ECONOMICS AND INDUSTRY STANDING COMMITTEE

INQUIRY INTO TECHNOLOGICAL AND SERVICE INNOVATION IN WESTERN AUSTRALIA

TRANSCRIPT OF EVIDENCE
TAKEN AT PERTH
WEDNESDAY, 23 MARCH 2016

SESSION TWO

Members

Mr I.C. Blayney (Chair)
Mr F.M. Logan (Deputy Chair)
Mr P.C. Tinley
Mr J. Norberger
Mr T.K. Waldron

Hearing commenced at 10.18 am

Mr ANDREW HARDING
Product Group Executive, Iron Ore, Rio Tinto Iron Ore, examined:

Mr MICHAEL GOLLSCHEWSKI
Managing Director, Pilbara Mines, Rio Tinto Iron Ore, examined:

Mr CLAYTON WALKER
Managing Director, Ports, Rail and Core Services, Rio Tinto, examined:

The CHAIR: Good morning. On behalf of the Economics and Industry Standing Committee, I would like to thank you for your appearance before us here today. The purpose of this hearing is to assist the committee in gathering evidence for its inquiry into technological and service innovation in Western Australia. You have been provided with a copy of the committee's terms of reference. At this stage, I would like to introduce myself and the other members of the committee here today. I am the Chair, Ian Blayney. With me are the Deputy Chair, Hon Fran Logan, and our other committee members Jan Norberger and Hon Terry Waldron. The Economics and Industry Standing Committee is a committee of the Legislative Assembly of the Parliament of Western Australia. This hearing is a formal proceeding of the Parliament and therefore commends the same respect as given to proceedings in the house. Even though the committee is not asking witnesses to provide evidence on oath or affirmation, it is important that you understand that any deliberate misleading of the committee may be regarded as a contempt of the Parliament. This is a public hearing and Hansard is making a transcript of the proceedings for the public record. If you refer to any documents during your evidence, it would assist Hansard if you would provide the full title for the record.

Before we proceed to the inquiry-specific questions we have for you today, I need to ask you the following. Have you completed the "Details of Witness" form?

The Witnesses: Yes.

The CHAIR: Do you understand the notes at the bottom of the form about giving evidence to a parliamentary committee?

The Witnesses: Yes.

The CHAIR: Did you receive and read the "Information for Witnesses" briefing sheet provided with the "Details of Witness" form?

The Witnesses: Yes.

The CHAIR: Do you have any questions in relation to being a witness at today's hearing?

The Witnesses: No.

The CHAIR: Before we ask you questions, do you have an opening statement?

[10.20 am]

Mr Harding: Yes, I do.

The CHAIR: Go ahead with that now, thank you.

Mr Harding: I thank you, Mr Chairman, and the committee for the opportunity to speak. You have already had introductions to Michael and Clayton, who are here with me, but a bit more about them. Michael is the managing director for the Pilbara mines and Clayton in his capacity as managing

director for rail, ports and our core services, he looks after those parts of our business. They are actually the vanguard at the executive level for a lot of our innovative systems and practices, so I thought that it was sensible to have them here with me.

The first point I would like to make by way of introduction is that innovation is actually part of Rio Tinto Iron Ore's culture. We have been in operation for 50 years and the business is vastly different to what it was when it first started 50 years ago. Simply, if you just look at it, it was one mine at Tom Price, with one railway system leading to a single port; now it is 15 mines. I will not go on and describe the whole system because that is available to you in many publications and online, but the cornerstone of increasing the size of the business has been the innovative use of technology and, indeed, innovating outside of technology. I will not talk about this again in my brief introduction, but innovation for us covers the whole spectrum of business, for example, of other areas of innovation that are outside of technology. But to give you a sense of the mindset; for example, probably one of the most innovative things we have done is actually the introduction of the Pilbara blend, which is a combination of many of the mines that we operate in the Pilbara into a single blend. We managed to achieve that through the application of technology and the brilliant people that we have working for us to get high consistency and reliability. It is the single-largest traded product and it actually gets a premium. We are not just selling into the market for what we can get, but we have added value through the creation of the business. So it is innovation in the marketing space. Second of all, just in the fly in, fly out operations, one of the innovative steps we took was to not think of fly in, fly out just out of Perth, but fly in, fly out out of regional centres. I am sure that you are probably aware of the regional centres that we fly out of like Geraldton, Albany and Busselton. They are just a couple of examples. We have managed to spread the intensity of our growth to some of the regional centres, and the benefits actually flow to areas that would not normally get to see benefits from the growth of the industry. From that point of view, we just draw from a wider pool of talented employees, so we actually benefit at the same time. Lastly, another innovation has been in the application and the use of Indigenous land use agreements across the Pilbara, which have brought reciprocal benefits for both Indigenous Australians and ourselves.

The second point I would like to make is that innovation is a term that is often linked to the explosive growth of the new ideas and start-up companies that you see in Silicon Valley, and Israel gets talked about occasionally as well, but what I want the committee to understand is that innovation is being undertaken across the older industries like our own and we might have more easily observable examples of it. The importance of that in the Australian context going forward is that if all you are focusing on is starting up some new tech start-ups but not the vast amount of wealth in human capital and capability that is tied up in the existing companies and get them online with an innovative culture, then I think we are missing out on a massive opportunity for the state and for the country actually, if the country was to copy Western Australia.

As a third point, I would say that there is a common misconception that innovation—I will move to technology—and technology brings with it a simple job-loss phenomenon. The reality is that if you look at the world in one, two or three-year time frame, then you can often find examples of that occurring. But if your view of the world is a longer time frame and you are thinking of the bigger picture; if you look at Rio Tinto's Iron Ore business, as an example, over 50 years, there were only several thousand people employed in our iron ore business back in 1966 when we kicked off with Tom Price and the railway line through to the Dampier port, now there are five or six times that many people employed in the business. We produce a lot more and get the business a lot safer; it is a lot more productive and it is at lower cost. The reality is that that is not a phenomenon that is just linked to making the business larger; it is actually achieving all those individual targets of safety, production and cost reductions with the application of technology. They are a package; you do not just get one without the other. You would not have had this massive engine of wealth creation for the shareholders and for the state if you did not actually look longer term than just what happens in

the one or two-year time frame and those very short cycles. It is much bigger picture, and that is the point I want to make.

I suppose—because I imagine that I am here for the questions—the last point I would make is that one of the defining differences that I think Rio Tinto has in innovation is that we do not innovate on a project-by-project basis. We do not decide: let us automate the trucks—that is not what we do. We set out a concept called mine of the future, which is an ecosystem that supports innovation, and we collected a group of people specifically inside that system that allows us to deal with many applications of innovation not just one. The concept of an ecosystem supporting innovation is really important corporately, and I suspect that it is more important at a greater scale in the state. It is not just about costs and it is not just about productivity, we have seen a massive improvement in safe work performance over time.

I have gone on too long. I could see much more, but I will not.

The CHAIR: No; I actually do interrupt people and tell them if they have gone on too long.

Mr Harding: I have some fact sheets here that I should provide to the committee as well.

The CHAIR: Thank you for that. I neglected to say earlier that Jan has to leave earlier at 10.50 am, so ask him to lead off.

Mr J. NORBERGER: Just my apologies; if I suddenly get up, you have not offended me.

Look, thanks for coming in, I really appreciate it, and for the submission as well. We obviously had BHP just ahead of you. Probably I might ask similar questions mainly because obviously you are both in the same industry. One of the things I was interested to know is what mechanisms does Rio Tinto use to scour the marketplace for technologies outside of your own organisation that you believe could be of benefit to you. That is where you are initiating your search. But equally, for companies that are out there, small to medium, whatever it is that they might produce, be it a widget or software or whatnot, if they believe they have got something that will value-add, is there an easy mechanism for them to try to get an audience or a way to submit that idea? Because you might anecdotally hear complaints sometimes from that smaller sector, "We just cannot get in the front door. We have got something fantastic"—what they believe is fantastic—"no-one cares; no-one wants to listen." Have you got a mechanism that you use to either find technology or innovation beyond your own capabilities or allow people to make submissions?

Mr Harding: Thank you for that. Look, it is part of the ecosystem. So, essentially, we start with the problem we are trying to solve. Be it the safe loading of ships or the automation of trucks, there will be a problem we are trying to solve. We have connections as part of the ecosystems with universities. So, we will have connections like to the University of Sydney, connections here to UWA, connections to other universities around world, because you are trying to scour the world for the ideas. We have connections into some of the Silicon Valley businesses themselves. We use existing consulting firms, the likes of McKinsey, just to give you an example, but not only them. What we do is we use that broader network to say, "We have got a problem and we are trying to find a solution to it."

In addition, we often and, in fact, probably the main part of our success has been we went and looked at other industries outside of mining, because if we just tried to solve a problem inside the mining industry we would be copying our competitors and we would not be innovative. So, we have gone outside the industry and we have looked—as difficult as it may be to believe, probably most of our ideas came out of international agriculture from application of machinery and easier to believe is obviously elements of the defence industry; globally they are very high-tech. So, we have deep connections with those and we solve problems outside of our own industry.

[10.30 am]

Mr Gollschewski: Andrew, I would like to add a point as well. At a more granular level, too, it is around making ourselves available. An example is there is an industry body called MESCA—mining and energy services, I think. It is a group of suppliers. They normally come together once a year in Perth, so you get a really diverse range of companies and suppliers. I think for the last two or three years we have actually given a business update. I have done that personally where it is, "This is where we are at, these are the projects we have got on, this is the state of the nation from our business point of view" and, normally, after that we hang around for the normal networking and you get flooded with business cards. I have someone with me and we normally direct all sorts of queries into the relevant areas. We try to avoid the solution looking for a problem, but the other thing that that does is it matches—it goes into people's memories and you never know if something will come up in the future—and you will keep a record.

Mr Harding: Probably just to add to that is that we connected with all these various groups and functions and that because the connections do not exist by any other means. We have the fortune of being large enough that we can afford that backbone of infrastructure. It does not exist to my knowledge in any other way, so we did all those connections ourselves.

Mr J. NORBERGER: Do you believe there is a role for government then to provide either a neutral mechanism or otherwise to create an environment that can facilitate making connections, or is it better left to industry to make its own?

Mr Harding: I think there is a balance, and on balance I would say you cannot try to do everything and if you do nothing, those are the wrong ends of that continuum. For example, if those connections were available to us readily without having to do our own work, I would not spend the money going and doing it; there is no benefit to me. Part of the ecosystem that would be greater in the state is if that was available. Innovation requires ideas to collide. Dyson's idea for the vacuum cleaner without the bag was he was at a sawmill and he saw the hopper collecting the dust at the top and he went, "It collects more dust than the hoover does in my house." Five or six years later, 5 000 prototypes later, he starts off being on the path to becoming a billionaire. It is the connection of ideas, allowing them to be applied together that creates the innovative opportunity.

Mr F.M. LOGAN: Of your six-point strategy for innovation, there is five, importance of people, and you referred to the high-performance teams. Does that reflect a ground–up approach to identifying innovation involving your workforce or is it a top–down structured approach of extracting ideas from your people?

Mr Harding: That is great. I am going to get Clayton to cut in on this because it is one of his favourite topics, but the very, very simple part is that almost all the good ideas have come from the ground up. We have provided the structure at the top and I would love to tell everyone that I wake up every morning and come up with a brilliant new idea, but that is simply not the case. But Clayton has run some of these programs.

Mr Walker: We believe that you have to take it from both sides. So, at the high level you are asking: what is the problem? Fall in love with the problem not solutions. But at the bottom we have another set of programs whether it is the Make It Count, Make a Difference or our HVIs, which stands for high-value initiatives. All three of those involve at basically a crew level, going out to those teams and saying, "All right. How can we make your jobs easier, safer, less costly?" We go out and challenge the crews. They live with it. They are the ones that understand day in, day out where the opportunity lies or what is it that is slowing them down. We provide them with some space, a little bit of coaching from our business improvement team and then they take those ideas. Last year we had over 400 of those Make It Count or Make a Difference programs running across our whole network, which is quite innovative. From that we saw everything from a different way to put in posts in the ground all the way to our big HVI that last time was called Fast-Track 35. We give everything a funny name; it gets everyone excited, right, and gets them to align to it. The idea is we had a group from the mines, we had a group from the rail and a group from the ports,

we pulled them out of their role and we said, "We want to be able to reduce our cycle time." We gave them the tools, gave them the time, and they were able to reduce our cycle time by over four hours in the course of just three months. Now, we also went and looked—as Andrew said, a big part of that was looking outside just our industry. How do other industries do it? So they talked to the people at Centurion and Toll, from those logistics companies, to get some ideas on how they did it. It is like a pincer move; you have got to push from the top and push up from the bottom, and that is where the ideas collide and you are really able to make a difference in the business. I think those are the three areas that you really have to have and are important.

Mr Gollschewski: Another example, Fran, is we use this approach a lot for safety. We had a risk we recognised around working on heavy equipment where we thought in this day and age, rather than working on it live for testing and commissioning, where you have got particularly on trucks and things like that where you are trying to look at deflection in steering joints and so forth, is how do you get out of the line of fire or potential line of fire? So we took actual mechanics from all our sites, put them together, gave them time and space and through using essentially GoPro and digital technology and a whole heap of other devices, they innovated a whole new way of doing work and that has now been translated into the standard work practices, so they also generated the standard work practices. So, I am a firm believer that the people who do the work should actually be involved in generating the solution.

Mr Walker: Can I just add one more to that. In that process we are really big on running trials, because not everything is going to work the first time out of the box. We have a bit of a thought process around—that is, you fail quickly, learn fast. The idea is that we encourage these teams to run trials: Did it work? Did it not? What did we learn? How do we go to the next one? People actually get more comfortable with trying that kind of crazy idea, and that way we can push it forward. But you really have to create that environment where it is okay to do it. You might not get it 100 per cent the first time, but you have to reward their learnings, not whether or not it worked.

Mr T.K. WALDRON: Fran asked what I was going to ask. That was really interesting because I think that the people side of it is the key. Just on collaboration, because collaboration is something that comes up in all the submissions and all the hearings that we have, could you give us some of the examples of where collaboration has helped your company innovate? I guess you have mentioned about agriculture, which was really interesting. But one of the things that you had in there with collaboration was a guiding principle to determine and commit to a specific area of focus. By that do you mean that when you look at collaboration, you are looking at something specific to collaborate with and then you seek partners? Is that what you are saying here? Perhaps if you could just expand on that, because that is quite interesting.

Mr Harding: Okay; and I will get Michael to come in after me. If you are just collaborating for collaborating sake, it is like a really nice, warm, fuzzy meeting where you are supplied food and absolutely nothing comes out of it, month in, month out. You actually have to collaborate with a purpose. The best collaboration is where there is something in it for both, or more than two, parties. I was originally involved in the start-up of the autonomous truck program. We have—it is not your typical customer–supplier relationship with Komatsu in the development, because the equipment did not work to start with. There were some very prototype beginning trials where it worked, but how do you actually get it into the mine? How do you actually make it productive? How do you make sure it is safe, because you can never have an incident while you are developing it or it will really set the technology back, let alone the human trauma? The whole idea is that you have to work to suspend, in that case, the typical customer–supplier relationship. You have to set up an environment where, yes, there is a commercial reality to this, so you cannot pretend that there is not, but at the same time both organisations are in pursuit of the greater goal. It is like a team. You have competitors in teams, but you are together to win; do you know what I mean? That is actually how we collaborate with purpose. The purpose was actually putting in autonomous trucks

that would unreservedly prove that they were much more cost effective and have greater productivity.

Mr Gollschewski: Safety was a huge driver around AHS as well. Driving a truck for 12 hours a day on the same cycle has that constant risk of fatigue for the driver, and you have the heavy vehicle–light vehicle interaction. We really arrived at the point that whilst we are relying on humans paying attention for 12 hours a day, we are human and people make errors, and no-one should pay with their life for making an error. We went in search for a technological solution. There are really three lenses that we look at AHS through: Is the autonomous haul going to be safer? Is it going to drive value into the business? And the third thing is: is it going to be easy to use and accepted by the operator? They are really the three key things that we look for. In this instance we collaborated with Komatsu.

[10.40 am]

Mr T.K. WALDRON: Just briefly, is there collaboration with the universities?

Mr Harding: Yes. We have a number of collaborations. Michael is actually the expert on the Sydney one.

Mr Gollschewski: Certainly one of our longest collaborations—I think it is mentioned in the briefing document—is the Australian Centre for Field Robotics, where we sponsor a number of PhDs. They have really done the scientific work and the development of the whole platform that allows us to do what we call RTVis, and it takes us towards our vision of mine automation systems. It is a software platform. Some of that is borrowed on technology from the agricultural industry, but it is also feeding back out. The findings that we have, where we do not have intellectual property issues over it, go back into the agricultural industry and now also into the aviation industry. Qantas is involved with that same centre for optimising flight routes using some of the algorithms that have been developed for controlling trucks in mine sites, but now drills, and we want to extend that further.

Mr T.K. WALDRON: And that same focus that you talked about before applies with the universities with your collaboration as well?

Mr Gollschewski: That is through Sydney university.

Mr Harding: We do not collaborate on the same thing with every university because they have all got different specialties. We hopefully get it right by picking what we think they are the best at in the world, or they are most likely to be the best. Sometimes you pick a trend, and we invest early with them and try to stay with them for a long time.

Mr Gollschewski: Sydney university has a specific focus on robotics and mechatronics.

Mr J. NORBERGER: Maybe just staying on the theme of automation for a moment, I think it is fair to say that Rio Tinto has achieved more in relation to automation, certainly in Australia, than the other major players. You have been at it in the world even, so you have come a long way. Also, notwithstanding, Andrew, part of your opening statement, I am not looking for a smoking gun—"Oh, my God, there's a net loss of jobs" or whatever—but it would be interesting to hear from you. You have been at it hopefully long enough to be able to provide a bit of an insight. What is the change of roles that has come out of it, because new roles would have sprung up? Give us a snapshot of what mining will look like in the future, because what should our educational institutions be trying to pump out?

Mr Harding: This is a very big issue for us and everybody, not just in our industry; it is the way the world is going to move. If you look at what we have done, automation is much broader than just the automation of trucks. I will just talk to that. Clearly, when you automate a truck, you do not require the truck driver. Although there are some things in our system which are very, very difficult to automate, and those truck-driving tasks are still done by people, because you are automating the

highly repetitive aspects of work. The thing that I think happens then is that you still have to maintain the piece of equipment. In fact, it has now become technologically more advanced to maintain. So the skill of the maintenance individual, the skill of the electrician, changes and morphs, and then you need people who can handle the massive amounts of data. Automation requires the transmission of massive amounts of data, so you need people who can make sure that occurs seamlessly and very reliably. Then you need somebody who can actually process high amounts of data, where you have not had to process it in the past.

Essentially what I am getting to is that you basically need a bias—in Andrew's opinion and, I would say, Rio Tinto's opinion—to have much more STEM capability. My bugbear, which I have said many times externally, is particularly statistical reasoning, because you are not dealing with what you can easily see, or an operator coming to you and saying, "I saw this"; you are dealing with a ream of information that comes at you, and you have to be able to process that information effectively, fast and safely to make decisions. You get a backup of quite complex algorithms and computer systems that help you, so you get decision assistance, which takes you into another field, because you need people who can help you generate decision-assisting software and that sort of stuff. So you get this morphing of the job area into that space. The reality is because mining is obviously connected to the ground, particularly as an industry, a lot of those decisions take place on site in real time. You can have some backup off site, for sure, and we have that with an operations centre, but there is always going to be somebody who has to interpret data and what is really happening and bring the two together. It is not like you can just have two PhDs sitting in Sydney running everything with a mathematics model. You need to upskill a vast number of people with at least good statistical reasoning, if not the entire suite of skills that you see in STEM-based education.

Mr F.M. LOGAN: That morphs into my next question, which is about STEM. You have identified the needs that the company has in terms of innovation, and also the change that you are bringing about, bearing in mind the future, with point 3, about "data-driven innovation". You have mentioned it, and every person who has come before our committee over the last six months has mentioned the need for STEM. But it does not appear, I think from the committee's point of view, that we are actually achieving that goal of driving STEM down into schools. There are commitments, and lots of words have been spoken, particularly by people like us—by politicians—but it does not seem to be happening too quickly on the ground. In conjunction with that rollout of STEM education at various levels of our institutions—not just from primary school but, for example, in technical colleges, where it does not exist either—of course in the current economic environment we have got hordes of engineers wandering around St Georges Terrace looking for jobs. So a parent may be encouraging their children to pick up more STEM skills because of the possibility of going into engineering and science outcomes, when they know there may not be a job there at the moment. How do you think we will overcome that? I will give you one example of where it is failing, and it relates to your industry here in WA, and that is GIS. You use a lot of GIS in your business and in the industry. Currently, in Western Australia there is one course for GIS, which is at Curtin University, and only 10 students per annum go through that, not because they would not like to take on more—they would like to take a lot more students than 10—but only 10 want to do it because they do not see the link between GIS, innovation, jobs of the future, and minds of the future. They just cannot make that link. Have you got any opinion that you would like to share on that, particularly for us as politicians, for example?

[10.50 am]

Mr Harding: Yes, but this is probably sharing more as a father of three daughters. My eldest is 17 and thinking about all the university-type options. She is equally balanced: terrible at languages, but very, very good at English and mathematics and something like physics, I think it is, so her entire early years at high school were that she was going to be a lawyer, a writer or a historian—something English-oriented. There is nothing wrong with that at all. What I started to do, though,

because she was doing so well at mathematics, was to put information in front of her like the differential pay amounts. I was never going to tell her what to do, because anyone who has got a kid knows that does not work, so I just gave her lots of information about making the decision. The school was probably pushing more for, "You're good at English; you'll get a great result in that. Maths is a lot harder." That is the issue. My wife has two diplomas, a first diploma, and a second diploma in mathematics and statistics, and she would always tell the kids that maths is hard work and they cannot just try and catch up in year 12, one hour before the exam or the day before. English, you speak every day. You can get better at it by practising and writing, because you cannot do nothing, but maths is one of these dogged things, and it is not natural, so it is less attractive for most of the population, I think, and from looking at that small population of my children. I think part of the issue is not just what we can do to change the institutions but how do we actually communicate and appeal to the kids. They are the ones who are going to make the decision and you and I are not going to tell them what to do, because they will do something different. So, how do we make that decision appealing and actually try to explain that education is about the rest of your life; it is not about what happens now. I will go back to the mining industry, which is cyclical. There will be more construction in the future. It becomes in mining particularly more difficult. You will need more technical capabilities to mine more difficult ore bodies in the future. It is not like there is no greater need in the future; there is technically a greater need to do these things. I think that the volume of requirement in the future is higher; it is how we actually get that attraction. We have to not lose focus on the kids themselves and think that we can just push down from government through institutions, or from companies down to education institutions. We have to figure out how to speak their language and give them the information to make the best decisions. At the end of the day, I think that kids with the right information, which is accurate and presented well, make good decisions, and hopefully we still have lots of artists and lots of actors, and even the occasional lawyer would be useful!

Mr Gollschewski: I am dying to have a go at this one as well. My daughter has started first-year engineering and I have a son who is doing law. I will start with vision and culture. My daughter ended up going into engineering. She was fortunate she had me as a dad, I suppose, because I was able take her to a mine site and show her what a mine site was really like. She does not even want to work in the mining industry, most likely. I was also able to show her and talk to her about Carnegie Wave Energy, around businesses like Civmec and Monadelphous—homegrown industries here. If you arrive in Perth, you do not see that. We have not created a vision or a culture around Perth that actually smacks you in the face and says that this is one of the resources, science and engineering centres of the world. If you fly into Seattle, Washington, you see the history of flight. If you fly into Peoria, Illinois, where Caterpillar and Komatsu make their trucks, they have a whole history of Caterpillar and LeTourneau and they celebrate it. It is in and around the town, so it is part of the culture. I very much agree with Andrew that you cannot make someone go in that direction, but I think we are missing a lot of opportunities with people to make choices because they do not see the opportunities in the first place. I think we have got it all here; we just do not create that vision and the culture around it. If we could do that, I think it would be amazing.

Mr T.K. WALDRON: Is there a role for state government there?

Mr Gollschewski: I think so.

Mr Harding: Yes, we have talked about this a few times. Probably one of the more important roles is actually painting the picture that helps the population, particularly the younger population, move forward through that. You will not get a payback in one or two years, but in the 10 to 20-year range, it will be astronomical. If you look at places like San Francisco and that, they went through a very poor period before the start-ups took off. Now it is an incredibly rich part of the world, and it has some issues attached to being incredibly rich as well from a social point of view, but something was created out of nothing over a period of time. Everyone looks back and goes, "Oh, well, that's easy".

No, it was not easy. You cannot pick the winners, technologically, but you can provide the ecosystem for it to work, and that is a big one for government in my view.

The CHAIR: My background is in agriculture and I was actually a research funder in agriculture part-time, so I am aware of the University of Sydney's work as an agricultural funder, because they are one of the organisations that we funded in precision agriculture, and I used to go to their precision agriculture conference every year. The other thing that occurred to me was we used to, if you like, spend a lot of time defining the problems that we wanted to spend research money on and then put out what we called an open call. We would define the problem and we would have on the bottom of it how many dollars a year for how many years was available to researchers to look at that particular problem, and then we would get back a heap of proposals and we would have to sit down and read them all and go through them and discuss and then pick who we were going to get to do the work. That sort of works, because that is a compulsory levy that farmers have to pay, the federal government puts some money with it, and then farmers and scientists allocate the money. But it strikes me that the private sector does not really work like that. I put it to you that I would assume that Rio Tinto could find a few million a year to put out an open call for research and put out a prospectus and send it to the researchers and say, "Okay, we want to do some research on this area. Send us your proposal, sit down and fund it." What do you think about that model?

Mr Harding: We do not use anything as formal and traditional. We run a hackathon. We give a group of really, really smart young people a problem and a weekend and a lot of pizza. They basically work really, really hard to actually solve some of those issues that have got to do with operation problems that we have got in the business. So we have got a way of doing that which is less formal and structured. Based on the evidence that I have seen, that would be akin to me, at the top of the business internally, saying, "I think these are all the problems, and you guys, can you solve them?" It does not give you enough bottom-up. There is some of that that happens, but there is not enough bottom-up. If you look at the evidence for state support, for example, of scientific outcomes, you get some benefit for your buck—and that is not a bad thing; do not get me wrong—but do you get the multiple effect that you get out of the Silicon Valley where you have got the drive from people starting up their own businesses and taking their own risks and actually trying to solve problems? I do not think you could get anywhere near that multiple. It is a potential solution and it exists, and it will give you some benefit, but it will not give you the 100 time multiple that you are after.

The CHAIR: It interested me that you said that when you wanted to look at other industries to see where you could innovate from, you said agriculture.

Mr Gollschewski: That is one.

The CHAIR: That is when I made the connection with precision agriculture.

Mr Harding: Yes, and, look, precision agriculture was actually something that we learned from. That very, very specific topic was one of the kickstarters for the work we are doing now.

Mr T.K. WALDRON: In your submission you mentioned partnerships with some of the major companies. I think there was Komatsu, Hitachi, General Electric and others. Do you have similar partnerships with SMEs here in WA; and, if you do, how are they going; and, if not, are there obstacles involved in you partnering with those SMEs?

Mr Harding: For that sort of technology, there is not a lot of opportunity with the local suppliers. Because we are kind of doing something at an extraordinary scale with very big manufactured products, like the big trucks and that sort of stuff, you just do not have the local opportunities to actually go into those very big partnerships. That does not say we do not work with local companies, but the ones that we focus on and talk about are the ones that I guess give us the biggest bang for the buck. We worked with some smaller businesses around maintenance activity and that sort of stuff. That is good for us. It is worth millions of dollars of value to us; it is not worth tens

and hundreds of millions of dollars. I am happy for these guys to tell me if I have missed something. But that is kind of the rationale. It is just the size of the business—there is not an obvious supply base that actually can grab those really, really big projects, on the scale. It is a scale issue. If you look at GE, we are a minor customer to them on a global basis. Clayton probably knows the numbers.

Mr Walker: They have over 1 200 locos, just with the Burlington Northern—one railway line. We only have 175 in our whole system.

The CHAIR: We are going to have to call it a day. I would like to thank you for your evidence before the committee today. A transcript of this hearing will be forwarded to you for correction of minor errors. Any such corrections must be made and the transcript returned within 10 days from the date of the letter attached to the transcript. If the transcript is not returned within this period, it will be deemed to be correct. New material cannot be added via these corrections and the sense of your evidence cannot be altered. Should you wish to provide additional information or elaborate on particular points, please include a supplementary submission for the committee's consideration when you return your corrected transcript of evidence. There is a chance we might have some more questions to follow up with; is it okay if we just write to you with those questions?

Mr Harding: Absolutely.

The CHAIR: With that, thank you very much for your time today.

Hearing concluded at 11.00 am