<u>Patrick McLaughlin, Cerulean</u>

I: Patrick, could you tell us a little bit about Cerulean in terms of the company and, particularly, your innovation stories?

PM: Cerulean is a market leader in electronic instrumentation for the tobacco industry and specialised tube-packing equipment. It's been around for about 40 years. It has a long history of incremental product improvement. Indeed, the QTM – the Quality Test Module – has been its core product for about 10-15 years.

About four or five years ago we got to the point where it was clear that that product was starting to run out of steam. We had been very good at incrementing that, improving it. It had several re-launches over the course of the 10-15 years. But we felt that we wanted to move beyond that; we wanted something new, something different.

We then set about how we were going to create a product that was different from what had come before. That resulted in the innovation project.

I: That's interesting. That isn't to the exception of 'steady state innovation'; you still keep on a regular programme of incremental innovation as well.

PM: The way we saw it was the incremental will run in the background. We're good at that; we need to do an awful lot more with it. We've taken steps to improve our new product introduction process, we had stage gate project management, we review projects. We had a review process right at the beginning to look at new products, we reviewed them at each stage. If necessary, some of them get killed along the way. We track products cost, we track project cost. So, it's fairly well-managed. That, if you like, was the underlying project management that we had built up. What we wanted to do was create something that sat on top of that, perhaps distinct, perhaps running separately, perhaps slightly interwoven with it that would allow us to do two different projects; that would allow us to create projects that weren't an enhancement of what had gone before, but were something new, either coming from out side or coming from internal ideas.

We had tried that once in the past about seven or eight years ago. The idea came from us going into an outside consultancy and paying a substantial amount of money for an idea that really should have come from within the company. All the consultancy did was talk to different people, play back those ideas in a form that led us to a product. I felt that we've got the wrong materials, we've got the fuel for the product ideas within the business. We just need a mechanism to focus that, to bring it to fruition as a project proposal. The radical innovation project came from that. It wasn't intended to replace incremental, it was intended to either sit alongside or on top or loosely interwoven with it. There was a feeling, I think, initially that we could plug them both into the same process and get a common output. It quickly became apparent that that wasn't going to work.

I: So, in a sense, you've got a problem with trying to create two different cultures: the one that's there supporting incremental innovation; and a new one, which, as you say, may sit alongside, maybe a little separate, which is about doing something rather different.

PM: Yes.

I: Can you do it with the same people?

PM: Yes, you can. Those people have to be managed in a way that allows them to do things differently. One thing we didn't want to do was to lose our ability to do the incremental. We had continuous improvement, we had continuous development of our projects, our products. We wanted to retain that, but, at the same time, we wanted to be able to use that group of people to take ideas that had come from ideas within the company, ideas from outside, perhaps outside the industry, and say, 'Right, here's a suitable product.' We didn't want to create something that sat outside. It would have been nice, but we're not big enough to have a 'skunk works' . Also, we felt that, if it was too remote, it became too detached. We're not in a position where we can do speculative development that might lead to something six or seven years down the road. We're a small business, we're relatively profitable, we need to retain that profitability. To retain that momentum, we needed this additional feature of two different products starting to flow through. We needed to revitalise the company and regain the reputation we had for being an innovation company.

I: You've described how the incremental, the steady state system works – you have a portfolio, you have a stage gate system, you have the classic tools for innovation management. You also described this new culture, this new system for the more radical. Very briefly, could you tell us how that works? How do you search for, perhaps, the slightly unexpected? How do you choose some, perhaps, slightly different ideas to the ones you're normally used to allocating resources to and how do you carry them forward inside the same company alongside some more traditional incremental projects?

PM: We look in the usual places for our industry – we look at our customers, we look at our suppliers, we go to trade bodies, we go to trade fares, we present technical papers. We have an input coming from our customers. What we've also tried to do is develop inputs from other areas. We've done that in a number of ways: when we're recruiting we try to bring in people who can bring a different perspective. We don't necessarily want people who have worked in the type of instruments we have in the same industry. Certainly in the past, we have brought in people who bring a completely different perspective, almost like introducing the grain of sand into the oyster. We deliberately look outside. We will look in other areas. We will look in areas that are, perhaps, a different technology, we will look in areas that are

adjacent to what we do where we haven't normally looked. And, what we also do is encourage the employees themselves to come forward with ideas.

Some of our product ideas have come from an individual who was sitting as a peripheral part of a little project team that was looking at two different project ideas and two different products for the future of the business. He had an idea, he created something in his garage, he brought it into me and said, 'What about this?' We looked at it, we had a quick discussion about it, talked to the management team and initiated a development that we took to one of our suppliers. That came right from outside an area where we normally operated in, it came through one of our employees – long service employees, so not someone who was recent to the business. But it was triggered by him thinking in a way; I think we've taken the constraints away, we've taken the barriers away and, all of a sudden, he can think further, broader, beyond where he traditionally thought and an idea has come that he has married up to a potential market need, because of the job he worked in, when he was working in the service repair area. He said, 'Right, there is an opportunity for this product, here's how we could do that.' He created a prototype out of a piece of drainpipe and some pieces he had taken from the repair area and says, 'Here's a functional model, what about this?'

From that we actually created a product that has spawned a product range of small manual instruments, that, traditionally, the business hasn't been involved with for, probably, 20 years. Now, that is an idea that came from within the business, it came from an existing employee, but it's not something that we would have thought of as part of our normal pipeline. We had nothing that we could take we could incrementally improve. We didn't immediately say, 'There's a demand for this, let's do that.' That came from him having some local knowledge and talking to customers at a lower level, saying, 'There's actually a demand for this small product.' It's small, it's relatively niche, it's not going to set the world alight, but it enhances our product range and puts us into an area where I've never been before.

So, we're very receptive to those ideas coming forward. We create an environment where we encourage people to question and challenge. We've actually got an appraisal system where we look at people's competencies rather than performance. One of the competencies we want is, 'Is that person willing to question and challenge?' Are they willing to say, 'How can we do this better? How can we do this more effectively?' So, the continuous improvement is something we look for. But we also want people to hold up their hands and say, 'Hang on a minute, why are you doing them that way? What about this? I've seen this because of something I've done, one of my hobbies or in some of the social activities. We've talked about this. What about this?' And we encourage people to bring those ideas in and work with us to develop that into a product idea. We've actually set up a mechanism where we run a project team. So, we take people from all areas of the business – this is no longer just a product development area – we then put them in a room with whatever resources they need for three or four days and say, 'What we want out of this is a

number of product ideas that are different to what we do. Where can we go in the future? Where can we take this little business?'

Working with the limits of what we're capable of – yes, we could design an aeroplane, but we'd struggle to build it and we're not really set up for that – but smaller products, the type of thing that they're comfortable with that, perhaps is a hobby, perhaps is a personal interest, they bring that and they will come up with product ideas. The last one we ran, we had seven or eight product ideas came out ranging from we'll use an application for this particular industry, which is tube-packing – it was taking some of the concepts from instrumentation from the instrument side of the business and say, 'Well, we could use that principle to measure tubes.' They're both cylindrical – cigarettes and filters, cylindrical tubes are cylindrical – so we could use the same mechanism to test for tubes. That's, if you like, at the more incremental end. At the radical end we had some ideas coming for software tools and software development, completely different to anything we would normally operate in.

We have a question now: do we want to take this and work with this or could we sell this idea to someone else? But, for me, the big advantage of this is we're generating ideas. We're not saying, 'No, you can't think of that'; we're actually opening it up and drawing more and more out. I think that, the next time we run it, we'll probably get a broader range and perhaps more bizarre ideas coming out. We're finding that not everybody does it. Certain people prefer to have the incremental. Other people like to be able to go in and question and challenge and say, 'What about this? How radical can I be?' Because we encourage it, because we encourage them to question what we do, we want them to try things; we want them to say, 'OK, if it doesn't work, what have we learnt from that?' not, 'OK, it doesn't work, we're not going there,' which is creating that different stream of thought, that subculture, if you like, that is so different from the incremental where you want continuous improvement. There has to be an incremental and there has to be a demand for it, otherwise you're not going to do it, and the whole project management selection follow through is, 'Is this product going to deliver a sufficient margin and sufficient volume and is cost-controlled?' With the more radical products, that clearly doesn't work. So, we have to take something that's slightly looser. We will still try and do an evaluation.

We did a very 'back of a fag packet' evaluation for the little manual instrument. What we did was we did a quick poll of some customers and we found, yes, there is actually a demand. It's not huge and it's niche, if you like, within a niche, but there's a demand there. That gave us the encouragement that, yes, we can go for this; we can do this. We deliberately didn't develop it internally. We deliberately allowed this individual to project manage with an external supplier, so that it was given, if you like, its own identity, its own momentum and we wouldn't contaminate it with our incremental 'do better' approach. It happened as a parallel stream. We brought it in, it came in on budget, on time.

I think that acted as an example to the other people in the company to say, 'Yes, this is good.' There was a little bit of recognition reward. We made a presentation at the quarterly briefing, we gave him a sum of money. It wasn't particularly much – one or two thousand pounds as a recognition for doing this.

All of these things are encouraging the individuals to push a little bit harder; to think of 'What could we do?' 'Here's an idea. No one's going to shoot me down for thinking this is stupid, because there have been dafter ideas. I'll offer this forward.' That is slowly building up as a subculture, not across the whole company, but there are, if you like, a group of people that think in that way. It's almost creating the conditions to allow those people to flourish, to grow out beyond. Those people are still involved in their normal projects, their incremental projects, but what they can also do, as an additional activity, is engage in this more creative side, this 'do different' side, which allows them an opportunity to extend what they normally do. They like it, we get the product flow, the product ideas coming from. We're still at the early stages of trying to do something with those product ideas.

I: That's a lovely story and it really exemplifies how you can get a huge number of ideas from within, if you mobilise everybody's brains in the process. There is a corollary to that, though, which is a really topical theme, which is sometimes called 'open innovation'. The premise is not all the smart people work for us, even if you're a giant firm like Proctor & Gamble; you still can't cover all the bases. So, in a word, where there is masses of knowledge being created outside, not just RND, but market knowledge, what competitors do, in a sense, there is lots going on out there as well as the ideas in-house. How do you tap into this open innovation world? How do you pick up stuff that's out there?

PM: We open up the world to those people. We say, 'Where do you want to look? Where do you want to go? Do you want to go to different exhibitions?' We've had people making requests, 'I want to go to this exhibition? I want to go to,' the obvious one, 'Sensor & Vision,' but also going to things that are vaguely associated with what we do, but step them out into another environment. We certainly encourage ideas from our customers, not so much the users of our product, but the people involved with the RND side who are talking about what might be coming up in the future. 'It would be good if we had one of these and you could measure that.' Then that triggers an idea for a developer.

We actively look outside. We seek out new areas to go and experience. We will go on visits to other companies, for example, not so much in the last six to nine months, but certainly up to that we had a regular event where different people would go out to another company and look at what they do. This is not just product development, this is how do they operate, what can we learn from them? So, a form of, if you like, used for benchmarking, but what that does is, for those people who are involved in the development side, looking at new products, thinking about where there may be opportunities, both product development and sales people, they may see something

that comes back and creates an idea. What we're not good at yet is amassing that knowledge and storing it. It tends to be held in, if you like, hard format – documents, pamphlets, website addresses and people's knowledge – but it's turned over regularly; it's discussed regularly.

We have a little library area, I suppose you could call it, where there are lots of general magazines, technical, scientific magazines and the trade magazines. People can go in there and research something; they can look at something. We have access to the internet for virtually everybody in the company and it's left fairly open to them. They are allowed to go and search for things that they may think is important and bring those ideas in from outside.

I think the best way to describe it is, if there is a source of ideas, we'll look at it and we'll try and tap into it. We certainly don't claim to have a very formal system for doing it, but what we have done is create a culture where people are more than happy to go and look. They don't feel embarrassed about going and doing some speculative research, by visiting a customer, visiting a supplier, by talking to another company, by sitting and surfing the internet, we allow them time to do that, give them the resource to do it, we encourage them to do it. That tends to bring the art that was possible and a broader arena into a pool, if you like, that we can then work with.

I: That sounds tremendous and, clearly, it's a system that's working and people buy into and it delivers results for companies.

PM: Yes.

I: It's profitable, it's growing through innovation, not just by doing the same thing. But then that sort of raises some questions which are around strategic management, which is the horizon. So, perhaps, could I ask you now where you see, let's say the top two or three challenges, the things that you're losing sleep over, perhaps, you're worrying about or you can see coming and will be worrying about in the future? What are the future innovation management challenges?

PM: There are probably two parts to that. With the product, where is the demand going to be in the future in a very regulatory environment? It's difficult to see which direction it's going to be. The tobacco industry is becoming extremely regulated. Some of the things we're beginning to measure for research purposes are very much way off what we traditionally measure. So, it's knowing where those demands are likely to be in the future. It's staying abreast of the regulatory people – World Health Organisation, ISO, standards people – to understand where their thinking is, not where they are and what the current standards are, but what's the current topic around the coffee machine? What's likely to happen? Where's the political direction likely to take this? What do we need to be thinking of in terms of measurement in the future?

So, where are we going to be in five years' time in terms of products? There is always a nervousness, 'Can we see it before anybody else does? Can we then respond quickly enough?' So, the second part, having identified what that area is and that's where it's going to go, how do we develop that? How do we develop a product for which there is no standard written, for which some of the customers probably have no interest at all in measuring, because it's not yet a regulatory requirement.

The second part is probably easier, I think. Because of the culture we have now, we have people who are much more open-minded, much broader thinking. We no longer take what we've got and just automatically increment it. We'll look at doing that, but we'll also say, 'Well, is there a better way of doing this? Can we leapfrog the next incremental step and produce something that is significantly better by using a different technology, by using a different method?' The bigger concern I probably have is identifying, what's that area going to be? What is that demand? Where's it going to be from our current customers or is it going to be from someone else? If you think in terms of we produce instruments, support instruments – customers don't buy instruments; they want information about the process. So, is the product for the future selling them data on their process as a service, rather than us selling them an instrument? They only use an instrument because they have to. Technical director calls it a 'distressed purchase' – they buy it because they have to. They have to measure this. No one chooses an instrument in that environment because they like it because it looks pretty or there is any benefit.

There is a slight movement down the road of improving process capability and improving material utilisation, but the vast majority of customers used it because it is regulatory; it has to be there. If you then think further ahead, in a regulatory environment it's not actually the instrument they want, it's information about compliance and is that our project for the future? Do we get to the stage where we will install in a process line or instrumentation and we will sell to the customer information about their process? Pulled off per byte, pulled off per hour, pulled off per measure, in whatever form.

It's a subject that's actually begun some discussion with one of the bigger multinationals. So, that thinking is already there. It certainly creates a lot of discussion within Cerulean. We have half an eye on that as a potential product line in the future, where we're selling data, not actually selling hardware. Therefore, how would we operate? Very basic level or statement of requirement for our new product project; how would that look if we're going to produce data as an output?

There are other models about where companies lease products to people. The one that is in the back of my mind is wheelie bins. Wheelie bins are leased to those companies and the businesses generate such margin from the maintenance and supply and replacement of the wheelie bin. So, there are other models we can use

to do that, but we've got half an eye on that the products for the future are not necessarily the little blue boxes that we currently sell.

I: I think that's a very interesting theme, because it's got an awful label, but it's loosely called 'servicisation' and, increasingly, a company like Rolls Royce makes more money from those services wrapped around its engines than the actual aircraft engines it makes as product. The challenge, which I think you've started to identify, is how do you make the change when you might need very different skills? You almost certainly need to build different relationships. You may need to get to different parts of your client organisations to the ones you're traditionally dealing with. Any thoughts around that?

PM: Oh yes, lots. Overcoming the inertia with the customers is the biggest issue. Their thinking, particularly when you're dealing with procurement people is that 'we are acquiring this box and this, traditionally, is the cost of acquiring it,' but the more advanced view is, well, this is the lifecycle cost. So, you're going to buy data – that's cheap. So, you supply the instrument, the data's cheap, and the whole modelling of the cost is an issue. You're quite right, it's different people you're dealing with. The people that would be users of our instrumentation are production operators, quality assurance people, in some cases laboratory people. For the regulatory requirement, are they really going to be the users of it or is it, perhaps, more pushed towards the regulatory side and the regulatory bodies themselves?

We don't have any answers, yet, but the thinking is there; the discussion happens, particularly we're doing a strategic product review, talking about what's the future four years, five years from now? What are the types of products we could be looking at? That is tending to come up as something that we're aware of, we know we're going to have to begin to work with it at some point, because one of the major multinationals will, eventually, end up pushing us down this road. We know it will be slow, because the multinationals have their own inertia and we are the leading lights, the people pushing the boundaries in there are going to be restrained by the more traditional people. There is a tension between the people who want to maintain what they've got and the people who want to step onto something new.

It's at the point of discussion, really, at this stage. We're aware of it, we're very open as to how we will work with it. We know other models where that type of thing has happened, but we're not yet at the point – we know we have to get there, maybe it's five years, maybe it's 10 years, but I think it's fairly certain that it was one move a long way down that road. It may only be that the company would lease the instrument from us for a period of time – the wheelie bin scenario. It may never go to fully supplying later. But we have some simple models and how we will do that. We do a little bit of limited leasing to some companies where they struggle to get the money for capital expenditure. We'll put a leasing package to them. So, we have a peripheral knowledge of that. So, the thinking is there at this stage. It's still very, very embryonic.

I: It's a very good illustration of innovation as a dynamic capability. It's not just being able to manage it for one steady state set of conditions. The world changes and you've talked about product innovation, process innovation and there you're really talking about rethinking the whole business model from being a manufacturer to being a service company.

PM: Yes.

I: That raises the question of learning to build capability. Clearly, talking to you, it's a company that's learned and you, yourself, have learnt a lot of lessons about innovation. Difficult question, but if I ask you to think back, what are the two or three really big lessons you've learned about managing innovation?

PM: The key lessons are around people. Cerulean is a company that relies on its people's capabilities. We have no processes as such. We use our supply chain to provide the sensor technology. We put it together, we have the software. So, our business planning, our disaster recovery is all focused around what happens if we have an issue with people. What I find is, in making that change, creating that capability to think differently, to do the radical innovation, people's ability to adapt to that, to modify is incredibly complex. It's different approaches for different people. We have people that we thought were very stuck in the mud, they're never going to change, actually coming forward with some fantastic ideas. We have brought people in as a planned approach to say, 'Right, this is an individual, he's going to stir things up.' They think completely differently. They're very outspoken, they push their ideas forward. They're certainly not going to fit in. We've deliberately recruited people with a different character set and it hasn't worked. We've found that they haven't fitted in and, if anything, they have begun to adopt the incremental approach. The whole reason for bringing them in was they didn't just fit in and adopt the incremental approach.

So, how you gauge that at the beginning is still something that we're not sure of. The other thing, I think, which is the next stage on from that is changing the people that you have. It's not a simple, 'OK, today we're doing radical and they'll just change.' They diffuse into it and they need encouragement. That encouragement has to come from the whole management team; they have to walk the talk very much and it has to be seen to be something important. This cannot be something we'll do on Friday afternoons when we're not doing anything else. This cannot be something that will create the future……