

A Conversation

Scott Aviation Makes a Case for Outsourcing R&D

William A. Danesi and Albert Sherman

Scott Aviation is a leading U.S. supplier of protective respiratory devices and emergency oxygen equipment. Scott has recently experienced a significant turnaround in its performance, thanks to new product introductions. These new products were created both through internal efforts and through significant outsourcing of R&D, principally in collaboration with Arthur D. Little. Bill Danesi, Director of Engineering at Scott, recently met with Albert Sherman, Arthur D. Little's Senior Vice President and Managing Director, Technology and Product Development, to discuss some of the lessons learned in that collaboration.

Albert Sherman: Your company, Scott Aviation, has long been a leader in its industry. In recent years, you've also overcome some very serious challenges to your leadership position, arising from major changes in your industry.

Bill Danesi: That's right. As you know, Scott Aviation is a manufacturer and distributor of respiratory equipment for people in hazardous environments. We've been in that business for over 50 years, and for most of that time, we've been basically a supplier of mechanical hardware – respirators, gas regulators, and other such simple devices.

In the last five years or so, our whole industry has changed, because our customers have changed. Take firemen, for example: for years they always wanted the same equipment, but now they have to do their jobs in much more hazardous environments than they ever faced before, with bigger fires burning at much hotter temperatures. At the same time, they've started to become aware of technology and the difference it can make for them as they face these new challenges.

They've learned about technologies that can help them do their jobs more safely and effectively and even at lower cost. And they're demanding products that take advantage of these new technologies.

AS: What were the particular challenges you faced at Scott in trying to meet these new customer demands?

BD: A lot of our smaller competitors began choosing niches where they could exploit a particular technology – we suddenly had to defend against offerings in all kinds of niches. To maintain our leadership position, we had to increase the breadth of our product offerings while, at the same time, maintaining the depth of design and execution demanded by our customers' requirements for safety and efficacy. It became obvious to us that we didn't have the technology to do this. Even state-of-the-art wasn't going to be good enough – we had to innovate and make dramatic advances. Success in our industry now depended on new product execution, and anyone who couldn't do that would be left way behind. We needed to come up with some very creative solutions to stay out ahead.

AS: So how did outsourcing become part of the solution for you?

BD: We have major technical assets in our core competencies, and we felt confident that if we could build on those, we could neutralize the competition. The choice was whether to expand internally, to buy new products (either through acquisitions or the licensing of technologies or products), or to outsource product development. Actually, we ventured in all these directions, each of which has its own opportunities and risks. It turned out that outsourcing was far and away the most successful path for us.

AS: As you know, outsourcing R&D is becoming an established practice in industry now, and for very good reasons. For one thing, if you never know what's around the next corner in terms of technology – whether it's going to be cryogenics or electronics or some technology that we don't even know about yet – it's not very realistic to expect that you can have all the capabilities you're going to need in-house.

BD: That's exactly right. Or just consider the fact that we can identify over 70 separate technical functions employed in the development of breathing systems: to have in-depth expertise for all these functions would be highly desirable but very impractical. We're also in a highly regulated industry and the regulations impose very sophisticated requirements. All these factors combine to make outsourcing a very effective solution for us.

AS: You've also experimented with various forms of outsourcing situations.

BD: I've found that when you're limited to doing projects in-house, it becomes very difficult and sometimes very frustrating because you usually give something up. When I took over the engineering department at Scott, I had about 19 engineers and 174 projects; every time another project came up, I was faced with not only killing one of the 174, but also knowing that the new project could suffer the same fate three months down the road. So

I began to think that if I could outsource work, I could make it immune to these kinds of problems. Since 1990, we've had 19 different projects in which a significant portion of the product-development process was outsourced. Sometimes we've just needed to supplement in-place capabilities with outside expertise in particular disciplines. In other instances, we had the necessary capability in-house, but our engineers were overloaded, so we turned the project over to an outside partner to carry it through from concept to production.

I can also mention a couple of projects that you know well, because they involved collaborations between Scott and Arthur D. Little. In the first project we worked on with you, we had an idea we needed help in executing. We came to you with a wide-open requirement and asked you to research the application and recommend the approach. We depended on you to provide a solution that would give us significant market advantage, utilizing technologies in which we had no core competence. Later, when our companies knew each other well and had formed a close working relationship, we approached you for timely help in resolving a problem with a major customer and a mature Scott product. So our decisions to outsource, as you can see, have been triggered by a lot of different situations.

AS: Let's talk about that first collaboration between our two companies. You had identified a market need for a certain type of liquefied-air respirator. In order to extend work time and reduce heat stress for workers in hazardous environments, you wanted to develop a device that could operate in any orientation and provide cooling for its user during extended use. You also had one critical requirement for this product for which you had no capability in-house: you needed to develop a gauge that could accurately measure the amount of liquefied gas remaining in the tank, even while its user was in constant motion or in any orientation. In short, you had an idea for what promised to be a breakthrough product and needed help with a crucial piece of technology. I imagine there must have been some doubts among your people at Scott about putting something so critical to the success of this project in the hands of an outside party.

BD: Well, we did have a cultural challenge, at first. People at Scott felt that we were the first ones to meet the challenges of this type of respiratory-protection equipment and that there just wasn't any need to go outside: it was a classic example, I suppose, of the not-invented-here syndrome. You also have to understand that, at the time we first made contact with you, we were in a major consolidation program, so some of our R&D people saw it as a threat to their livelihoods when they thought of the company funding work outside the organization.

AS: Yet you obviously overcame these challenges quite successfully. How exactly did you do that?

BD: I would say our company simply learned that, in outsourcing product-development work, we're not giving up any of our core competencies – on the contrary, we're building on them, complementing our own considerable skills to make the most advanced and innovative products in our markets. When we look at some of the technological work we've done with you, we see that, as a result of it, we've enhanced our own capabilities; in some of the areas where we depended on you for a jump start, we're carrying on.

Meanwhile, as Scott and ADL have gotten to know each other better, our people have continued to work side by side. Together we've moved from purely developmental projects, to troubleshooting, to finding new opportunities for Scott. As a result of such collaborations with you, Scott has even formed relationships with other companies that have also worked with ADL. So outsourcing, for us, is more like an acquisition, or maybe an alliance, than a contractor-supplier relationship.

AS: So you've learned it isn't true, as some people think, that outsourcing involves a loss of control. Even the word „outsourcing“ seems to suggest loss of control to some people.

BD: Outsourcing may just be the wrong word. It was originally used to refer, for example, to people getting their payrolls done outside, which was truly outsourcing. I've heard people use another term: „interpreneurship.“ Professor Richard Schiavo of the William E. Simon Graduate School of the University of Rochester defines interpreneurship as „a structure for meshing large-company strengths in developing existing technology and small-company strengths for developing new technology.“ In our case, this refers to the process I've described, where you carefully select certain core abilities, then find organizations or individuals outside your company to add to both your depth and your breadth. In other words, you solidify those core capabilities, but then you supplement them on all sides. At Scott, we wouldn't try to build up a new core capability, because it took us 60 years to build up the core we've got. So what we do is look for other capabilities that can help us expand our horizons, to grow our core in controlled directions. That's taking control, not losing it.

AS: Perhaps you've come across the phrase „virtual R&D center,“ which describes a situation in which the external partner is the outsourcer's R&D organization.

BD: I think that's what we do with your company, because the relationship is a real-time activity with that kind of responsiveness.

AS: We've been talking about technology. But have you found that a company to which you outsource can be a source not only of technology but also of new market opportunity?

BD: Absolutely. I've been talking about product-related activity, but we could be dealing with an issue that's market-related – for example, maybe we're going to sell in a new country. That also involves an expansion of capability. And, as I look at it, to successfully develop new products for new markets you have to be able to do exactly that, to expand your capability – quickly, decisively, in a number of different directions, whatever is needed. And we could never do that within our organization. In fact, we could waste an awful lot of time searching for an answer that's right there, that's already understood by someone else.

There's another great benefit that comes from a relationship with an external partner like ADL, which works in a lot of different areas: if we have an unusual idea, we can draw on the expertise of people from a variety of disciplines, who will bring a lot of new and creative perspectives to the table. We've seen that in the projects we've done together.

AS: That brings us to something else I wanted to talk about. There are two distinct phases of product development: what's sometimes called the „fuzzy front end“ – where you're looking for very creative ideas – and then the much more straightforward stage of developing the actual product. In which of these areas do you look to your outsourcing partner to provide the greatest value – or is it in both?

BD: I'd say both areas, definitely. As you yourself have pointed out, often we don't know what the solution is going to be. We don't know where it's going to come from. And if it's going to come from an easy, logical accumulation of known factors, our competitors are going to be jumping on them, too. So I think that the secret of staying ahead of the pack – in our industry and in a lot of others – is uniqueness. We often need completely unique approaches, and then we need depth, understanding, and solid technology to execute them.

Speaking of execution – and also about ways in which an external partner can help with market opportunities – I should mention a particular way in which our relationship with Arthur D. Little has helped us. While working with you, we've started using QFD, or Quality Function Deployment. This provides a systematic methodology for translating opportunities and customer needs into clear product specifications, ones that engineers can use for design and development. When you have a bare-bones marketing and sales group and a bare-bones engineering staff, as we do, getting this part of product development right is awfully difficult. So QFD is an important tool we've acquired through our relationship with ADL.

AS: In general, what makes for a successful outsourcing relationship, based on your experience?

BD: The first thing I think you need is a basic compatibility, comfort, and feeling of mutual trust between you and the people you're working with. If you don't have that, it's just a flip of a coin as to whether the relationship is going to succeed. Another thing I've found crucial is to have a very concise but unambiguous work statement, with mutually understood goals, timetables, and checkpoints. But when you and your outsourcing partner trust each other, the agreement becomes a simple thing to do.

AS: It's interesting that you've cited things like „trust“ and „the right people“ and „responsiveness,“ rather than technology, although obviously one of the primary reasons for getting an outsourcing partner is to bring in their technology. But perhaps the technological contribution is just assumed – if the other party can't do that, there's no basis for a relationship. So what distinguishes a successful outsourcing relationship, for you, are all these other intangibles. That being the case, are there any particular lessons you've learned about how to select a partner? What could you tell others who are going down this path for the first time?

BD: I'd say that the optimum blend of complementary technical capabilities is the basis of successful partnering. Beyond that, one thing I try to do is just talk to other people, to try to get a sense of how successfully you can work with them. If they seem to be looking out only for their own interests, that's a hint that you should probably be careful. If their proposed agreement is couched in a lot of legalisms, that's a clue to how they're thinking. But most important of all, I think, is the other party's track record. I would also advise someone who is looking for an outsourcing partner to make sure that they think about an enduring relationship. And here you want to consider several issues: ownership of intellectual property developed by the partner; access to beneficial network relationships possessed by the partner; and any influence you can gain by identification with the partner.

AS: Can you summarize, finally, the overall benefits you've gained from outsourcing R&D?

BD: Certainly. The product development function at Scott has significantly increased its output since we began outsourcing, and the achievements have been leadership-class. We've turned around what had been a five-year drought of new products, and we've produced a steady stream of new offerings, upgrades, and extensions into new market niches. More importantly, we've developed relationships that ensure that we and our external partners will continue our joint efforts in our markets and in extensions of those markets. We consider our outsourcing partnerships to be integral to who we are as a company today.

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Aviation in 1989.

Albert Sherman is a Senior Vice President of Arthur D. Little, Inc., and Managing Director of the firm's Technology and Product Development group. He is an internationally recognized expert in the competitive and technological strategies of the energy industry.