that is in no small part down to their success in attracting foreign students. Foreign students have not only been good for universities, they have been good for Britain. As a minister travelling abroad, I was always struck at how our ambassadors used to tell me that the single most important thing we could do, long term, to grow our influence, was to expand the number of foreign students we taught at university.

That is why Yvette Cooper has called on the government to remove international university students from the net migration target. I made great strides as an Immigration Minister to develop policies that made British Higher Education an attractive proposition for foreign students. There is now a need to reverse the damage done by the negative messages given off by the current government around legitimate student immigration in key countries like India.

We have got to be very alert to the rising proportion of undergraduates in England who consider they receive poor value for money; the proportion has now soared to one-third since the coalition trebled tuition fees; the reason cited most for disappointment is: “I haven’t put in enough effort myself”⁶⁸ and a lack of time spent with academics breeds this problem. We must therefore work to ensure students see more of their teachers;

after all, it is only through creating a smart, motivated and hardworking graduates that we will see the same attributes in our workforce.

The core challenge however, is bigger.

Extra skill means extra pay. For most a degree is the key to a middle-class life. Economists may disagree on what technically constitutes “middle-class”, but the marketers tell us it’s the difference between a household earning £37,000 and £47,000 a year. That’s the kind of earning power a degree level qualification gives you. On average, degree holders earn more than £100,000 more over a lifetime than someone with only two A-Levels.

The bigger, “traditional” route to university via A-levels and then into university at the age of 18 or 19 appears to be working well. But the a lack of viable routes into good jobs for those that do not currently go to university, and a lack of degree-level vocational provision for those that want to specialise and train towards a career.

To tackle this problem and break down the divide between academic and vocational education, there is a very good case for thinking radically about how we transform access to university, and the way universities teach their graduates and connect them to the world of work beyond.

We need to be much more ambitious for the years to come and it is in this field that the lack of any “system” really reveals itself. We now need to debate four basic system changes:

Transforming access

- An “earn while you learn” route to degree level technical skills
- Post-graduate: the new frontier for access
- The role of Massive Open Online Courses (MOOCs)

TRANSFORMING ACCESS

Let me start with transforming access.

Both NUS and almost every vice-chancellor I ask tell me that some form of collective access promotion arrangements would make more sense than what we have got today.

Aim Higher was not perfect, but a collective effort to encourage more students to successfully apply for university is better than today's arrangements, where many Vice Chancellors know that any effort or investment they make, may actually lead to a student going somewhere else.

It doesn't really encourage effective collaboration, and as NUS have argued, it doesn't encourage equal access to high quality information, advice and guidance.

Crucially today's system fosters work aimed at the over 16s, when we know that real progress demands sustained investment from primary school upwards, and amongst returners to education.

Now, many institutions have developed new infrastructure and it's important that we do not throw this away in any return to collective arrangements. Most people I speak to believe some kind of new regional consortia, with ring-fenced support, make the most sense. For example, the NUS' priorities for new arrangements include:

- Developing understanding of available pathways among the socially and educationally less-advantaged through coordinated provision of independent IAG focused on the under 16 and mature returners to education
- Raising attainment of young people through tutoring and mentoring from current students
- Articulating clear progression pathways between different qualifications and different institutions
- Engaging employers to enhance understanding of the labour market and progression into employment.

The government is edging in this direction, announcing on 26 June 2014, £22M for “networks for collaborative outreach.”⁶⁹ Yet much remains to be learnt. Anne-Marie Canning, a former Labour Councillor and Head of Widening Participation at King’s College London, sets this out in a compelling first-hand account:

Do what you can, with what you have, with where you are?

Anne-Marie Canning, Head of Widening Participation, King’s College London

Serena is sat opposite me on a train. She’s 18 and I am 28 - our stories share similar hallmarks: we’re both first generation and from low participation neighbourhoods. If I can be considered a part of the Aim Higher generation then Serena is most definitely a part of the OFFA generation.

Recent Office for Fair Access reports show that the sector is collectively spending over 145 million pounds a year on outreach work. When Aim Higher was closed in 2012 we lost something unique though we didn’t know quite how effective the initiative had been until afterwards.

Collaboration is the watchword nowadays and rightly so. We achieve more for young people and mature learners when institutions work together. But collaboration is not the same as co-ordination; whilst quality has soared co-ordination has fallen in recent years. The fruits of a less co-ordinated approach are expressed in stubborn regional differences in participation (from 41% in London to 31% in the North East). It is a commonly received wisdom that if Universities look after the communities they serve, they will build a patchwork of widening participation across the UK. But as a result of this approach many rural, coastal and other isolated communities are missing out on much-needed schemes.

Back to my train journey and Serena tells me she has ambitions to become a teacher. In another ten years’ time I want to stand next to her at the front of a classroom of pupils and know those stubborn participation figures have started to move in the right direction and that the aspirations of no young person are curtailed simply because of where they come from.

Second, the IPPR also argues that the money currently spent on access could be used more effectively⁹⁰. In 2014/15, the government will spend £468 million on “widening participation”, including outreach in schools and the National Scholarship Programme (NSP). The House of Commons Library estimates that represented an increase of £250-300m on access spending under the previous loans system, due to requirements for universities charging higher fees to offset the costs with fee waivers to support access for disadvantaged students. The problem is NSP was distributed according to total number of students - not the number of disadvantaged students. Equally, fee waivers and cash bursaries have a poor track record of widening participation as students don’t know they’ve got an award until after they’re offered a place.

We need a debate about how to better support diverse access to universities. For example, IPPR recommends diverting existing access spending (to universities) to create a “student premium” of £1,000 for every student from a disadvantaged background awarded on an annual basis for students hailing from a low-participation neighbourhood (there are 210,000 students in this category today), or previously in receipt of free school meals. IPPR recommends phasing in the idea.

Third, there is a genuine case for supporting the University Schools and University Technical Colleges movement which higher education leaders are quietly building with the school system.

The idea has gathered pace since Ken Baker and others began pushing the development of University Technical Colleges, around five to six years ago. Building on early thinking from City Technology Colleges, and subsequently academies, UTCs are academies created with a sponsoring employer and university. Beginning with the JCB Academy opened in 2010 and the Black Country UTC opened in 2011, there are now a total of 50 open or otherwise in the pipeline, which will cater for 30,000 students by September 2015.

All over Britain however, universities are sponsoring schools. Some like Aston or Greenwich are largely sponsoring UTCs. Others like the University of Birmingham are actually building their own school on the university site. Others like Wolverhampton are building networks of sponsored secondary and primary schools.

Talking to heads and governors in my constituency, I'm struck by how popular the idea is, and this for some simple reasons. First, it offers the school real capacity, access to resources and crucially, world class continued professional development. Second, it allows work on raising aspirations to begin in a really deep way, very early on in a child's career. And third, it begins a new conversation with parents, not only about their children, but their own return to college.

Most university leaders aren't terribly clear about what they get out of it; they know it's a big management burden but they know too "it's a good thing". We don't yet know the real impact on raising aspiration and application levels, or the realistic constraints on what we can and should expect a university to stretch to. These are questions demanding urgent research and a new conversation with education leaders about how far the University-School movement could go, and what role government should play in providing support. .

Case Study: Warwick Manufacturing Group – Academies

Based on the UTC model, the WMG academy for Young Engineers will be part of a new and exciting "learning campus" catering for 14 to 19 year olds from Coventry, Warwickshire and Solihull. It will focus on engineering, ICT and digital technologies and is due to open in autumn 2014.

The Academy will make real, business focused, practical problems and challenges the centre of the curriculum. Students will learn by making things and creating things – just as engineering businesses do every day. Team working will be the norm.

Behind the initiative sits a range of experienced partners, including The University of Warwick and a collection of over 40 key employers including Jaguar Land Rover, IBM, National Grid, SCC and Automotive Insulations as well as the Local Enterprise Partnership, Coventry and Warwickshire Chamber of Commerce, Westwood Academy and other key stakeholders. The pre-mentioned companies have had difficulty recruiting staff with the right abilities, and see the Academy programme as a long-term solution to addressing these skills deficits.

There is a great appetite to continue developing Academies in this nature, with plans afoot for a second WMG Academy to open in North Solihull in 2016, backed by JLR, Aero Engine Controls and Arup.

Case Study: Queen Mary, University of London (QMUL) – Vertical Trusts

QMUL is supporting initiatives to progress vertical integration at two schools: the nearby St Paul's Way and Draper Academy. The University has worked with both schools over a few years, and is now moving towards a fully "vertical ladder" model which will create an educational pathway from "four to twenty-four."

Motivation for involvement is clear, with each school located in areas of disadvantage where they suffer limited engagement and progression into higher education. By introducing the idea of university-level education and the opportunities it can bring at a young age and in a sustained manner, QMUL are able to cultivate a culture change among populations that traditionally may not have considered attending university.

Operating at the helm of a Multi-Academy Trust model, QMUL is able to better connect with younger children, ensuring better attainment and a smoother transition to secondary schools. They're also able to educate pupils and their families on the opportunities that are present at University level before other prejudices kick-in.

THE EARN WHILE YOU LEARN ROUTE TO DEGREE LEVEL SKILLS

The second big system change we need to debate is just how we create a genuine “earn while you learn route” to higher education.

This is not just a challenge to the *higher* education system, it a challenge to the *whole* education system. Ed Miliband, Tristram Hunt and I have now set out what a gold standard vocational route would look like under a Labour Government⁷¹:

1. Everyone will study some vocational education from the age of 14
2. Everyone will study some English and maths through to the age of 18.
3. For those on a vocational track, we will introduce a gold standard qualification, the Technical Baccalaureate, for 16-18 year olds, and to ensure universal high quality standards in Further Education, we will licence further education colleges as institutes of technical education.
4. We will radically increase the number of apprenticeship opportunities, crucially using the power of public procurement to increase the number of opportunities and give employers working through industry-led sector bodies more control over standards and the ability to broker money, in return for more apprenticeship opportunities.
5. Finally, the priority for any expansion of HE under the next Labour Government will be new earn while you learn “Technical Degrees”; degrees which you can study for, in a wide range of subjects, while you are in a job, drawing a wage.

Together these measures will ensure that the 14 year old who wishes to progress through vocational education can see a clear gold standard route, not just through college and into an apprenticeship, but up to degree level skill that sets them up for a career. And for the first time businesses suffering crippling skills gaps will be offered the chance to develop the advanced technical skills they need to win the race to the top.

The problems that bedevil the integration between further and higher education cry out for change. Making progress is going to require colleges,

universities and business starting a new dialogue – and dare I say, a new partnership - together.

That means looking beyond the cut-throat competitive pressures of today towards a system that we might one day build together.

There will be asks of government of course and the added challenge is that funding pressures are going to remain tough for the foreseeable future. But everyone who cares about education has an interest in making progress. So here's a list of the problems we need to solve together.

The broken bridge

Let's start with the "level 3" challenge. While those who study A-levels have a de facto right to go to university, there are a lack of high quality apprenticeships or good college-based vocational qualifications to provide the critical bridge between school-age qualifications and higher level training for those on the vocational track. Today, this bridge is broken.

Unlike universities, colleges by-and-large teach qualifications that are awarded by others, for instance, OCR or Pearson. They are paid against a complex range of tariffs for different qualifications and age ranges. Cost control in the sector is therefore exercised by governments either changing the tariff prices, or squeezing students' entitlements to state support.

The problem is that under this Government there is no rhyme or reason to the changes made and absolutely zero thought given to how a seamless integrated system pathway from college to university might work. Rather, a combination of heavy cuts to further education and a highly marketised system of higher education reform where private colleges have radically expanded provision, especially delivering HNC/HNDs to EEA students, has created ferocious competition between colleges and universities and huge cost pressure. The British student is the loser as Vince Cable admitted in April;

"high-level vocational training has fallen through the gap between our HE and FE systems...Relative to other countries, we are way behind where we need to be."⁷²

There is now a real challenge for young school leavers who need to study for a Level 3 qualification – an A level or equivalent.

If some-one is under 18 then the state picks up the tab for their education. If some-one is over the age of 24, then they are entitled to a “Advanced Learner Loan” to cover the cost of tuition, for example the £6,602 that it might cost for an OCR Level 3 Cambridge Technical Diploma in Business.

But for someone leaving school or college at 18 with serious skills deficits there is only a state funding for 50pc of your tuition cost, and no access to the Student Loan system for the rest of the money. So either you have to find the cash, hope the college or provider will deliver the course on the cheap, or persuade your employer to fund your course. It’s a “valley of death” in the education system where thousands of young people are getting lost.

There is a way forward.

Ed Miliband has declared support for the IPPR’s idea of a youth training allowance for young people aged 18-21.

The idea is simple; young people should be learning or earning, not sitting on the dole. So, under a Labour government, young people aged 18 to 21 who lack the skills or experience they need to secure a decent job would qualify for a youth allowance, means-tested by parental income in the same way as support for HE students, that would be conditional on them being in training, instead of Jobseekers Allowance which actually prevents them from training more than 16 hours a week. This will enable young people to take up their existing training entitlements. The goal is stop short-changing colleges and young peoples’ education on the critical transition between school and higher education.

Connecting L4 and 6

Then we come to the Level 4-Level 5 challenge, and in particular to HNDs/ HNCs and Foundation degrees. This weakness was singled out for especial attention by the OECD in their critique of skills in England. The OECD was pretty blunt;

“The weak articulation,” they wrote, “between level 4 and 6 programmes and university bachelor programmes is a serious problem.”

Introduced in around 1921, the Certificate (awarded to part-time students) and the Diploma (awarded to full timers) combined both theoretical and practical components and were originally sponsored by both the board of education and professional associations, like the Institute of Electrical Engineers.

These qualifications, says the historian WAC Stewart, “were the best available from 1921 for over thirty years.”

Now accredited solely by Pearson (since Edexcel was sold in 2003), these higher-level qualifications allow entry from HNC into a second year of a degree programme while HNDs allow entry into second or third year. Quality assurance is delivered in the most part by the QAA and although currently funded by HEFCE, the government is considering transfer to the funding regime run by the SFA to get round an embarrassing and unplanned explosion in provision at private colleges, including allegations of fraud.

Foundation degrees also integrate academic and work-based learning and build on a long history of design and delivery of the curriculum by employers. Regulated by the QAA, they are typically accredited by universities (although colleges can apply for foundation degree awarding powers), and students can fund the £5,250–£8,100⁷³ cost through a Student Loan Company loan, with extra costs to the institution covered by HEFCE.

Despite the problems in the private college system, provision of this crucial bridge has collapsed by some 40pc since the election and in one of our roundtables we heard why. There are 10 times as many people studying bachelor’s degrees as foundation degrees.

I have heard directly from colleagues at the University of Sunderland how once successful programmes delivered jointly with Nissan and open to a wide range of SMEs simply collapsed when the teaching grant was

shredded and tuition fees were tripled because companies could no longer afford them. We heard similar stories from the University of Wolverhampton and Anglia Ruskin. The work-based degree route has simply collapsed.

The organisation of this part of the education journey is a mess.

First, while you can get a tuition fee loan of up to £9k plus a maintenance loan for a traditional university degree, students can only get loans for a small slice of the qualifications you need for a technical or professional degree. The law constrains HEFCE funding solely to Pearson's level 4&5 HNCs and HNDs, excluding a large number of qualifications that might be more relevant to many employers. In particular, many businesses have expressed frustration at this apparent monopoly, and that funding isn't available for Cambridge Technicals, Level 4-7 which they see as serving a key business need.

Nor are there any incentives or rewards for employers who want to contribute to paying for their staff to do professional and technical degrees even if they pay upfront - helping us minimise the level of debt write-off and thus spend taxpayers' money more effectively.

In practice it is very hard for colleges - who are close to employers - to get the power to award degrees for programmes tailor-made for employers. Colleges often complain that their accrediting universities are slow to act - and it takes many years for a college to win its own degree awarding powers. Very few colleges have succeed in creating agreements that would allow a student to take the credit earned for a professional and technical degree and build from it a full honours degree.

Just to compound the problem, there are not many professional and technical degree programmes that automatically give you the certificates or status you need with professional and learned societies. Yet these are the qualifications that employers and workers really value.

Now, the Skills Funding Agency will fund some L4 and above qualifications beyond HNCs/ HNDs, but you need to be on a Higher Apprenticeship to get the entitlement, and here the problem is that there are very few

apprenticeship frameworks that reach up to higher and technical level skills. Out of 200 apprenticeship frameworks, only 14 stretch up to level 5 which is degree level.

We need to change this. We want young people to have a real choice of an earn while you learn degree or a classic high quality university education - and we want adults to be ambitious about raising their skills - and wages - to have a real chance to go back to night school.

That is why Ed Miliband announced that new Technical Degrees will be our priority for growth in the higher education system.

There is already some great vocational education: medicine, architecture, law and divinity are vocational subjects leading to degrees but also enjoy professional status and accreditation.

Yet our objective is to give people a genuine choice of an “earn while you learn” route to degree level skills. These new Technical Degrees will:

- **Provide a gold standard destination for those wishing to specialise in vocational skills**, giving them a clear line of sight from 14 right through to a career and building on the vocational excellence of Labour’s Tech Bacc and high quality apprenticeships.
- **Be delivered in partnership with industry: co-funded, co-designed and co-delivered by employers and universities.** This will give firms real influence over the curriculum to ensure they get the skills they need to succeed. For a young person doing this degree, they will be able to work and get paid in a good job while training for their chosen career, with opportunities to apply their learning in the workplace.
- **Support our university system to work with employers and other partners to drive investment in a high skill, high wage economy.** This sort of provision is not currently a priority within our university system, because it has never been a priority for government. We will change that.

We want traditionally research-intensive universities to be involved in this, complementing some excellent pockets of earn-while-you-learn provision already evident in the sector, including Business Management at Nottingham Trent University, Design for Industry Working at Northumbria and Network75 at the University of South Wales. There is also a role for partnerships between colleges (licensed as Institutes of Technical Excellence) and universities, on integrated programmes that directly address the challenge set out by the OECD of the poor joinery between levels 4 and 6.

Some of the design features we have to get right are;

- Learning from the US-style community college partnerships so people can transfer their professional and technical degree credits onto a full honours programme at partner universities. This is what David Cragg has described as a “Local College Partnership” and Martin Bean describes as “structured pathways.” In essence a bit of a return to the regional partnerships we had in place and which apparently worked well - but beefed up and tied to funding agreements in order to make universities actually play ball. Again we have models to draw on, for example in Hertfordshire and Oxford Brookes.
- How best to incentivise employers and encourage them to take part in the system and to contribute. Employers, working through reformed sector bodies as advocated by Labour’s Skills Taskforce, would need to work with universities and professional and learned societies to get in place degree level apprenticeship frameworks. They might perhaps start with the 117 job roles which have been put on the Shortage Occupation List, where currently employers can fast-track in foreign workers because they can’t find British skills.
- How to simplify streamlined high quality accreditation
- An integrated system is possible, as a number of heroic education leaders in places like Stoke, Birmingham, Oxford and Hertfordshire are demonstrating admirably.

Case Study: Hertfordshire Higher Education Consortium

Since the early 1990s, the University of Herefordshire, Hertford Regional College, North Hertfordshire College, Oaklands College and West Hertfordshire College have operated within the “Hertfordshire Higher Education Consortium.”

There are over 1,500 students within the consortium at any one time, studying for foundation degrees across a range of disciplines. Students graduate with a University of Hertfordshire award and are able to “top-up” their studies via the university, to gain an honours degree.

By bringing together FE and HE in this way, Hertfordshire residents benefit from an accessible and cheaper route to higher level skills, with 2014/15 fees coming in at £5,500 – much less than the £8,500 national average for a full-time undergraduate degree. The institutions also benefit financially, by sharing services, pooling resources and reducing bureaucracy by centralising enrolments and applications.

Case Study: Oxford Brookes

Oxford Brookes University operates a partnership with 7 FE colleges covering a broad geographical region. The partnership is deliberately small so that relationships can be developed more deeply, including networks of support services, libraries, marketing etc. An example of the courses offered includes a Foundation Degree in Policing, a programme that is run with Thames Valley Police and recruits nationally.

Case Study: The Birmingham Bacculaureate

South & City College Birmingham and Birmingham City University have joined forces to develop and provide a clear progression pathway for young people from school through to college and on to university, building on the development of the Birmingham Bacculaureate – a qualification ensuring that Birmingham school leavers have the basic skills required by the local jobs and training market.

From early in their secondary education, young people with recognisable practical skills are nurtured in their vocational development leading to further vocational specialisation at college and even further specialisation at University.

This provides employment opportunities for young graduates in areas of labour and skills shortage in the West Midlands, helping the region to develop and grow economically and provide future financial security and opportunity for its workforce. Importantly, this framework enables young people who would not have otherwise considered Higher and Further Education as options to make informed choices about their futures.

We know what good likes like. Rolls Royce employed nearly 300 apprentices in 2013, many trained at the state of the art Apprenticeship Academy in Derby that I had the privilege of visiting earlier this year. At the Higher Apprenticeship level, workers get to study in Technician level roles towards, for example, a Level 4 in engineering Leadership + Project Management with an Honours degree, or Level 5 in Supply Chain Management, with an Honours degree or a Level 7 in Manufacturing with a Master's degree. The average age of commencement on the programme is a little over 20.

Case Study: Jaguar Land Rover and the Warwick Manufacturing Group

The Warwick Manufacturing Group has a close relationship with Jaguar Land Rover, allowing Warwick University to play a key role in educating JLR apprentices to degree-level.

This has paved the way for a highly innovative, work-based undergraduate engineering programme delivered part-time over four years to individuals in companies. It provides a firm grounding in mathematics, technical subjects and modules related to finance, supplier management and other commercially related topics, delivered in the engineering and advanced manufacturing context through a “case study” approach. Learning supports the internal pathways within Jaguar Land Rover.

At its heart is a tripartite relationship involving academic supervisors, industry and the student at the centre, to create personal learning plans. These plans recognise the need for work-based flexibility in modules, the timing and location of delivery and to manage short-notice work commitments of participants. In addition to the lectures, laboratories, seminars and tutorials, apprentices have access to an internet-based bespoke “Managed Learning Environment” and undertake “activity based learning” which is embedded in the laboratory-based part of the programme.

WMG are also working with 1000 existing Jaguar Land Rover employees to provide training to degree-level in product engineering and manufacturing engineering.

Now some say, “sure, this works for big companies, but what about small firms.”

I’ve thought about this a lot. Before I was elected, I built a multi-million pound technology business from scratch. One of the conclusions of

Andrew Adonis' work, and our regional skills taskforce is that we need to encourage what Andrew called Business Hubs, and what I've called City Apprenticeship Agencies or Group Training Associations, which create a shared platform for SMEs to take on apprentices. In Leeds, they have doubled apprenticeship numbers in 18 months.

Case Study: The Leeds Apprenticeship Training Agency

The Leeds ATA is a limited company by guarantee owned jointly by Leeds City Council and Leeds City College. The Board of Directors includes members from a wider group of stakeholders such as the Chamber of Commerce and local businesses.

The company is in receipt of funding under the City Deal – maximum of £882,500 over 3 years linked to the delivery of outputs – business engagement, apprenticeship starts and conversion to employed status with SME businesses. The company must become self-financing within 3 years.

Most of the host businesses have chosen to pay the ATA's recommended wage rate per hour, which provides a higher quality and more committed candidate. The ATA charge a management fee on top of the apprentice wages. In return for this, the ATA will undertake the following for the duration of the apprenticeship:

- Recruitment
- Training Provider Liaison
- Payroll, HR & Admin
- Pastoral Support
- Apprenticeship Performance Monitoring
- Apprentice Reviews

Together these changes could over time, lead us somewhere very exciting.

At Rolls Royce, over half of apprentices will go on to achieve a first degree level qualification, in the first ten years of their career.

What would it mean if all apprentices at level 3 hit the same goal?

Well, there are 200,000 apprentices studying at level 3 today. However, more than half of these are aged over 25 – many of them existing employees with many years of experience rather than new job entrants. Last year there were just 66,300 apprenticeships available to 19-24 year olds, and another 33,700 taken up by 16-18 year olds.

We need far more apprenticeships at Level 3 and above to provide sufficient opportunities for young people that don't currently go to university. We also need to ensure that those that wish to progress to degree-level skills are able to do so. Current data suggests that half of all suitably qualified apprentices under 25 studying for degree-level qualifications would mean 50,000 new Technical Degrees. This would be a big shift in the proportion of students on an “earn while you learn” route.

Universities will need to develop their capacity to deliver what's needed. Professor Sir Keith Burnett and Prof Nigel Thrift have given some thought to how they could do this.

Both Sheffield and Warwick have had to become deeply involved in industry-led research and are pioneering new approaches to vocational education, but within an environment enriched by the UK's High Value Manufacturing Catapult, which accelerates the inter-play between university research and industry. This sits alongside the Advanced Manufacturing research Centre Training Centre, which welcomed its first cohort of 150 Advanced Apprentices in 2013.

Case Study: Sheffield's Advanced Manufacturing Research Centre (AMRC)

The University of Sheffield's "Advanced Manufacturing Research Centre" (AMRC) welcomed its first cohort of 150 advanced apprentices last year. These apprentices are employed by manufacturing companies – many of them local SMEs – keen to benefit from the high-quality training in the practical and academic skills that manufacturing companies need to compete globally. Sponsoring companies range from global leaders such as Rolls-Royce and TATA to local high-tech supply-chain companies.

Based in a new 5,500 sq. m building alongside the University's National Research Centres into Advanced Manufacturing and Civil Nuclear Energy, the University has agreed progression routes for through undergraduate study in Engineering up to doctorate and MBA level. The Centre has particular resonance for local people as it is sited on the former Orgreave Colliery, scene of conflict in the 1980s during the miner's strike and now a symbol of hope and opportunity for the children of communities blighted by the decline of traditional industries.

Allied to two national manufacturing CATAPULT research centres, the Advanced Apprenticeships address concerns about quality and parity of esteem through first-class facilities and truly research-led teaching. The curriculum is directly shaped by research undertaken with partner companies and apprentices access an alternate route into higher education with a focus on the skills and culture so important to employers. The apprenticeships also provides a direct alternative to student loans. An apprentice who progresses through undergraduate degree levels will graduate at 22 with a degree from a leading UK university, 7 years industrial experience and no debt.

Drawing on their experience to date, Burnett & Thrift argue for elite universities, working with the UK's top companies to create a new "gold standard" advanced vocational education in the shape of Royal Technology Colleges that aim to educate 40,000 on advanced apprenticeships, with pilots in four to five universities to get the ball rolling.

It is a ground-breaking idea, and Labour's Technical Degrees offer an opportunity for universities that want to specialise in this way. The broader question is what would a 21st century "Technical University" look like to educate this new volume of students? Let me define some characteristics to get the ball rolling;

- First, this is not about building things from scratch. There isn't the time or money, and the infrastructure we have is already rich.
- Second, the programmes run would be designed and delivered with industry, for people in jobs. Ideally they would lead to professional and technical registrations, and include an element of management training. We should take the opportunity to do something that is far more common in Germany than here; which is enabling apprentices to gain skills managing a team, along with deepening technical and professional skills thereby strengthening the nation's middle management cadre. In Germany, some 13pc of apprentice graduates go on to this kind of programme, where generally apprentices take a professional exam with flexible preparation or a two year part-time programme in a college. Some 15pc of the Swiss workforce have a similar qualification⁷⁴.
- Third, the university partner should be engaged in applied research with industry, such as hosting a Catapult.
- Fourth, where appropriate universities should partner with a major college or networks of colleges with specialist facilities. A "structured pathway" for the degree would connect college and university ends of the programme.

- Fifth, University Enterprise Zones represent an opportunity, alongside reformed LEPs, to ensure maximum leverage of wider council and LEP assets and relationships, especially with SMEs, and the local city or county apprenticeship agency.
- Naturally it would make sense to develop proposals in fields of industry where skills shortages are a major problem, and we should keep our regional economic development goals very firmly in mind.

POST-GRADUATE: THE NEW ACCESS FRONTIER

On my tours of various campuses, supporting access to postgraduate study consistently comes out as the second most important priority after cutting the headline undergrad fees cap. As one student in Leeds put it to me:

“Everyone has got a degree. If we’re really going to distinguish ourselves in the labour market, you now need a masters”.

Vice-chancellors tend to agree; expanding post-graduate research and teaching is seen as key to maintaining global competitiveness of UK universities and meeting key skills gaps at higher levels.

So, assuming this problem is not resolved before the election (I hear rumours it may be resolved in the Autumn Statement), an incoming government will need to examine how to ensure that post-graduate learning does not become the new barrier to access.

ONLINE OPEN LEARNING: HIGHER EDUCATION'S "REVOLUTION?"

We could not complete any survey of higher education's future without pointing towards the growing importance of online open learning, including the proliferation of Massive Open Online Courses (MOOCs). David Willetts has referred to these as having the potential to "revolutionise conventional models of formal education."

If we are committed to enabling more people to access the education they need to upskill and maybe reskill throughout their working lives, then we need to embrace online learning. It provides a flexible means of enabling people to access learning, whether this is informally, through free open educational resources such as MOOCs, or by more formal pathways to traditional degrees.

MOOCs are already making waves in the US, with prestigious institutions such as MIT, Harvard and Stanford offering them. Today, through the Open University's "FutureLearn" platform, we're seeing the UK catching up.

In an age of high tuition fees and with a worrying lack of flexibility in traditional course delivery, many are asking what MOOCs mean for the future of the traditional university experience and whether the death knell has been sounded for teaching as we know it.

This is not the case.

Instead, MOOCs are complementary to existing provision. We should not be afraid to adopt and embrace and, yes, promote them to our students. Everything in our lives and work is being transformed by technology – education is no different.

Students now expect the right technology to enhance their course to be available. It should not replace teaching and contact time but it can enhance it.

We must learn the ways in which we can use technology to better prepare students for university – by encouraging them to take MOOCs to work out

which course is for them, providing training in research skills ahead of their course or just introducing someone to the idea that higher education is for them by giving them a chance to try it out for free.

MOOCs can be a useful marketing tool to international students. They can directly access content provided by UK universities using the FutureLearn platform, thus raising the profile of UK HEIs and removing the need for intermediaries.

Educational demand cannot be met by conventional supply alone. If we're really to answer the question of what the future of higher education looks like, then we must think of HE as clicks and mortar rather than bricks and mortar.

It would be a mistake to assume that new technology, online learning or provision for mature or part time learners is just an issue for the Open University. The whole HE system/sector needs to think more carefully and proactively about how it delivers teaching and learning and how many different types of people can access it.

Case Study – The OU - FutureLearn

FutureLearn, was set-up and is wholly owned by The Open University, who have enjoyed over 40 years of experience in distance learning and online education. It has enabled traditional UK universities to make a forage into the world of MOOCs and counts amongst its partners a number of leading UK and international universities, as well as institutions with a huge archive of cultural and educational material, including the British Council, the British Library, and the British Museum.

Despite its first courses only opening on October 2013, just ten months later it has 450,000 learners studying courses from almost 40 leading universities, 10 of them in overseas markets including China, Korea, South Africa, Australia, New Zealand, Norway and The Netherlands.

The organisation has, at its heart, a mission to connect learners from all over the globe with high quality educators, and with each other, offering a diverse selection of free, high quality online courses from some of the world's leading universities and other outstanding cultural institutions.

Courses are delivered one step at a time, and are accessible on mobile devices, enabling participants to fit learning around their life, rather than their life around learning.

Only in BETA stage at the moment, FutureLearn will be a key asset to the UK Higher Education scene, giving international students a chance to access UK higher education and the opportunity to “try before they buy.”

CHAPTER 5: CONCLUSION

The purpose of this paper is to share, in the spirit of debate, the content of the conversations I have enjoyed with hundreds of people across the world of higher education, here and abroad. The paper could have been twice as long.

As someone who loves the world of higher education, I want to see the sector take a central role in the debates we have as a country in the months leading to the general election.

No-one I have met believes that today's system is sustainable. Everyone is worried about the future of our research base. Everyone is frustrated at how "marketisation" is destroying collaboration in a country where far more could be achieved by working better together.

But most of all, people believe we can be better than today. People resent incentives that only allow them to think of the health and well-being of their own institution.

Above all, the people who talk to me fear that we are at a crossroads. They know better than anyone how global competition is intensifying and they fear that if we do not make the right choices soon, then while a handful of institutions may go on to succeed, as a country we will fall behind. And while most people I speak with are citizens and scientists of the world, there is in them a patriotic sense that as a country we must raise our game.

Imagine a country where schools worked in partnership with a university – a partnership that parents knew well enough to talk about in the playground. Where there was a clear route to an affordable degree through A levels, but also a clear vocational route right through to degree-level skills, delivered in partnership with employers offering highly skilled jobs; where our best research universities were anchors to global networks of science and innovation, and around them, eco-systems of entrepreneurial start-up firms were growing; where a local council's economic development plans were completely integrated with the work of the local university and their partnerships with local entrepreneurs and SMEs, offering shared research

platforms that helped local companies innovate faster, growing sales and margins. Where everyone, no matter where they were born in life, was able to access good training that leads to a career, with get a vocational and technical route to match the opportunities available to those that currently go to university.

That's a much better choice than a system that's going bust, with patchy access arrangements and support for science short-term and at risk; where students, businesses and parents are all frustrated.

I think we can do better than this. I'm with the patriots and optimists and future-seekers. I'm paid to go to work to serve one of the poorest communities in Britain. I visit a primary school nearly every fortnight. I'm honoured to work with young people all the time. I know that we have the most entrepreneurial generations we've ever seen in our country coming up through the ranks. I know their potential and yet today I see it wasted. I know the ambitions of their parents and yet today I see it frustrated. I want the children of Hodge Hill to have a better future, not a future full of fear, futility and failure. That's why this debate matters to me so much. And that's why I want your help getting our final answers right.

Let me know what you think.

TEN IDEAS FOR DEBATE

1. How we support the growing global network of research - “Star Alliances”- that connect our universities and researchers - in international networks of the best?
2. How we support bigger, stronger global science hubs here in the UK, around which the world’s best businesses will foster entrepreneurial networks of companies
3. How we build a research department for the UK “mittelstand” that better connects SMEs and our brilliant universities to power more R&D in regional economies?
4. How do we boost equity of access to university, learning the lessons of Aim Higher with a new 21st century way of doing business?
5. How do we ensure that post-graduate study does not become the new barrier to access?
6. How can we encourage university applicants from low income backgrounds?
7. How do we boost the new University-Schools and University-College movement that is emerging across the country, hard-wiring the creation of clear pathways of learning from primary to tertiary?
8. How do we create a gold standard vocational route to degree level skills by fixing the “broken bridge”: the “L3 gap” for 19-24 year olds?
9. How do we ensure clear pathways through technical education, and back reform with a drive to foster Local College Partnerships on the lines of the US community college partnership model?
10. How do we expand “earn while you learn” or “technical degrees” supported by a new generation of partnerships, connected to regional economies with far more University Enterprise Zones?

ENDNOTES

- 1 Annual Survey of Hours and Earnings, 2013
- 2 Page 265, Robbins Report, 1963
- 3 Speech opening the Science Debate at the Party's Annual Conference, Scarborough, 1963, in Harold Wilson, *Purpose in Politics: Selected Speeches* (London, 1964)
- 4 Butler & King, *The British General Election of 1964*, p59
- 5 Butler & King, p73
- 6 *Years of Crisis*, p20
- 7 Reporting 19th July 1945
- 8 Para 64
- 9 Percy, Para 34
- 10 It estimated that the nation enjoyed the services of 55,000 qualified scientists in 1946 but forecast a minimum demand of 70,000 by 1950, and 90,000 by 1955. Barlow Committee, Para 23
- 11 Robbins Revisited, David Willetts, SMF, 2011
- 12 Para 3
- 13 Ben Pimlot, Harold Wilson, p302
- 14 Richard Crossman, *Diaries of a Backbencher*, p1026
- 15 Benn, *Diaries. Out of the Wilderness*. P66.
- 16 Butler and King, *ibid*
- 17 Robbins Report, 1963
- 18 The Cabinet Paper from 1st October 1963 is here: <http://filestore.nationalarchives.gov.uk/pdfs/small/cab-129-114-c-173.pdf>. Macmillan stepped down on 18th October 1963
- 19 "there will be great educational benefit in the establishment of close academic and other links between the polytechnics and other colleges engaged in higher education... mutually advantageous links with universities shall be developed." Para 26.
- 20 Cabinet Office, *Getting On, Getting Ahead: A Review of the Evidence for Social Mobility*
- 21 Quoted, Pollard 262.
- 22 Indeed, America's lead in labour productivity of manufacturing was probably well established as early as 1820. R Millward, *Industry and Infrastructure*, in Dintenfass, p49. - and then didn't change much over the course of a century.
- 23 In the mid-19th century, Britain dominated the world's chemical industry, the telegraph, and global submarine lines network. Marconi, an Italian brought his ideas to perfection with British backers; Sebastian de Ferranti, born in Liverpool in 1864, pioneered improved alternators. In the 1870s, Burroughs-Wellcome laid the foundations of their pharmaceutical business. Radio technology was pioneered by the Navy, and in electrical engineering, Britain led the world by 1880. New consumer industries like Cadbury or Lever Brothers could boast plenty of appliance of science to production technology.
- 24 Pollard 117
- 25 Pollard 118
- 26 Quoted Sidney Pollard, 186
- 27 Cited, Burnett+Thrift
- 28 Pollard 178.

- 29 Student numbers promptly doubled to 198,000 by 1914, but the curriculum, dictated by the then permanent secretary Sir Robert Morant, severely limited scientific and technical education at the expense of traditional subjects like Classics.
- 30 Pollard 182.
- 31 It was certainly no match for the German or US systems. By the turn of the century, there were more than three times as many students in German technical universities than British technical colleges; and twenty times the number of graduate scientists in German industry³¹. German universities boasted a budget six times the size of their British colleagues . The Treasury which only began paying for universities in 1889, directed £25,000 to British HE by 1897. By contrast, the state of Prussia alone spent £476,000 on her ten universities in 1900-1³¹.
- 32 Barnett 110.
- 33 Barlow Committee, Para 2.
- 34 See Liam Byrne, *Why Did Labour Lose?*, Progress, 2010 and Liam Byrne, Chapter 13, *The Squeezed Middle and the New Inequality*, in *After the Third Way, The Future of Social Democracy in Europe*, edited by Olaff Cramme, Patrick Diamond
- 35 Commission on Living Standards (2012) *Gaining from Growth*, London: The Resolution Foundation
- 36 The American literature is wide; see Paul Krugman’s “Conscience of a Liberal”, Robert Reich’s “Supercapitalism”, Jared Bernstein’s “Crunch”, and more recently Dambisa Moyo’s “Winner Takes All.”
- 37 <http://liambyrne.co.uk/my-speech-to-the-oxford-martin-school-5-june-2014/>
- 38 <http://www.nesta.org.uk/publications/vital-6>
- 39 See Liam Byrne, *Our Old Enemy – Sometimes Called the “British Disease” – Is Back With a Vengeance*, for a longer discussion: http://www.huffingtonpost.co.uk/liam-byrne/uk-gdp-productivity_b_5524430.html
- 40 Office of National Statistics: http://www.ons.gov.uk/ons/dcp171778_327151.pdf
- 41 Press Release, TUC, 12 July 2013
- 42 See David Autor and David Dorn, “The Growth of Low Skill Service Jobs and the Polarization of the U.S. Labor Market.” *American Economic Review*
- 43 Brynjolfsson, E. and McAfee, A. (2014) *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*, New York: W. W. Norton & Company
- 44 http://www.nap.edu/openbook.php?record_id=11463&page=1. The 85% refers to the work of Robert Solow and Moses Abramovitz published in the middle 1950s demonstrated that as much as 85% of measured growth in US income per capita during the 1890-1950 period could not be explained by increases in the capital stock or other measurable inputs. The unexplained portion, referred to alternatively as the “residual” or “the measure of ignorance,” has been widely attributed to the effects of technological change
- 45 <http://www.telegraph.co.uk/comment/personal-view/3562991/Unless-we-get-smarter-well-get-poorer.html>
- 46 SET Statistics 2013, BIS, 11 September 2013
- 47 Peter Nolan, *Is China Buying the World*
- 48 GSK Written Evidence, to the Business, Innovation & Skills Committee Inquiry into Business-University Collaboration
- 49 IFS/Sutton Trust (2014): <http://www.suttontrust.com/news/news/graduates-paying-off-student-loans-into-their-50s--ifssutton/>

- 50 ONS, November 2013: http://www.ons.gov.uk/ons/dcp171776_337841.pdf
- 51 ONS (2014): <http://www.ons.gov.uk/ons/about-ons/business-transparency/freedom-of-information/what-can-i-request/published-ad-hoc-data/labour/december-2013/graduates-and-non-graduates-with-an-apprenticeship.xls>
- 52 Cited, Burnett + Thrift, *The Future of Higher Vocational Education Apprenticeships*, private paper
- 53 BIS, February 2014, "The future of work: jobs and skills in 2030"
- 54 In the period 2013-14
- 55 Fazekas and Litjens, 2014
- 56 Musset et. al, 2013
- 57 *Improving Diversity in STEM*, CaSE, May 2014
- 58 PA Consulting Group, *Here Be Dragons*, p8
- 59 A phrase I owe to Sir George Cox
- 60 <http://www.britishcouncil.org/organisation/press/response-announcement-%E2%80%98-newton-fund>
- 61 Green, A. (2012), "Skills for Competitiveness: Country Report for United Kingdom", OECD Local Economic and Employment Development (LEED) Working Papers, 2012/05, OECD Publishing. <http://dx.doi.org/10.1787/5k9bb1vc6skf-en>
- 62 Cited, Million+, Briefing paper for the Role of Universities and Regional Growth roundtable
- 63 Moretti, 2004, cited, *ibid*
- 64 Richard Jones, *The UK's Innovation Deficit & How to Repair It*. SPERI Paper No.6, <http://speri.dept.shef.ac.uk/wp-content/uploads/2013/10/SPERI-Paper-No.6-The-UKs-Innovation-Deficit-and-How-to-Repair-it-PDF-1131KB.pdf>
- 65 <http://telescope.livjm.ac.uk/>
- 66 For which a huge thank you to Million+, Universities UK, University Alliance and the Russell Group
- 67 For which I owe enormous thanks to both Ulrich Stark at the Friedrich Ebert Stiftung for organising, and my colleague Stephen Timms MP for joining
- 68 The HEPI-HEA Student Academic Experience Survey 2014, pp. 22,34
- 69 HEFCE letter to VCs (Ref: 20/2014), 26 June 2014
- 70 A critical path: Securing the future of higher education in England, IPPR, 2013 <http://www.ippr.org/publications/a-critical-path-securing-the-future-of-higher-education-in-england>
- 71 See for example: <http://www.publications.parliament.uk/pa/cm201415/cmhansrd/cm140709/debtext/140709-0004.htm>
- 72 Cambridge Public Policy Lecture, 23 April 2014
- 73 Figures based on extensive research of Foundation Degree costs at different providers. private correspondence, with Simon Field, OECD
- 75 A critical path: Securing the future of higher education in England (2013), <http://www.ippr.org/publications/a-critical-path-securing-the-future-of-higher-education-in-england>
- 76 HELP UK: A new higher education loan programme: adding to the debate on funding, University Alliance (2014)
- i ONS. *Economic Review*, 2010, p12, available at: http://www.statistics.gov.uk/downloads/theme_economy/EconReview_0810.pdf.

Copyright © The Social Market Foundation, 2014

Robbins Rebooted

How We Earn Our Way in the Second Machine Age

In this pamphlet, the Shadow Minister for Universities, Science and Skills, the Rt Hon Liam Byrne MP, sets out options for reforming Britain's universities to boost the country's knowledge economy and open high paying technical and professional jobs to all.

Kindly supported by



Social Market Foundation

11 Tufton Street
London SW1P 3QB

020 7222 7060
www.smf.co.uk