# Appendix D
# SRI's Business Model and the Question of Adaptation

Again this appendix is formed from the author's experiences and impressions over 40 years at SRI. They do not represent any official view of SRI.

## Contract Research—SRI's Core Business

Research carries the connotation of trying to introduce something new. If you enter into a formal arrangement to explore a new area, under specified terms and conditions, describing that work as "contract research" makes sense. But, if the contract is for developing something specific or predictable, a more appropriate term would be "contract development." Though that second term is never used at SRI, the Institute undertakes both kinds of work. And, clearly, losing track of such a distinction invites trouble. True exploration with only vague notions of outcome is clearly different from performing a specified task, in a limited time, with an expected outcome. Failure in true research should be forgiven, even though it is sometimes not, whereas failure to complete predictable development is often unforgivable—a sign of poor work or a badly written contract. Happily, much of SRI's work lies between these two limits, and outcomes are generally acceptable; however, the path followed to attain them may not have always been predictable.

Fortunately, a wide variety of organizations elect to fund contract research. In the United States research money that allows considerable exploration is mostly the province of the federal government. On the other hand, industry, whose needs are much more directed, may be blind to longer-term opportunities—a situation SRI has repeatedly experienced. Nonetheless, SRI has won its share of contracts across a varied spectrum of clients. Doing so is an important element in the diversification that characterizes its business model.

Because it was organized to conduct research much like its parent Stanford, SRI's revenue stems from thousands of projects, conceived and won by research principals. At its largest, SRI had more than 2,000 projects active in a given year, with individual researchers essentially working directly for their clients. In all, SRI has conducted over 50,000 individual projects, ranging in size from a few hundred to tens of millions of dollars.[1]

Because SRI's core business is contract research, its work primarily has consisted of *applied* research. But at an eclectic place like SRI, even that quite general term has not pleased everyone. The non-technical groups at SRI, those outside Science and Engineering, have occasionally found "research" too vague and uncertain a description for the work their clients want done. In the beginning years, however, applied research was, as a result of Stanford-issued policy, all that SRI was allowed to carry out; there was no room for what is today mostly referred to as management or business consulting. Not until the mid- to late-1960s, when the link to Stanford had grown vanishingly thin, did the open use of those terms emerge at SRI.

Regardless of their orientation, all externally funded projects lead to revenue, SRI's term for the money it bills its clients. As seen in Figure D-1, contract revenue grew over the years, reflecting first the increase in staff and then, after about 1965, mainly the effects of inflation. Not that a research institute's main goal should be growth, but current-year revenue clearly hides a relatively stable staff size. The constant dollars curve corresponds to a staff of around 3,000 people between 1965 and 1990.

The U.S. government's post-World War II emphasis on research offered a propitious time for SRI to grow. Moreover, industry was also

[1] SRI's project numbering system flows between 1,000 and 9,000 and is, therefore, on its fifth cycle of these numbers. To be exact, the first round of numbering started at 102. The next five rounds went between 1,000 and 8,999, and now SRI has a more endurable five-digit numbering system.

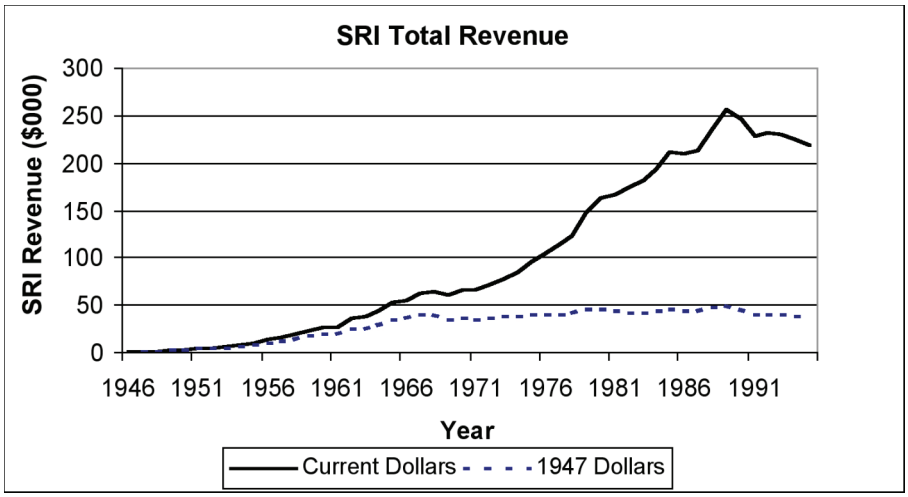


**Figure D-1. SRI's annual contract revenue from its founding until the SRI Consulting separation.**

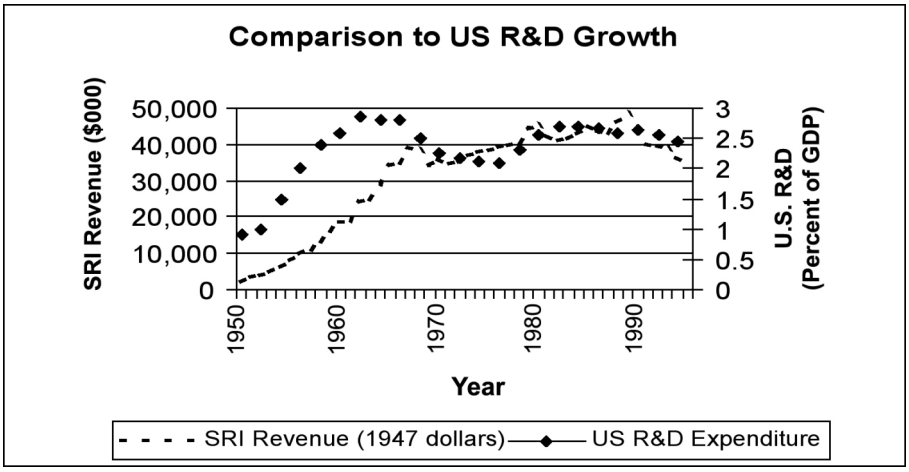


**Figure D-2. A comparison of SRI's revenue growth with that of the U.S. commitment to R&D.**

trying to profit from the new technology that had been developed during and after the war, and R&D as a percent of GDP really accelerated. A comparison of SRI's revenue, in 1947 dollars, with the percentage increase in U.S. R&D expenditures shows a similar pattern (see Figure D-2).

SRI's mix of projects is also worth mentioning. SRI was founded to serve business interests in the western United States and over the course of the first half-dozen years it did just that. But government-sponsored research has always been a large part of the SRI story and it was not industry, but the Office of Naval Research that sponsored the very first SRI project. Figure D-3 shows the fraction of SRI revenue over the years that came from the U.S. government versus that from commercial or international sources and though the size of the sector was not available for the figure, within a decade of its founding, SRI was doing international work.

Describing the business of contract research would not be complete without considering it as a working process. While contract research at SRI had its freedoms, in the absence of endowments researchers can never be free of their clients' preferences. However, those preferences have ranged widely—from extremely narrow, even utilitarian, to wide-open exploration of general goals. For the most part SRI researchers have sought the freedom to practice as their vision dictates, even to advance a new science or technology. Viewed in terms of a time horizon for realization, the best available compromise between complete freedom and specified detail is perhaps those projects whose impacts lay 5-10 years out. As mentioned, government research agencies and foundations often allow the greatest leeway, and commercial companies allow the least. The great goal of work in the sciences and technologies has been to have the freedom to invent or contribute to a totally new conceptual area like, for example, computer networking in the 1960s and 1970s. With such freedom, researchers know their work will be original, it is just a question of its eventual impact.

While a nonprofit institution, SRI still requires a source of net income that it can use to provide capital resources, hire new people, and make other investments in its future. At SRI that income is called the "contract fee," which is a line item on all contracts.[2] The fee is a small percentage of all other contract costs, including

[2] Exceptions are government or foundation grants, which have no fee and often require a reduced overhead rate.

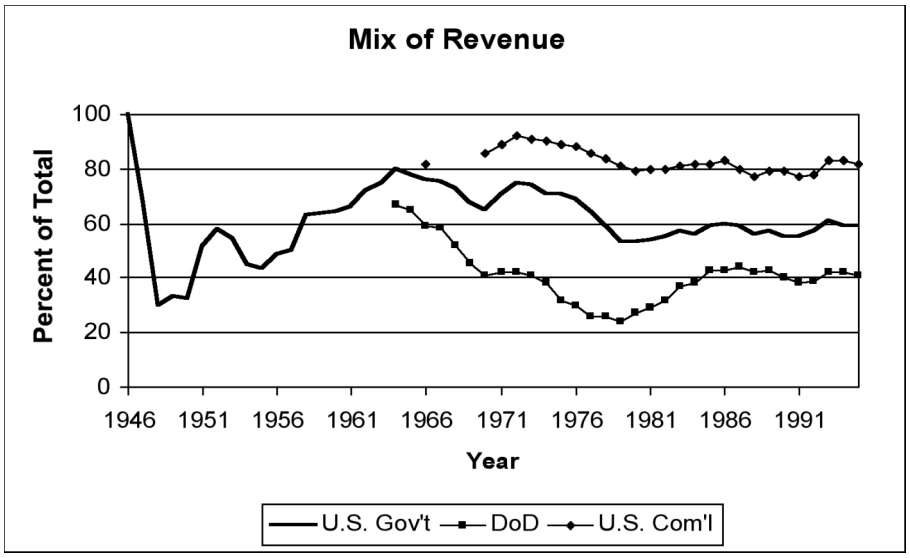


**Figure D-3. SRI's revenue mix history. (Until about 1964, SRI distinguished only between government and commercial work. Since that time, each sector has been further divided and the above divisions from bottom to top are, respectively, U.S. government DoD, U.S. government non-DoD, commercial domestic, and commercial international.)**

direct charges such as those for labor and materials and allowed overhead or indirect charges. In a full cost recovery scenario, where all direct and indirect charges are expended exactly as allocated, fee is the same as profit.

Before leaving this snapshot of SRI's initial business model, a word about its early culture and research staff is necessary. Much of early SRI was patterned after a university research environment; that is, it grew to be roughly discipline-centered. That it wound up this way was perhaps inevitable since the popularity of applications tends to come and go. Though new disciplines also arise, they do so more slowly. Real world projects, on the other hand, are often client-centered and multidisciplinary; yet they require individual disciplines to provide competent insights and innovative solutions. For most of its existence, SRI has attracted the kind of staff that wanted to expand an area of knowledge and, clearly, innovation becomes more limited when its roots are yesterday's knowledge.

Accordingly, SRI has always "enjoyed" a natural tension: extending knowledge about the most important scientific and technological concepts of the day, and applying that knowledge to solve specific problems. SRI's technical side has always wrestled with this dual need, and discipline-centered research has often proved the path of least resistance. Even in new fields (e.g., artificial intelligence), disciplinary barriers can be quickly erected.

## The U.S. Research Marketplace

In the United States research is funded in just three ways, one commercial and two by the government. Commercially sponsored industrial research accounts for by far the largest piece of the research pie, but industry conducts that type of research almost entirely in-house.[3] Moreover, the research is mostly of a short-term nature, directed at products a couple of years out or less. A few exceptions to this rule exist, such as Bell Labs, IBM, and Du Pont, but increasingly even they must respond to Wall Street's dictate that their parent companies show quarter-by-quarter profits. If a contract research place like SRI is already engaged in a particular technology, it can almost certainly conduct research in that area cheaper than a company's in-house laboratory's cost to enter it. But the business world's perception seems to be to the contrary. Underestimating the cost of internal research and the belief that an outside research firm cannot protect intellectual property are two frequent industry misconceptions.

Almost all long-term U.S. research has its origins in the federal government, as typified by NSF and the National Institutes of Health (NIH). With the disappearance of basic research in commercial laboratories, the funding these agencies, and others like them, provide is perhaps the most unfettered research money available. Unfortunately for places like SRI, such

[3] According to the National Science Foundation (NSF), in 1998 industry supplied about $150 billion or 66% of all U.S. R&D. A staggering 98% of that was used by industry itself, and 70% of that was used for the development of products and services rather than research. Industry performed 74.4% of all R&D, universities 11.6%, government 7.6%, and nonprofits like SRI 2.6% (from an NSF report at www.nsf.gov/sbe/srs/seind00/access/toc.htm)

funding is often reserved for universities whose overhead structure is lower as a result of being shared with the universities' nonresearch activities. SRI thus finds it difficult to compete in basic research, and over the years the fraction of its total revenue received from such agencies has almost certainly been less than 10%.

The third major source of research money is the Department of Defense (DoD) and, to a lesser extent, a few other Cabinet departments and NASA.[4] DoD offices, in particular the Defense Advanced Research Projects Agency (DARPA), offer some of the few sources of funding with enough continuity for research to proceed until a logical conclusion is reached. The programs they fund may determine several things: that a particular goal is unattainable or has no further application, that it can be transitioned to a military service for implementation, or that it can be transitioned to a commercial setting. For example, DARPA, with modest supplementary research funding from each of the Armed Services, has been important in advancing information technology in the United States. Even for DARPA, however, adaptation is necessary as the importance of certain technologies fluctuates vis-à-vis DoD missions.

## Marketplace Adaptation

SRI, like any other public or private contract research organization, must adapt to the marketplace it finds. Adaptation at SRI usually follows two lines: tracking the steady advance of science or technology and sensing those problems that can be solved through the application of new technology or technology-enabled concepts. SRI's early days were characterized by a relatively noncompetitive contract research environment. While SRI was maturing, university-related, in-government, and even commercial-based research entities were also growing and presenting new competition. But it was literally an act of Congress that posed a new kind of competitive challenge for SRI. Prior to the 1980s, almost 80% of SRI's contracts had been secured noncompetitively; that is, based on sole-source proposals. In 1984 Congress passed the U.S. Competition in Contracting Act (CICA) and in the space of about 3 years 80% of SRI contracts, at least in the Engineering Group, had to be won competitively—a complete reversal. That adaptation, which was forced by both law and competition, drove the cost of doing business significantly higher.[5]

Because winning contracts and thus revenue generation at SRI traditionally took place in the first two levels of the organization, it is there that virtually all meaningful adaptation occurred. Having 1,000 flexible, adaptable project leaders plying the waters of perhaps a 1,000 clients to explore mutual needs, proved an effective way to monitor and match market need. The only additional factor required was making sure that SRI's ideas and techniques were both relevant to clients and directed toward the future. If they were not, natural selection took place, and SRI management was obliged to prune the structure so that better opportunities ahead could be pursued. The present SRI management's marketing mantra seeks to assure prospective clients that whatever SRI undertakes, the result will create definable value for them in the future.

## Fiscal Realities and Adaptation of Another Kind

The awarding of research contracts is fundamental to SRI's existence but that's not the only factor required for successful operation. Like any business, expenses must be controlled and there must be enough contract revenue to cover those expenses deemed essential. [6] Meeting this need has not always been easy and as a consequence the profitability, that is, the money needed for reinvestment, has often been problematic.

While some areas of research have remained "profitable" for many years in this nonprofit setting, many have not. The reasons for this unevenness range from the specific type of

[4] As a recent indication of the composition of government R&D, the 2003 allocation had the following breakdown: NIH $26.2 billion, NSF $5.3 billion, Department of Energy $8.2 billion, DoD $58.6 billion, and NASA $11.0 billion, out of a $117 billion total. The proposed 2004 R&D budget is about $123 billion with 51% to DoD and 22% to the NIH.

[5] The CICA as written by Congress was intended to avoid both research funding and nonprofits. However, both of those stipulations were effectively ignored in its application by funding agencies. (*Inside SRI*, Vol. 1, No. 2, June 1986.)

[6] Note that research institutions are not necessarily created to make money. Like all organizations, however, they must have enough discretionary resources to secure and expand their future position.

research, funding for which may go in or out of fashion; the type and quality of staff and their ability to convince clients that their ideas are worth supporting; and the clients themselves. More than half of SRI's funding comes from the U.S. government, and the government's regulation of the overhead and fees of its research contracts and grants govern SRI's profitability in that sector. Add to that limitation the cost of increased competition in the government sector forced by CICA and the result is that SRI's original business model has incurred a certain stress.

In addition to increased competition nationally, strictly local difficulties have affected SRI. The Institute's location on the San Francisco peninsula—one of the most competitive places for workers in certain fields and one of the most expensive areas to live anywhere—can significantly impede SRI's ability to attract staff to its main offices in Menlo Park. A second local factor has been the vast amount of venture capital available in the immediate region of Silicon Valley. That funding availability has lured many out of research and into the area's abundant start-ups, reaching its peak in the late 1990s. With those local stress factors in mind, SRI has, of necessity, taken on some of the traits that characterize the local business environment. Two very important factors will now be discussed that go a long way in defining a long-term SRI model for an activity we will call commercialization.

By the early 1980s, SRI began to reorient itself so that a greater portion of its income came from the licensing of intellectual property, including the creation of equity. Indeed, seeking a highly leveraged financial position by providing or participating in the seed round funding of a new company is tempting. But even seed round funding of numerous potential start-ups is expensive for a marginally profitable Institute. To the extent that such investments significantly erode the funding of new research opportunities or contribute to the overall overhead structure, they hamper SRI's ability to compete in its core business from which commercialization opportunities arise. Venture capital organizations, on the other hand, have few such distractions and can reduce their overhead nearly to zero if need be. This difference suggests a natural partnership: one with substantial money and a tolerance for risk and the other with little discretionary money and an opportunity engine. The research institution produces the technology or other opportunity, and the investor community commercializes it—each capitalizing on its own strength.[7]

While easily forgotten, SRI's nonprofit status and charter require its work to remain in the public interest. It is this status, however, that enables SRI to enjoy an excellent position from which to create and use government-sponsored intellectual property. The 1984 federal Bayh-Dole Act, mentioned in Appendix B, stipulates that nonprofit organizations, typically universities, can take intellectual properties generated under government research contracts and commercialize them. This legislation came about as part of a government desire to stimulate the economy and has resulted in two important advantages for SRI. Research sponsored by the U.S. government gives individual researchers great latitude in seeking innovations and, once SRI has created a set of marketable intellectual property, it is free to commercialize it as it chooses (even overseas partnerships are allowed if, wherever economically feasible, manufacture is done domestically). Simply put, the model consists of conducting a lot of research and technology development under government contract and then gleaning from that work innovations that have an attractive commercial market.

While this type of commercialization is obviously desirable, not all research can lead to intellectual property positions that are of commercial interest. When President Miller first proposed this kind of initiatives around 1980, there were some who thought rewards to inventors might become a divisive problem. The increased emphasis on research for commercialization in the mid- to late-1990s again raised the question of fairness. Two things transpired to allay those concerns. One specified that substantial income from intellectual property would be directed toward needed capital investments in *any* research area and to the staff in general. Second was the fact

[7] The early dispositions in the history of SRI were not aligned with holding patents. From a Stanford Ph.D. thesis that examined the Institute in 1951 comes the following: "Stanford Research Institute does not desire to develop and hold its own patents. It prefers to have patentable discoveries made under sponsored contracts. One of the Assistant Directors explained this policy with the observation, 'A patent is just a license for a court fight.'" (Ernest Barbour O'Byrne, *The Research Institutes of Stanford University*, Ph.D. dissertation in the School of Education, Stanford University, SRI partial reprint dated June 1951.)

that not many such opportunities came to fruition anyway. But the commercialization process still carries important potential for the Institute and it is continuing to be explored. We will now back up and add a bit of detail to a number of important events that had a downstream effect on that subject.

## SRI's Move Toward Commercialization of Its Intellectual Properties

Particularly in the context of today's IPO-frenzied world, it is odd that for most of its 50-plus years SRI did not use its patent positions wisely. For most of that period, SRI's Patent Office was lightly staffed, and its chief function was to secure patent positions that could be offered to potential clients as an incentive for new research contracts. Licensing was minimal and had few impacts, and though SRI was in the midst of the world's premier venture capital marketplace, those people stayed away in droves.

There were several reasons for this: one was the perceived fuzziness about the ownership of rights for work done for the government before passage of the Bayh-Dole Act; a second was that good, innovative research was too far in advance of the commercial marketplace. A notable example of the latter was that licenses to the mouse issued in the late 1970s and early 1980s yielded SRI less than $150,000. The mouse's value became apparent only in the declining years of its patent protection, which ran from 1970 to 1987.[8]

This somewhat intermittent approach to dealing with intellectual property commercialization started to change with the arrival of President Miller in summer 1979. Having venture capital experience, Miller was attuned to the potential of this kind of investment. So, Miller took several steps to place SRI in a better position to profit from its accrued intellectual properties. He set up an SRI holding company, revisited the Institute's plan for sharing royalty with its staff, set up a commercialization office reporting to him, and signed an agreement with a new venture capital firm that gave them first right of refusal on all SRI-owned innovation.[9] He completed these important steps by 1982, but having done so did not see commercialization as being a huge preoccupation for SRI, estimating its revenue at something like 5% of the total.[A]

To give a flavor of the kind of action that followed Miller's initiative, consider the 1984 review given a popular field at the time, artificial intelligence (AI). The exploration began with an examination of SRI's inventory of AI innovations. Targets were identified and a report issued but in spite of that prominent and directed examination, no commercialization action was taken. Curiously, in the same laboratory at the same time, two software engineers were building software packages as part of their computer support activities. These were not AI implementations at all but either because these programs lay outside the AI-centered products they were seeking or because one of the programs was already under license, they were not considered by the task force.

One program was called EUNICE, which SRI had licensed in 1982. EUNICE enabled programs written for the increasingly widely used UNIX operating system to run on the also popular VAX computer from DEC that came with an incompatible operating system, VMS. The second SRI program, MultiNet, mated UNIX with the variety of local and wide-area networking protocols that were emerging at the time. These proved to be lucrative arrangements for SRI, netting several million dollars in the late 1980s and early 1990s. Some of that return came to SRI as gifts after their inventor, Dave Kashtan, and his AIC cohort left SRI to form a new and successful company called TGV.[10]

Note the contrast between the top-down exploration of a selected, seemingly attractive technology that didn't materialize versus a natural, unprompted flow of a needed, royalty-producing product that did—all from the same laboratory at about the same time.

Another SRI staff member, Phil Green, an inventor in ultrasonic imaging, was more adamant than anyone about the advantages of commercialization, both for the Institute and for himself. In the 1980s, he began investigating companies that were infringing on his SRI-owned ultrasound patents. Perhaps

[8] A critical factor of timing for the mouse was the Macintosh, which was introduced in 1984.

[9] For more details on these actions, see Appendix B.

[10] TGV stood for "two guys and a Vax" and became a small successful start-up; successful enough to present royalties and substantial financial gifts to SRI. TGV was eventually bought by Cisco Systems.

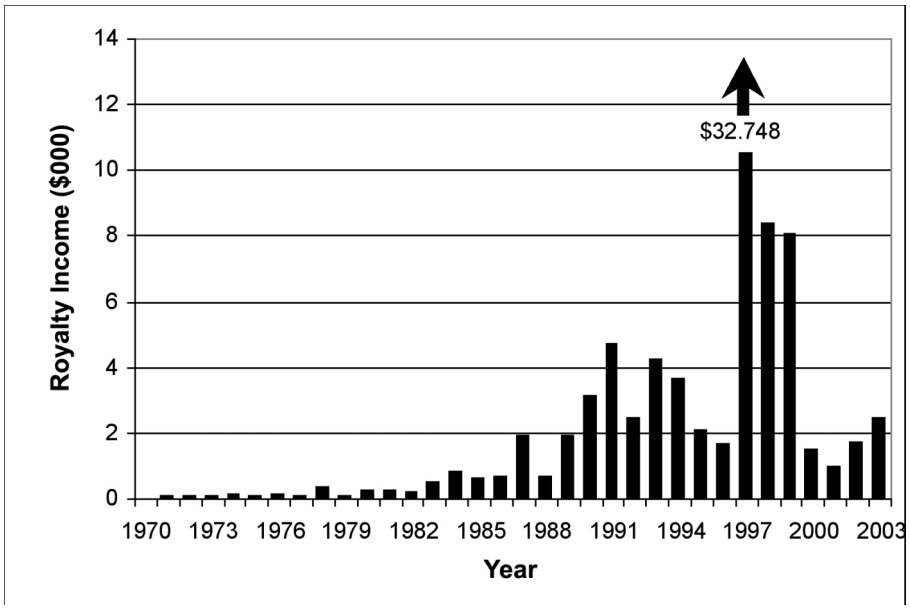


**Figure D-4. SRI income from royalties. (Values are after inventors' shares are subtracted. Also not included are the sales of shares SRI accrued from the transfer of intellectual property.)**

surprisingly, many "infringers," as he called them, having received a straightforward notification and request for royalty payments, simply responded with periodic checks over the remaining life of the patents. Two firms that didn't cooperate were sued by SRI and ultimately saw a conviction with willful avoidance. All together these ultrasound infringement pursuits returned well over $50 million to SRI. Figure D-4, which shows SRI's royalty income history, net of inventor's share, clearly reflects the change in emphasis in this area and the ultrasound settlement forms the large promontory.

In the meantime, Miller's exclusive commercialization arrangement with the venture capital firm, CommTech International, was not succeeding as hoped. While it had placed some technologies in the market, far more failed or were left hanging.[11] If it was simply a measure of just how difficult and problematic such equity-building initiatives are, it was not welcome news to those at SRI whose technology was under prolonged scrutiny. Under the exclusive agreement, SRI lost all flexibility in exploiting technologies, as well as much of the incentive to do so internally. Whether SRI would have faired better by having retained control and having focused more interest on this issue is not clear, but under the existing arrangement, delays and failed promotions were the norm. I remember, in one case, meetings and arguments went on for years with one failed opportunity after another while other places were exploiting exactly the same technology. To most SRI inventors and managers, the agreement was simply a source of frustration.

A couple of other important risks will round out this discussion of commercialization at SRI and they have to do with its proper balance with research. First, research tailored to commercial products or services entails, by nature, a much shorter lead-time than does more fundamental work, including work that defines the state of an art. If SRI devoted all of its discretionary resources to research with time horizons in the 1- to 2-year time frame, it would almost certainly forego research that resulted in the fundamental advances that sometimes change the world (as did SRI's visionary efforts on personal computing in the mid-1960s and on digital networking in the 1970s). SRI should reserve some resources for visionaries who can see beyond the incremental changes on which the commercial marketplace thrives. Enabling such long-term vision is, after all, part of the original motivation for commercialization building an endowment big enough to grant that kind of freedom.

Another risk is the impact on laboratories that discover an important technology that is subsequently commercialized. Exclusive licensing agreements concerning such intellectual property can curtail or even deny future research contracts in that area for such a laboratory, as well as result in the loss of key

[11] A couple of examples that have had some success are the licensing of SRI printing technology to Accuprint and a very long-chain polymer to Dow Chemical. In the latter case, after some delay, CommTech made the original licensing agreement with Dow and when Dow didn't want to complete the investment needed to produce it, CommTech found a sublicensee who would. That firm is Toyobo who is manufacturing and selling it and trying to expand its use into the large bullet-protective vest market. SRI receives some royalty income from Toyobo. (Source: conversation with Bonnar Cox on May 20, 2004. Cox headed the SRI commercialization effort in the early 1990s.)

people. Some staff members will inevitably leave SRI to join the licensee, but those who remain should not be so encumbered in using the intellectual property that has been sold, that the parent laboratory becomes effectively dysfunctional. That did happen and through the efforts of SRI's current president, Curt Carlson, guidelines are now in place to prevent this win-lose situation, wherein once the golden egg has been sold, the goose that laid it is shot.

Finally, there is the question of balance following this excursion towards commercialization. SRI's core business is unequivocally contract research. That work will be closely examined for commercialization opportunities and perhaps even shaded at times to enhance such opportunities. But research not related to commercialization will also enjoy all the respect it deserves. That balance seems to be now present at SRI.

## The Changing Nature of Research in the United States

For perhaps a decade or two, the U.S. government has taken initiatives to spur the national economy. The government has invested in precommercialization technologies, carried out by places like SRI and, in the case of the Department of Commerce, by small start-up companies. But research conducted by U.S. industry appears to be headed in a different direction.

Corporate America is in a quandary regarding the role of research in its future. Because of today's relentless pressure for high market value and profitability, corporate research facilities are being given stringent tests for relevance. Are their expenses justified by their contributions to the product innovations the company needs in order to increase its valuation or to capture or maintain market share? Corporate officers are questioning such utility, even to the point of divesting some of the best-known U.S. research laboratories. The trend seems to be away from long-term research with its vague goals, toward short-term research that directly serves product development. Some companies want to end internal basic research and argue that industrial research is at the end of an era.[B] Targeted are such venerated research operations as Bell Labs, Xerox PARC (now an independent research center), GE's Schenectady Lab, and others.[12]

The reasons for this change vary, to be sure, but a major one is that the ever-shortening pace of product introduction has undercut the more leisurely pace that has typified the traditional research laboratory. Open-ended research projects with outcomes that are difficult to determine are now seen as an unaffordable luxury, no longer worth the low probability of a market-altering breakthrough. Another important reason can be the financial health of the parent company. In the case of Xerox, the biggest reason for scrutiny was that the parent company is threatened by bankruptcy.

But we should also recall that industrial-sector R&D funding in the U.S. continues to increase both in absolute dollars and as a fraction of GDP, possibly as a result of greater acceleration of the product development cycle. Regardless, to the extent that long-term research continues, carefully selected outsourcing will be good for universities or places like SRI that provide steeper and thus more efficient learning curves.

In the meantime federal government actions continue the tendency started during the early 1990s. In the DoD, the narrowing of research horizons is perhaps best evidenced by one of its largest research sponsors, the Defense Advanced Research Projects Agency. There, emphasis has shifted to Advanced Technology Demonstrations, which are geared toward bringing technology to bear on important military problems rather than inventing new technologies, an area in which DARPA had excelled. By the same token, the Department of Commerce makes R&D allocations under the Advanced Technology Program to foster partnerships among government, industry, and academia for pursuing high-risk research intended to have significant commercial payoff. This program allows industry to extend its technological reach to promote new commercial products and conceivably even new companies.

[12] At Sarnoff's tenth anniversary, GE Chairman Jack Welch stated that, "GE R&D is…in the critical path of every major technology intensive program in each of our businesses. And every technical contributor in our laboratory is working on a project that is vital to a current business plan…. The undiverted focus must be on winning in the marketplace." (April 3, 1997)

## How Will these Changes Affect SRI and Its Brand of Research?

The industrial world's shortening of its research horizons and greater emphasis on internally funded, rapid-paced product development, has several messages for SRI. If industry still wants to fund some level of long-term industrial research, the resulting outsourcing will provide potential benefit to SRI, particularly if SRI is already engaged in the appropriate field. Using SRI would often be cheaper for the industrial client than internally developing the skills needed. Moreover, SRI can bring to such projects its own intellectual property for exploitation. But if companies continue to cloister their short-term R&D projects internally, SRI will obviously be denied that particular market. And to the extent that corporations also abandon their longer-horizon research, SRI must look to the government.

On the face of it, contracting with an outside research institute ought to be an obvious choice for a company when it has little or no background or capacity concerning what it wishes to explore. Unlike university grants in such cases, which do not yield rapid results and for which preserving confidentiality is difficult, contract research houses such as SRI are skilled in meeting both requirements. Costs are also much more easily controlled with outside contractors as long as the sponsoring company is closely involved. Finally, a broadly based contract research organization has greater ability to employ a new technology, or especially technologies in combination, than does a typical, more narrowly focused company.

## Endnotes

[A] *SRI Journal*, Vol. 5, No. 2, April 1985.

[B] Gordon Moore, "Some Perspectives on Research in the Semiconductor Industry," in Richard Rosenbloom and William Spencer (Eds.), *Engines of Innovation: Industrial Research at the End of an Era*, Harvard Business School Press, 1996.