

Good afternoon.

Professor Lord Kumar Bhattacharyya, the Chairman and founder of WMG at the University of Warwick, has asked me to convey his sincere apologies for being unable to deliver his speech today.

He has had to stay on in India to attend a high level meeting with Government and is unable to be here in time.

Lord Bhattacharyya created WMG 38 years ago to work at the academic: industry interface.

I joined him over 20 years ago from the UK Research Councils and we have since worked together on many new initiatives in research, education and knowledge transfer.

I am delighted to be here with you today to present Lord Bhattacharyya's speech.

It is fitting that we are in Strathclyde for this prestigious conference.

I have known Sir Jim McDonald for a long time.

Since before either of us was knighted, in fact!

We worked together at the Institute of Engineering and Technology and the Royal Academy of Engineering.

Jim made a significant contribution to the UK's Dowling Review of business: university research collaborations, with many excellent proposals to break down barriers between University and Industry.

Now, there can be a divide between those that review, and those who do! I am very glad to say Jim practices what he preaches.

The industrial partnership projects he leads in Strathclyde and across Scotland are genuinely outstanding.

Strathclyde's Advanced Forming Research Centre is now a decade old, and the research partnerships it has created with firms like Rolls-Royce and Boeing have made a real difference to Industry and innovation across the UK.

Just last month they secured almost twenty million pounds to develop the forge of the future.

Alongside the Forming Research Centre, there is now the Advanced Nuclear Research Centre in Strathclyde.

There's a phrase in English - "Shipping Coal to Newcastle" - when you bring a product to a place already swimming in it.

"Bringing industrial innovation eco-systems to Strathclyde" is a bit like shipping Coal to Newcastle!

That said, Manfred has invited me to share my reflections on WMG's experiences developing partnerships between University and Industry.

Today, I want to talk about how we ensure innovation eco-systems develop organically.

My analysis has been informed by long experience.

My work in this field began over five decades ago.

I came to the UK in the sixties as a graduate apprentice with one of Britain's largest engineering firms.

Based on my further industrial experience, I was invited to do my Masters and Doctorate under a Lucas Fellowship.

Perhaps you can picture a young man arriving in Britain's industrial heartland from an elite Indian university.

It is safe to say it was a bit of a Culture shock.

I mention this story because I believe the starting point for any University-Industry ecosystem is the experience of the individual student, employee or researcher.

In part, this is because it is here we find the closest overlap of interests between University and Industry eco-systems.

Universities educate Students and researchers.

Businesses tend to employ them.

So there's real mutual interest there!

I believe, that by putting a sustained focus on offering academic expertise to individuals at all levels of industry that Universities can best be a catalyst for innovation at every level of an industry ecosystem.

I believe that for an Industrial partnership to be truly sustainable, a University must not restrict itself to a single variable such as research, or training.

Instead, we should engage with Industry at every point of contact.

This begins with a focus on supporting the growth of those who work or will work, in the industry.

Far too often, the academic and workplace experiences are kept entirely separate.

You study, graduate, and then sail off into the world.

It is still rare, in many fields, for those working in an industry to have a continued working relationship with academia.

From my perspective as a graduate apprentice in Engineering, I was able to see for myself that there's no real rationale for this separation.

As distance learning institutions have shown, the way we structure courses and restrict entry pathways can define who accesses education.

The way we decide on course structure, entrance standards and module design is not a question of preserving academic independence, but too often, of maintaining tradition, mystique and habit.

Alongside this, it is sometimes a matter of convenience - for us, and for existing funding bodies.

In my field of mechanical engineering, however, the interaction between learning and doing has always been relatively fluid.

Sadly, this tended to be seen as an unfortunate consequence of a discipline still emerging from the grime and soot of the industrial revolution, not an organising principle for a respectable academic institution!

I wanted to turn this around.

What if we made the role of supporting industrial innovation through academic excellence our core purpose?

That is the perspective I started with when I founded WMG at the University of Warwick, almost four decades ago in 1980.

Britain was in a poor competitive position. Japan and Germany were moving ahead very fast based on investment and re-equipping.

I was invited to Warwick to create WMG with the support of the then Prime Minister, Mrs Thatcher.

Our mission - then and now- is to combine academic excellence with industrial relevance.

When I began WMG, I already had experience working in academia and in Industry, so I knew there were developments in materials, computing, design and many other fields that could be of great use to engineers working in manufacturing.

Indeed, I was one of the few people in Britain who had been to Japan and seen the Toyota Production System at work.

I knew how far behind British manufacturers were.

At the same time, I knew that those same engineers - and their employers - were talented, dedicated and willing to learn.

I concluded that what British manufacturers needed was a structured exposure to the latest advances in Engineering.

Universities were very good but industry did not know how to assimilate graduates.

So we formed the Integrated Graduate Development Scheme with leading companies with the support of the Government.

What was essential was seeing it from the industry perspective.

What people couldn't justify was long stretches of absence from the workplace, nor were they interested in courses that weren't related to their personal career development.

So we started developing modular, customised courses that met the needs of people working in our existing Manufacturing ecosystem.

This is important because there is sometimes a perception that the real role of Universities in an Industry ecosystem is research collaboration.

Research collaboration is incredibly powerful, don't get me wrong.

We are spending hundreds of millions of pounds on it at Warwick!

But, I think starting with the needs of people active in an industry at every level gives you a critical, in-depth perspective on the immediate needs of the sector.

Many big industries in the UK and internationally are coming to WMG for tailored training, with over 35,000 individuals involved to date.

This need for talent applies to more than merely current workers, students, managers and owners. It includes future planning.

At WMG, our focus on people is the reason why we run two Academy's for young engineers, educating schoolchildren from fourteen to eighteen.

It is why we run the Jaguar Land Rover lifelong learning programme, offering accredited courses to over twenty-five thousand workers, with classes that run at every level from skills refreshers to Doctoral degrees.

It is why we run the Dyson immersive engineering degree for degree apprentices at the Dyson Institute of Engineering and Technology.

Just this week, we were delighted to announce an investment at WMG of ten million pounds in a new degree apprenticeships centre, teaching up to a thousand apprentices right up to master's level.

Every single one of these initiatives has industrial partners.

These range from global giants such as Jaguar Land Rover to small businesses acting together as part of a local enterprise partnership.

I regard this as the foundation of our University presence in the industrial ecosystem.

For many firms, especially in the small and medium business end of a cluster, their most significant and most pressing demand from a University is the provision of better workplace skills.

This is true for both existing employees and the next generation of recruits.

The way I see it, only after that core need is met can these Businesses feel confident enough to trust you with their next most pressing challenge!

Further, starting with people encourages organic growth in industry partnerships.

If an engineer has learned something from your University, and you stay in contact with them, ask them what challenges they face, and how you can help them progress, you have created the basis for a lasting partnership based on trust.

I know this for a fact.

Not least because the Chief Executives of Companies who have gained degrees, or done courses at WMG have told me so.

I think of Ralf Speth at Jaguar Land Rover, Venu Srinivasan of TVS Motors and Henry Tseng of Kingtronics among many others.

The personal experiences and trust came first. Our research collaboration and partnerships came later.

Indeed, it is from these relationships that WMG has been able to play a crucial role in attracting inward investment to the UK, where we have been involved in attracting thousands of quality jobs.

We were able to show business leaders around the world the quality of British industry.

That is why I'm so passionate about building long-term relationships, both with firms and with individuals.

Among colleagues from across Europe, I can hardly fail to mention how much of this we learnt from the Continent.

Time and again, I've seen how the deep intertwining of personal development and industry partnership has been a successful driver of European innovation.

This applies whether one is talking about the superior technical education system of many Northern European countries or the work of Fraunhofer Institutes across Germany.

Once you have that relationship of trust between academia and industry, you can really begin to expand innovation into every aspect of the industrial ecosystem.

I think a lot of what we hear about the barriers between University and Industry collaboration come from missing out that first, personal, step.

When I began WMG, we had just five partners in the UK manufacturing sector.

What we learnt from them was that it is the people and the products they make that matter.

You have to make a difference to the quality of the core product.

For that, you have to be deeply integrated.

It is that which makes the difference, not tinkering around the edges.

As a result of following that strategy, today, we have a programme of over two hundred million pounds per year, have over a thousand people and are one of the largest groups of our kind in the world.

Only a tenth of our funding comes from core Government funding.

Our growth has come mainly from the experience and recommendation of those who worked alongside us and found our expertise helped the growth of their career and their company.

Today, we have over a thousand business partners.

That growth itself has been a driver of change.

We began as “Warwick Manufacturing Group” and were focussed on engineering solutions to support our regional and national manufacturing industry.

Today we have twelve research centres covering everything from nanomaterials to digital health.

We are building three more institutes as I speak.



Those initiatives grew out of existing collaboration with industrial partners, often pushing us to expand into new, and fascinating, academic disciplines.

But the challenges they face have changed again and again in that time, so our focus changes with it.

In the 1980's there was little focus on electric Battery technology.

Autonomous vehicles were a distant dream.

I don't think many car makers worried about data security or cryptography.

Now each of those research areas is vital to the future of Automotive manufacturing.

This means you have to take a multidisciplinary approach.

At WMG we have mathematicians, engineers, statisticians, cryptographers, material scientists and healthcare experts working together.

This flexibility encourages industry investment in innovation.

At WMG, we are spending a billion pounds over ten years on our new National Automotive Innovation Centre to research these issues.

With our industry partners, we are spending over a hundred and forty million pounds on Battery research as part of our Energy Innovation Centre.

We are amongst the few in academia to take our battery research into commercial manufacturing funded by industry.

As well as this, we have played a major role in both policy development and inward investment.

As British manufacturing struggled to recover from stagnation and underinvestment, we also saw the need to offer policy proposals to support innovation.

We were among the leading voices calling for a UK Industrial Strategy.

I called debates in the UK's second chamber, the House of Lords, to call for the creation of the UK's Technology Strategy Board, now Innovate UK, which supports collaborative research and development.

Then, as part of the Nurse review, helped to ensure it survived the restructuring of UK Research funding.

We spend billions of pounds on fundamental research in Britain, which is amongst the best research in the world, with high numbers of Nobel prizes.

However, industrial impact has not reflected this.

This is why I initiated debates in the House of Lords which led to the assessment of the impact of research in the national Research Excellence Framework; the system for assessing the quality of research in UK higher education institutions.

I think too often, we miss out that essential insight of how to build a sustainable, long-term collaborative culture with industry.

We go straight into talking about intellectual property, or the latest advanced technology breakthrough, or the latest materials advance without really asking if Industry wants that from us, or if they are worried about something else entirely.

In other words, you cannot build a successful collaboration without being willing to listen!

What flows from that is that you have to be willing to be flexible.

For example, at WMG, we are able to reward our people for their focus on applied academic excellence.

However, to extend such an agenda beyond the scale of a single institution requires adapting new academic reward and promotion structures.

It is vital that researchers who accept the challenge of working to make a difference in Industry are not unfairly disadvantaged by promotion metrics that do not adequately measure the impact of their work.

This is an important consideration, not least because journals and conference papers tend to focus on a single discipline.

It is also unfortunate that innovation in working methods can sometimes meet with opposition, even in Academia!

The same applies to concerns about intellectual property.

At WMG, I don't restrict intellectual property at all.

I regard the 'tariff wall' that intellectual property protection and restriction places around University innovation as a barrier to Industry partnership and a disincentive for academic talent to pursue Industry projects.

I accept that not all institutions will agree with this approach, but we should recognise that there is a cost to over-enthusiastic protection of University intellectual property.

Course design, departmental thinking, career development and over-protectiveness on intellectual property are all examples of how University life can be structured in ways that retard innovation partnerships, creating artificial barriers to increasing the impact of research and teaching excellence.

This leads me to the final point I would like to make.

We have too many hard borders that slow innovation, including literal ones.

The way we think about industrial ecosystems and universities has, historically, been entirely local.

We look at MIT, or Caltech, or South Korea, or a host of others, and we seek to replicate that success structurally.

I think we need to recognise that Industry ecosystems in many fields are now at least as global as the academic environment.

Our partners do not restrict themselves to a region when they think about innovation.

They look for expertise and impact right around the world.

At WMG, we have partnerships with over a thousand global companies.

They want global reach, not just local knowledge.

They want us to think internationally.

They want us to collaborate globally.

They want us to be part of their global innovation effort.

Increasingly, they are looking for research institutes that are internationally flexible and able to identify research partners in emerging markets.

Further, Businesses want research partners with the scale to attract global talent, and with the international reach to collaborate with world-leading researchers in fast-evolving fields.

We must think the same way.

As academics, this should come naturally.

However, with industrial innovation, there tends to be an overly national approach.

However, we are making progress.

For example, I praised Fraunhofer Institutes earlier.

So I should mention that here in Glasgow there is a Fraunhofer Institute.

The innovation ecosystem cannot be locked behind national borders.

Beyond national borders, institutions in the developing world are often neglected.

At WMG, we have partnerships with leading Universities in China, India, Malaysia and other fast growing economies. After all, that is where our industry partners want to invest.

It took years of partnership working to get to this point.

We need to ensure our innovation partnerships are as much between academic centres of excellence as between Universities and national champions.

From my four decades in innovation, I can say three things with confidence.

First, the nature of the industrial ecosystem is in constant flux.

That means success will go,

Not to the followers of the latest mantra,

Or fashionable lines of research,

Or to those responding to government financial incentive schemes.

Instead, success will find those institutions who listen to industry, grow organically and stay flexible.

Second, I believe that Universities that build trust, create long-term relationships and who put people first will have the most impact.

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Third, insisting collaborations deliver both academic excellence and industrial relevance is not merely possible, it is also essential for success.

I reiterate Professor Lord Bhattacharyya's apologies and disappointment at being unable to join with you this afternoon.

Thank you for welcoming me to your Conference to present his speech on his behalf.

Thank You