**Lecture 3**

**The Pursuit of Innovation**

So tonight what I’d like to do is just … uh … talk about the research that we’re doing here at the college on the topic of how firms, organizations pursue innovation, how they go out and seek to find innovations and bring them in and exploit them in their organization. So what I’m going to do is give you a little history … um … we’re going to go backwards and forwards in time, and we’re going to come up to the present and talk about some of the challenges that organizations and individuals working at the front lines of this premises are facing.

One thing about this topic is you end up having to study a process which is changing, dynamic, complex and uncertain. So you need a lot of friends to help you understand a topic like innovation. And these are all the people that I’ve written papers with in my academic career. It’s a large … uh … cacophony of different voices from around the world. I’ve worked with papers with fifteen different … uh … people from thirteen different countries. It’s an extraordinarily diverse and … uh … uh … eclectic blend of individuals. So it takes a village really, an academic village, an open community to understand innovation process. It also takes resources, and we’ve been generously funded by the EPSRC, the ESRC, and many other … uh … sources of funding and support from various different places to help us understand this topic. And of course these resources are essential to much of our research I’ll talk ? about ? today.

So innovation is a hot topic … um … because of the industrial religion of the late twentieth and twenty-first century. It’s kind of a rich … uh … exciting topic that everyone wants to be engaged in. You can see it with P— President Obama, who’s got the innovation bug, you know. In the State of Union speech he said that, you know, the twentieth century the United States led the world because it led the world of innovation. So innovation is really this spurring of the American, Pax Americana of the twentieth century, this capacity to develop new products, processes and services. This is the mechanism which gives America its great power and force in the world.

Of course, we in Europe have a passion for innovation as well. We have a new inner target to achieve … uh … uh … a high level of innovation in Europe, with the Innovation Union for 2020. We have a very passionately committed advocate for innovation ? Máire Geoghegan-Quinn, the European Union commissioner for research in innovation. And in her— … uh … her strategy for Europe, she is saying that our standard of living depends on our ability to drive innovation. So we see these modern voices calling for more study of innovation, more understanding of innovation practices.

However, much of this is not very new. We go back in time to the 1780s, the great Dr Johnson talked about the age is running mad after the— of— after innovation. ‘All business is to be done in a new way. Men are to be hung in a new way.’ One of the critical revelations of this decade was of course the guillotine, which has many positive aspects and many negative aspects because it simulated ? activity. And it’s of course referring to Tyburn, which was where the capital punishment was carried out here in London for those who were pickpockets and various other minor crimes. So the art of innovation is an old art, and the age of— of innovation’s— we’ve been running madly, furiously after innovation activities for a very long time indeed.

To understand innovation, we really go back to our fundamental intellectual roots and the work of a man by the name of Joseph Schumpeter. Schumpeter was an Austrian economist who in— early in his career developed a set of ideas about how the capitalist system worked, which talked about the role of entrepreneurs driving forward the innovation process. He was very excited by the potential for individuals to play an active role in changing the ? of differing industries. And he defined innovation very broadly for us. He talked about innovation for new ... uh ... competition for new commodities, new technology, resources of supply, and new s— … uh … new forms of organization. He had a very broad notion of the innovation process. And this search for the innovation in the— the broader sense has been the driving logic between much research that’s been done on the topic of innovation.

Of course, our fascination with innovation is linked to our— our understanding of the process itself. I’ve done quite a bit of research, which I’ll talk about later on, about this process. And Chris Freeman, maybe the greatest British scholar on the topic of innovation described it as a kind of random, accidental process and it’s ? of arbitrary character. Firms that engage in innovation are more victims of the process than its conscious manipulator. It’s a social process that generates much good, much value for society, but doesn’t always reward the innovators. So this— this complex, uncertain, messy, dynamic process is one that people try to understand, try to understand the roots, the sources and dynamic forces that drive the innovation system. And that’s what I’m trying to talk about this evening – how this process takes place and what we can learn from our understanding of this … uh … topic.

We’ve done a lot of research on different patterns of innovation. We try to understand how innovation takes place, we study innovations. One innovation I studied was the use of fire engineering in buildings. And here’s a simple one. The idea is in tall buildings it’s safer to evacuate people by elevator than it is by taking the stairs. So many large buildings and tall buildings in London, if there’s a fire, you take the elevator out of the building. This innovation was developed by ? here in London and it’s—it’s … uh … spread around the world. This is Lan Sheng, a tower in Shanghai which used the same technology.

It’s a complex innovation, it wasn’t easy to get this innovation adopted. Even in parts of Britain today, many firefighters are opposed to this type of … uh … strategy for allowing people to leave different buildings. Even in London, you can cross the street— one part of London says ‘Yes, we support this type of technology’, you cross the street, another council says ‘No, we don’t support this technology’. So innovation is a complex, argu— it’s argumentative process, a disputed process. But of course there are potential opportunities to use new technology, such as in this case simulation technology, to design new practices to change the way we engineer and make our buildings safe in case of an extreme event.

So the pursuit of innovation has really been a pursuit of understanding this process. We’ve done a lot of research on different topics, read a slew of different books addressing the different questions. We really do try to measure and map the innovation process. This is not a field which is driven by a few, it’s a field driven by the experiments of business firms and individuals. You know, we don’t— we didn’t start out with a big idea that we’re trying to test. We started out with an interest, an inquiry into understanding how organizations and individuals innovate. Part of our search has been a search for the holy grail. You know, the source of innovation. If we could find which group, which individuals, which organizations generate innovations, we could go there and get more. Right, we could live for it, have an endless supply, an endless pot of innovations. So much of our research effort is hunting for these sources. What is it, where is it that innovations come about, and what are the factors that support their development? These are really the critical questions that we try to address in the research activity.

This is not an easy task. Innovation is a complex, difficult phenomena, as Schumpeter said it involves many different types of activity. We still don’t know much about the nature of innovation or arguably what we do know. So there are many unknowns— unknowns— unknown unknowns in the innovation process. When we study this topic, we go at it different ways. Sometimes we follow the innovation, so here we look at individual patterns or pieces of technology which were developed by a particular organization, and we follow them backwards in time and forward in time, how they were used, how they were adapted, how they were modified for uses in different places. We also follow the organizations who may be developing innovations. So we’ve developed all sorts of structured techniques for collecting information on the innovation process.

You start up by first measuring how much firms invest in research and development. This started 1965 and has been— has been sustained ever since. So it’s a fifty year old investment in collecting information on how much R and D we spend in the economic system. Over the last fifteen years, we’ve invested a lot of time and energy in trying to measure the innovative output of industrial organizations. So every two years in the UK we send a survey to thousands of British companies trying to assess innovative activities. We’re not the only people to do this. It’s actually mandated by law in the European Union that we have to collect this information, but the Americans do it, the Chinese do it, the Swiss do it. Everybody tries to collect more and more information on innovation. And over the past fifteen years over a million firms around the world have filled in these types of surveys, to populate our understanding of the innovation process.

The other thing we do is we follow individuals. We look at who generates the innovation, who is the spark and the creativity which generates some kind of new innovative opportunity? And we do this by looking inside organizations. And we also look across organizations, people’s networks. Who in this room is going to be the source of the next innovation? We try to map these processes and activities so we can understand which types of networks, which types of experiences that individuals have that allow them to be more successful in generating innovative development. And we made some progress in trying to understand the individual level of the innovation process. Now if we think about this research effort, it’s good to take stock and think about what we know about the innovation process. One way to think about this is to use Lakatos’ idea of how progress is made in science. Laka— Imre Lakatos had a wonderful idea that in a scientific discipline, you know, a progressive scientific discipline, he described as a— a discipline which has got this sort of momentum and development, and people are coming into the discipline and building it up and sustaining it. And in that discipline there’s a core set of ideas that emerged, that everyone in that discipline basically accepts as true.

 But there’s a permeable belt around the discipline, around these core ideas, where new ideas can enter from the side or from the top or from the bottom and so what we’re— what I’d like to do is just talk about some of the hard core of the innovation, then I’ll talk about the permeable belt, and this’ll be my entrée— entrée to the rest of my talk which will be about open innovation.

So we’ve seen the growth of innovation as a— as a field of … uh… studies since the 1960s. There’s a huge number of journals, references in this topic. It’s grown exponentially … uh … in terms— as a— as a— as a research domain that people are interested in. It’s a field which is open to studying new facts, lots of novel experiments. We’ve collected all sorts of new data, such as the surveys I just mentioned on firms. We can be able to make much more precise predictions about the development of innovated activities. But it’s not a field that’s got a hard core in the sense that the core itself is not clearly defined. But there’s opportunities to change what we think about the primary s— sources and dynamics of innovation. It’s an eclectic community –? practitioners, sociologists, scientists, have all made major contributions to our understanding of innovation. The first generation of people studying innovation were engineers and scientists themselves. Now it’s become more of a discipline, more social science like. Most people studying innovation are economists or management scholars.

So once we’ve defined the hard core of innovation, what have we learnt about this process in this inquiry? Well, I believe that innovation is the main driver of economic growth. We know that innovation’s pervasive across the economic system, it’s not located in an individual sector. It’s pervasive in every economic sector. It primarily involves new combinations, so new combinations of existing technology and existing knowledge. So innovation’s not necessarily about the— the introduction of new technical knowledge to the economic system, it’s about the re-combination of that which is already known. It’s those combinations which is really the driving force of innovative activity. It’s almost always relational in the sense that it always involves interactions between individuals and between organizations. There’s very few examples that anyone can find of an innovation developed by a single individual. Almost all innovations are products of collective activity, made by many people.

The other thing we know is that most technical change is evolutionary. Innovation is cumulative. We learn from what we did previously and we build upon it. Nobody starts from a blank sheet of paper when they seek to innovate. They— they stand on the shoulders of all the other innovators who came before them. Revolutionary changes in the innovation process are fairly rare, and in many sectors they don’t happen in a lifetime. But many parts of our economy are quite stable and evolutionary, and they are characterised by mostly incremental process. But in some sectors of the economy there’s very dramatic and quick changes, we call those almost revolutionary changes. The interesting thing about these changes is they’re almost completely unpredictable. The other thing that’s great about them is they’re quality of ? So what happens when— when there’s a major revolutionary change is completely different in form of it— in terms of its activity or technology, organizational structure than what came before. So it’s not just we get more of something, we get something different, just fundamentally different in its nature and character.

The other thing about innovation which is great is it’s a search process, a process of— of discovery, where people have to go out and find these new combinations, they have to invest time and resource in looking for these innovations. And R and D— our investment in R and D, is you can think of as— as one big investment in search. The other thing we’ve learnt is that it’s very important to des—delineate innovation from invention. They’re not the same thing. A good idea is not an innovation. An innovation needs to be used or commercially developed, that’s a fundamental Schumpeterian notion. We’ve also learnt that, you know, to capture return to innovation is very different from the capability to generate innovation in the first place. Those who benefit from innovations tend not to be the innovators. It’s other people, fast followers, who come along and exploit the ideas of others more successfully than the people who originated that idea.

We’ve learnt a lot about how organizations can innovate. What— what— what teams they should put in place, how much time and freedom they should give to their staff to explore different areas. We try to look at different types of innovation such as business model innovation, purchase innovation, product innovation all ? across different industries. The other thing I discovered with innovation is this— is it’s sticky. You know, Thomas Freidman says the world is flat. Well, not when it comes to innovation, it’s very curved. Right, innovation tends to fluster and conglomerate in particular locations around the world. It’s very sticky. It requires a lot of social interaction. It lives in cities, right? It lives in spaces where people have this dynamic process of interacting and learning from each other.

So what are some of the auxiliary hypotheses? The protective belt, where maybe ideas are coming in and challenging our perceptive— perception of the innovation process. Well, I’m going to give three, and I’m going to focus on one in particular for the latter half of the presentation. First of all, in the Schumpeterian tradition, there’s a strong view that technology is the main source— new technology entering the economic system is the main source of innovative dynamic processes in our economic system. I think now we can say that that privacy that we gave to technology was probably overstated. Organizational change, change that does not involve introduction in ? can be fundamental to understanding what is the character of not having innovation.

So we gave too much attention to the technological side of the innovation process. The other thing we’ve done is spent a lot of time measuring research and development. Now research and development’s important, but it’s actually quite a poor ? for our investment in innovation. Right, if you— we know from the work of my colleague Jonathan Haskel, who’s here this evening, that R and D represents between 9 and 13% of our total investment in innovation. Right, this is aside, it’s a very small piece of a much larger puzzle. Fundamentally, however, our critical … uh … crunch … uh … attack on the central … uh … core of the innovation is that the firm is the central actor in the innovation process. So more and more research we do, we see that the firm is not necessarily the central act. Sometimes the firm responds to the wishes and desires of others. The firm is more a facilitator of the innovations of other people, rather than the primary driving force of the innovation process.

What I want to talk about now is the new models of innovation which— which have tried to take up this question. So what are the other mechanisms, that drive the innovation process if it’s not simply the firm as a central drive— actor in the innovation process? These new models of innovation come with various names. There’s a whole industry of people out there in London putting words in front of the word innovation. You can make a very successful, profitable career for yourself as a consultant if you can think of a new word to put in front of ‘innovation’. We’ve had ‘user innovation’ ? Maverick Innovation, we’ve got Wikinomics Co-creation we think and then my two favourites, ‘democratising innovation’ and ‘open innovation’. Right, these are powerful concepts that people have used various different terms to describe.

Two other proponents I’ll— I’ll speak about now just briefly. One of them is Eric von Hippel. He’s probably the leading pied piper for the idea that innovation has fundamentally changed and he says we’re in the midst of a major paradigm shift in the way we understand the innovation process. We have to discard our notion as the firm, as the primary actor in the innovation process and look at users and communities as instead the fo— the—the motor force of the economic system. Another proponent of this is the father of the o— the concept of open innovation. He also describes this as a new paradigm, open innovation as a new paradigm, we have to re-imagine the innovation process, all sorts of pathways that ? and shape the relationship between the firm and its external environment. So we should think of research and development as an open system.

And in this model you have a very … uh … fluid and dynamic process by which firms develop innovations. So there’s— the traditional models you have to— technology develop in-house, and it went through to your current line. Chesbrough’s idea is that firms can take technology from different sources, internal and internal, and then they can follow multiple pathways to take these ideas to the mark. And this model’s perforated, porous, fluid, so ideas can go in and out of the firm over the life of their development. This is a very powerful model. It’s had an enormous effect on practitioners; so many R and D departments have been renamed ‘open innovation’ departments. Henry Chesbrough launched the concept of open innovation in 2003. And in his office he has a pile of business cards with peoples whose title it is open innovation. And his— his pile keeps getting taller and taller. Last time I saw, it was as tall as he was.

So thousands of individuals have adopted this language as their modus operandi, their way of working and how they understand themselves and their role in the innovation process. However, this idea of open innovation is not new. There’s fundamentally nothing truly new about this expectation of the role of … uh … of external parties in the innovation process. If you look back historically you can actually see that the first area of open innovation was the 1880s to the 8— 1930s. This was the golden age of the independent ? This is the period before the birth of the R and D lab. We have very extensive activities of university and student collaboration. There were lots of patents traded in this period. Thomas Edison developed patents that he sold to private sector companies. And people used R and D labs as a monitoring— vehicle for monitoring external developments. The primary goal of a research and development laboratory was to look elsewhere and not to develop ideas internally.

The second age of innovation, the age of the corporate R and D lab, was the period between the 1940s and 1980s. Here we have the birth of large R and D labs in— vertically integrated institutions ? alright? Massive facilities constructed by large organizations to invest in the search for ‘new nylons’, the internal discovery of new products. And we also created a national infrastructure to support these activities. We invested in universities, we built up training and education programmes to feed scientists and engineers into these labs, right? It was purely a part of this huge investment in building up an infrastructure for R and D. But of course in the modern period we see the decline of corporate R and D and possibly the return to open innovation again, vertical … uh … specialisation in the major industries, the growth of small R and D firms, lots of outsourcing, alliances, massive expansion in the markets for technology. All of these factors are taking us back to the age before the rise of the R and D lab. Maybe we’re returning to a sort of natural state of innovation, and the R and D lab was a historical anomaly in this process. That’s an old question.

What I’d like to do with the rest of my … uh … time with you this evening is to talk about the— the challenge of being open— the hard graft of openness. You know, open innovation seems very— like a very attractive option. One can go to the market, one can go out there and find ideas. It involves a lot of ? a lot of work on the part of organizations and individuals to make it effectively— … uh … ? delivery. You need dedicated units and staffs, you often have to realign you R and D departments, you may need to rename them. Organizations like Procter and Gamble have renamed their R and D activity called Connect and Develop, to realign it to the search for external ideas and the use of these external ideas internally.

GlaxoSmithKline operates a centre for excellence in external drug discovery which spends almost as much as one of the other centres of dr— … uh … excellence in drug discovery that they operate. And it’s a very interesting … uh … o— model. So they have twenty six individuals whose job it is to go round and invest in projects in biotechnology start-ups. So they go out and look for projects in different firms and they spend all this money externally, not within the firm, but outside the firm. This is a different model of R and D as opposed to the sort of search for new line-ups internally. However, all of these activities require attention and resources, managerial efforts, skilled individuals to go out and hunt for these different types of activities. In my own research I’ve tried to estimate how much time and effort firms make to be open. And what we’ve found for UK firms, and this has been found in many other countries, is that most firms are not open enough, they’re not open enough to external ideas, that they would benefit from greater openness, right? And if they were more open, they would be more innovative.

However, there are some organizations who over-invest in open— openness. And all of these relationships, these— these— these efforts to go and find ideas in the external market can be quite costly to the firm. Think about a— a simple problem which you have as an individual. I mean, how many evenings does one have to go out and participate in activities? The more you’re searching, the less time you may have to do other things. As … uh … Oscar Wilde once said about socialism, ‘it’s a wonderful idea but it would take too many evenings’. He didn’t want to sacrifice his evenings to the cause of … uh … socialism. Many organizations appear to be sacrificing their evenings as well.

So open innovation is a wonderful idea, but it often works better in theory than in practice. The problem is managing intellectual property around the ideas you want to— you want to search for. Large organizations look for ownership and control of ideas. They want ideas that only they can use, only they can exploit, ideas which are not available to their competitors. They need intellectual property— formal intellectual property, to hold the possessive, to give them some advantage, exclude others from that particular area. So they erect, you know that they erect … uh … uh … walls around their firm which are surrounded by intellectual property, and then they want to lock innov— innovative ideas, usually in the form of a patent, over the wall, and then grab these ideas and use all the resources inside the firm to exploit these different ideas.

One of the problems for the firm is that ideas are leaky, right. They spill out— they spread all over the place, it’s very hard to stop people from using ideas. Here’s two examples of leaky ideas from the Cold War. This here is the first Soviet atomic bomb. It’s an exact replica inside of the Fat Man which was dropped at Nagasaki in 1945. Klaus Fuchs handed over critical documents to allow the Soviets to replicate the American bomb. All the investment of the Manhattan project was easily and— and quite simply handed over by one individual to a foreign government, right. Millions of— of US dollars were spent on the Manhattan project and it was replicated by another organization. But the Americans got their own back with the stealth fighter and bomber. This was an interesting story. So the Americans were working away on different technologies and they read— they— they got a paper, written in Russian, by a very talented Russian scientist who’d thought up some formula for looking at the shape of— of objects on a radar signature. They translated this paper from Russian into English and Lockheed Martin took this idea and built the stealth bomber and fighter with it. Right, the Russian idea leaked backwards to the Americans. So ideas are leaky. They want to come across boundaries, right. So it’s difficult for firms to draw—draw easy walls around their organization. They would like to protect all their ideas, but of course, these ideas they want— they don’t want to be free, but they— they— they— they want to spill but they’re hard to pull and keep tight to a single organizational centre.

The other issue is, who owns an idea? And what is the idea— the ownership for the idea established? So here there’s a film, called Flash of Genius, which is the story of Bob Kearns. Bob Kearns was a great independent inventor. He developed the intermittent windscreen wiper. He took this idea— he patented this idea, but he took this idea to Ford. He told them all about it, and what did they do? They stole his idea. Right? So he said, ‘Oh, that’s terrible. I’ll sue them.’ No lawyer would take his case. Ford had deep pockets, Ford was very powerful. Poor Bob Kearns had to go and learn the law for himself, he had to represent himself in this court—this court case. He spent twenty years of his life chasing Ford, trying to get some rewards for his invention. His search for reward for his invention cost him his family. His wife— his wife left him cos she just couldn’t take this search forever. So of course, you know, you don’t want to end up like old— poor old Bob Kearns, having ? of innovation and losing your family. It’s a critical issue. Who owns an idea? When is this idea shared? How much information about this idea is shared with the other partner? In what— what form can one develop an idea that makes it valuable to you but doesn’t disclose too much of its value to others? How can you structure this relationship effectively both for the large firm and for the small firm?

One issue for firms is how to deal with unsolicited ideas. So let’s say someone— one of your customers has a wonderful idea for your organization. You would think you’d want their idea for a new innovation. Well, many organizations struggle with external ideas. Many the organizations have what they call ‘no patent, no talk’ policies. So if you have an idea to give to a— a large firm, such as 3M, you can go to their website and submit an idea. But 3M will only take your idea if you have a patent, they do not accept any ideas which are not patented. It doesn’t matter the nature of your idea, ‘You’re not patented, we’re not going to speak to you’. There’s lots of reasons for this. They get lots of bad ideas, they don’t want to spend all their time searching and scanning through them, they’re afraid of contaminating their own R and D investments with these bad— … uh … these externally submitted ideas. The patent itself contains a lot of information about the nature of the innovation and how it’s submitted to them. But they exclude many innovators from their interactions.

Other organizations have very contradictory messages for their customers. So organizations such as Microsoft, an organization I work very closely with, has all sorts of mechanisms on their website for individuals to submit ideas to them. But if you click on the terms and conditions on the Microsoft website, what does it say? ‘Microsoft, nor any of its employers, do not accept or consider unsolicited ideas’, period. So on the same website they ask for ideas they say ‘we don’t accept them’. It’s a complex business taking external ideas. In many organizations you have a legal requirement that says ‘no, no, no, no, we don’t want that stuff, it’s a legal minefield, stay away’. And then you have the people over in the R and D department saying ‘oh yeah, bring us your ideas, fantastic, we want to build relationships with you’. These are big, complex beasts, these organizations. They have contradictory messages that they send to the external world. We’ve been trying to think about how organizations could better structure this process, so we’ve developed some toolkits to guide them and think about when they can use IP effectively in their open innovation activities.

So that’s a little about the organizational side. Think about what the organization has to do to get— … uh … develop the skills for open innovation. To try to characterise these different skills, they have to kind of show that their willing to be open, they have to put up the sign saying ‘come on in, we’re open, we’re willing to play with you’. Organizations like P and G have been very successful in doing this. They also have to orchestrate these external communities outside the firm, people who— like university researchers or resource communities, people who may not be directly tied with the firm but have an interest in developing the firm. And also they want to signal their ideas to the external world, tell them what their problems are, what issues and challenges they’re facing in their activities so that people come from the external world and align their ideas to their problems and ideas. So these skills are orchestrating, signalling and demonstrating your openness or new skills for many organizations. Many organizations still struggle to manage these skills. They— they look into the face of openness and get very scared and back off and retreat into the closed world of the— of the lawyers.

What does this mean for individuals? So we’ve talked a little about organizations, but what about individuals in this process? It’s really hard to be an individual working in a large organization, whose responsibility it is to go out and get external ideas. It’s a real hard graft of an activity. Many your colleagues don’t like external ideas. They’re not well aligned to the corporate pro— processes and procedures, and they may not line up with your skills and capabilities that you’re holding inside. They maybe take a while to exploit. You’ve got all these … uh … facilities that you’ve developed, brands that you’ve invested in. The last thing you want to do is someone to throw you a really radical idea, right? It can be very costly to implement that. So many organizations turn away from these external ideas.

But of course now, people are being pushed out into the world to hunt for external ideas. To go to places like Imperial College and find relationships with people here that may allow them to explore the merits. This is very challenging for many organizations— many individuals who work in the kind of traditional R and D environment. They have to manage a kind of new fluid model. So these are people who are really skilled in the arts of openness. People who know how to work with external parties, who know how to build relationships …uh… an— and successfully. So know how to talk the language of intellectual property, know when to approach an individual about a non-disclosure agreement. These are all skills that individuals have to acquire.

Right, the traditional R and D lab did not require this of many individuals. They worked for this hunt for ‘new nylons’, the internal process of discovery. They rely on internal knowledge, now they have to look externally for some of these ideas. In our own research, we’ve tried to look at the different role that individuals play in this process. And we’ve looked at … uh … a large organization and the role of different R and D staff in bringing in knowledge into the fray. And what we’ve found, is there are basically three roles that individuals take up in this process. Some individuals are explorers: they’re out there hunting for exciting, new ideas. They’re actively searching and scanning the external environment. Some people are really good at the assimilation process. They can take external ideas and make it— give it a local feel. Bring it in to the organization, and enthuse and engage their peers about these ideas and start to get them to take it up, to fit the categories of the firm. And then finally there is those people who just are very good at selling external ideas internally. They are passionate champions of these ideas. They take risks to overcome resistance within the organization of these external ideas. And of course there are some individuals who take on all three roles. And there are some take on none of these roles, who just look internally. What we found in our own research is that the individuals who take on all three roles have the highest individual performance. Those who can do all three stages of this process are the individuals who are really the— the people who are very best at doing work with innovation.

So it’s not enough to just go out there and explore the external space. You need to think about how your idea is going to be assimilated internally. And how it’s going to be championed and driven through into execution inside the organization. So you— when you’re talking to— … uh … let’s say you’re an academic and you’re talking to someone from the industry. You know, are they the explorers, are they assimilators or are they exploiters? Who is it you’re talking to in the industry? Does the person you’re talking to have the capacity to take your idea, transform it into an idea which is usable within the firm and eventually exploitable by that firm. Right? This is going to— this is going to affect the value of your relationship with that individual.

So in summary, what I’m trying to give you is a little flavour of the open innovation and distribute process. So we’ve talked about individuals and organizations, and society and governments , which I’ll come on to in just a second. This is an area ripe for business experimentation. There’s a plethora of new websites, organizational structures, new type— forms of collaboration that we’re going to ? develop, and this is a great opportunity for us to research these topics. You think about the— the history of innovation, it’s really a story of— … um … of a history of innovation bending towards openness. So innovation, paraphrasing Martin Luther King, you know, the history of innovation arched towards— it arched towards openness as a fundamental problem.

So I’d like to just summarise what are some of the critical research questions and issues that we’re addressing and that I’m researching, and other people are taking on as well. So what are the skills that individuals need to be open? What are the careers of successful open individuals? What types of networks do these individuals have? What kind of skills, resources, activities do they need to be able to draw upon if they go to seek into— … uh … into the open? And then how to people overcome ambiguity in their role? Once you start to engage with external parties, you often have to span many boundaries in different organizations. It’s pretty challenging for an individual to be— be pulled in two different directions by two different organizations, by an external organization and their own internal organization. How do you develop a kind of way of making people feel comfortable with roles where they’re quite external to the organization but yet having a strong feel for the organization’s innovation process? How do you reward people for being open?

The traditional model for the ? of activity, is to reward them for their inventions. But individuals in most R and D facilities is awarded for the number of inventions, or the value of innovations, or inventions they develop, right? They develop a patent, they get a certain amount of points. At IBM, for example, you get paid for developing a very successful patent. You’ve got a certain number of patents, you get awarded a grand title, right? ‘Master Inventor’, right? So these all these rewards for invention. What about rewards for openness, right? What about people who can bring ideas in? Isn’t that just as valuable as those who can develop a ‘new nylons’, right? How do organizations reward, motivate and train their staff to do the same? Most organizations are still at the early stages of this process, they still reward invention. They’re still in the logic of ‘new nylons’ and internal discovery, as opposed to this logic of open innovation. So that’s at the individual level.

Let’s push on to the organizational level. They— what is there— the question here is, how do organizations become successfully open? What is the level and nature of their openness? And how active are they in searching these— what do they do to bring in external ideas? What is the timing of their openness? What form does it take? These are things we just don’t under— know about different organizations. We’re still at the earliest stages of understanding these dramatic changes in the way firms organise innovative activities. What are the most effective organizational ? within the firm? How do you proactively shape the development and use of external ideas? What types of institutions do you need within the firm to exploit these ideas? Do you need a dedicated unit whose job it is to scout externally for ideas? Do you need people who can take external ideas and then get them pushed through the organization so they get developed in later stages of development? Do you need to set up a separate unit, like GSK did, to invest in external activities, or is this a mainstream activity you expect from every individual in the organization?

These are questions we have no answers for today. The other thing which is really interesting is how about the communities around the firm, alright? Any firms rely on external communities. We all use open-source software, an extraordinary achievement to develop software by community— community activities. Many of these open-source communities are launched by individuals. Maybe they were supported by different industry, right? So the Simian— Simian foundation supports Simian software. Android is an open-source software platform. Many of the software platforms we use are partly open but supported by major industrial firms. How can organizations mobilise communities, programmers and other people to come and participate in their platform? What makes it attractive for someone to come and join these different activities?

So how can— how can organizations do this? How can they mobilise and orchestrate ? This is something we still don’t understand. The end for us, as a society, as a— thinking about our social resources, how do we go about organising activity? How we need to use the ? power Schumpeter pointed us to ? But we need to sustain our investment in radical innovation and learning. One of the effects of the decline of the R and D lab is many organizations are not taking long-term bets on different technology. The public sector investment may be more important now than it was in the previous era of the R and D lab. In the old days, in the R and D lab we could rely on the private sector to make huge investments in future technologies. Today, many of these organizations are closing down, there aren’t any facilities. They’re looking to us, society, the government to make these types of investments. We don’t stand up and make these types of investments, they may never be made. You can’t rely simply on the private sector. They’re hunting in the market for ideas. It’s not clear the market’s strong enough to sustain these types of long-term investment.

The other thing we need to do is we need to measure a map of the nature of innovation. So our whole measurement system for innovation is really focused on the innovation of 1965. Right? We’ve invested a lot of resources thinking about the innovation process, but we haven’t been able to develop measures to— to map on to these changes in innovative activity.

The other thing we can do as a society is to support community based innovation. This is a so-called … uh … big society model of innovation. These collectivities that come together around a common challenge or common platform. We can s— we can nurture and see these environments. But how do these— how are these activities going to be governed? How do these communities evolve? What kind of mechanisms support the development of these different … uh … innovations? This is stuff that we still don’t understand.

The other issue is our IP systems. IP system was designed to reward inventors for innovated effort. We give them monopolies, right, for their innovations, and we say ‘here you go, thank you for innovating, great invention, here’s a patent’. Is that the right mechanism in this model? Well, patents are very useful for transferring technology, but we wouldn’t open a lot of … uh … patents in areas or they become thickets or barriers to technological development. Some of the core ideas of science have been patented by private firms who— who— who then limited the field in the development of science in that particular area. So for example, DuPont took control over gen— the … uh … four patents around genetic light. That’s slowed down the pace of scientific development for many years afterwards because they have very restrictive terms on the use of those—those patents.

So how do we renew our confidence? How do we create a public infrastructure which supports and sustains lots of learning, a knowledge exchange, but at the same time providing some reward for innovative efforts, some— some proper balance between innovative effort between the individual and us as a society, the collective need for sharing knowledge and for sh— for developing knowledge to be open. These are some of the important challenges that we face as a society. And I’ll stop there. Thank you.

***This lecture has been transcribed with permission from Professor Ammon Salter, Imperial College Business School.***