CEO's View of Licensing

Standard Oil Chairman offers insight into decision making, urges cooperation with LDCs

BY ROBERT B. HORTON*

I'd like to start off by wishing happy birthday to Erasmus, which is a nice way to begin a speech to you sophisticated licensing executives. Accounts vary, but Erasmus was born either yesterday or today, most probably in the year 1466. Let me tell you why I'd like to wish Erasmus happy birthday.

He is renowned as one of history's great champions of the spread of knowledge across national borders. I hasten to add that Erasmus also provides us a handy cautionary lesson, since probably his best known work is entitled *In Praise of Folly.*

You have handed me as my subject "The Impact of Technology on Corporate Strategy," and I am pleased to talk to you about that, particularly since I am sure you all fully recognize this impact as a two-way street. Technology change bends corporate strategy, true. And corporate strategy also bends the utilization and diffusion of technology.

But I think it is also important for me to talk about the link between technology change and corporate strategy in the context of your overall convention theme this year. I'm particularly delighted to keynote your convention because of your stated theme: "Effective Licensing — Improving the Bottom Line."

Larry Evans has taught me how good LES is at sharing specific training, the how-to craft of your licensing art. In your meeting theme this year, however, you move on from how-to to consider the "why." To make a profit, of course. To improve the bottom line. And by focusing on the bottom line, perhaps you may find use for some observations from a chief executive officer.

Let me get to work.

My theme is really your theme. Technology transfer must improve the provider's bottom line. The most important axiom of your business has always been and must always be that we license technology to others, rather than hoard it, in order to profit by the transaction. Otherwise, don't do it.

We may have all sorts of driving compulsions to be on the side of the angels. We may want to improve the lot of mankind, to help the less developed nations grow, and generally to increase the well-being of the world. But companies are not welfare agencies. We are not philanthropic institutions. Being customer oriented is not being altruistic.

This is not to say that a company's actions won't produce many wonderful results for others. We are all perfectly aware of Adam Smith's famed Invisible Hand. As he said himself in *The Theory of Moral Sentiments:* "The rich are led by an invisible hand to make nearly the same distribution of the necessaries of life which would have been made had the earth been divided into equal proportions among all its inhabitants, and thus without intending it, without knowing it, advance the interests of society, and afford means to the multiplication of the species."

Milton Friedman couldn't have said it better!

I, on the other hand, am merely saying that strategic decisions and tactical projects, including projects to transfer technology, are not decided upon because of those wonderful external results. They are generally driven by the desire to make money. We forget this at our peril. And the world forgets it at its peril, too.

To launch our discussion, perhaps we can agree on a few basic challenges which face the Chief Executive Officer.

- First is the challenge of getting started. Every new invention, every new snippet of incremental improvement, brings a company's top management a new choice: Do we make and market this thing ourselves? Or license it to others? Or do we do both?

The world is different today from yesterday, and will change tomorrow from what it is today. But that basic question does not change. The answers that each company makes will vary with the circumstances. But the answer must improve the seller's bottom line.

A similar challenge also occurs from the buyer's point of view. Perceiving a need for something brings the question: "Do we buy it or invent it ourselves?" Again, each time the choice comes up, specific facts determine the answer. But we choose whatever offers us the better odds of making money. So potential buyers who ignore a seller's primary motivation can make wrong decisions and hurt themselves.

- The second challenger that CEOs face is one of unfamiliarity. CEOs are not likely to be deeply involved in too many specific projects. But on the other hand, signoff on transferring a particular proprietary technology will be made by CEOs who are juggling risks and opportunities quite beyond those of the executive shepherding the technology itself.

So, to serve your own CEO properly it is important for you to become familiar with the widest possible picture of the fortunes and strategies of your company and how each of your projects might fit.

Chairman and Chief Executive Officer, The Standard Oil Company, Cleveland, Ohio; keynote address at LES U.S.A./Canada Annual Meeting, October 1986.

• The third challenge for the CEO involves the complexity factor. Since technology transfer involves processes as well as products — the way something is made as well as the thing itself — the decision to transfer a process also raises complex issues. This can lead to more difficult decision making on the part of the CEO. I am particularly aware of this challenge because of my background in the petroleum and chemical industries.

• The CEO's fourth challenge has to do with time. The process industries like oil and petrochemicals are long lead-time industries. From the moment a concept flashes into someone's mind to the first experiements, to the lab bench testing of the concept, to the pilot plant, to a semi-commercial application, to a world-scale production plant is often a 10-year saga, or even longer. Moreover, the cost of this saga rises geometrically with each step. This again increases the complexity of decision making for both the technology buyer and seller.

Luckily, the products and processes devised in the petrochemical world have had long shelf lives. So successful innovation historically is rewarded for a long time. But aren't we beginning to see a shortening effect even in that industry? And of course the question of legitimacy of ownership is, to put it mildly, rather messy in some parts of the world.

• The fifth challenge faced these days is a kaleidoscope of changing fundamentals. Manufacturing has gone global, and so have services. Typical product life has shortened drastically, and specialties rapidly evolve into commodities. Swift diffusion of knowledge brings on new competition. Financial and monetary systems are in a state of dynamic change. And we can now hope that this planet may actually grow enough food to support its population indefinitely. (I add this point because it may well cause vast changes in economic relationships.)

And since we're in the midst of the most dramatic shifts and ferment right now, we mustn't forget Peter Drucker's fundamental definition of management as "coping with change."

Effects of Change

That, then, completes my list of challenges as a basis for our discussion. Now I can move on to the effects of changing technology on corporate strategy and vice versa. How do you select the technical route your company will follow in a particular instance?

The problem of weaving technology into the strategic direction of a company is twofold:

One — How much time, energy and money can we invest in new products and processes? (What size punt do you want to put on the young filly?)

And Two — How much can we devote to developing existing products and processes? (What sort of punt do you place on the tried and true, but maybe slightly aging, mare?)

The elaborate panoply of decision-making analysis with which we have chosen to surround ourselves (and this is a business in its own right) still has gaping holes. Discounted cash flow analysis is no substitute for strategy. Substituting DCF charts for brains and (dare I say?) intuition is a fool's game.

Alas, we do not live in a deterministic world, but a stochastic one. The road to heaven is not, as our Victorian forebears imagined, predictable if we only follow a known set of rules. In corporations, that has too often proved the primrose path to the everlasting bonfire. We cannot always rely on what we see as cause and effect. The world is more agnostic than Presbyterian.

Our mistake may be a mechanistic one. It's not that you can't predict, but that no one has yet found a satisfactory way to calibrate forecasts. And because risk and reward are different over different time periods, the problem is doubly complicated.

It is fashionable to sneer at economists for failing to predict next quarter's Gross National Product or inflation rate. I thing economists do as well with the long-range picture as any of the fancy prognosticators from other disciplines. They all do badly!

I'll never forget the time a friend showed me the prepublication galleys of the Club of Rome's *Limits to Growth.* My reaction then is everybody's reaction now. Malthus should have stayed in his grave.

My point is that when we start analyzing any complex situation with a view to making decisions, we must keep firmly in mind how much we resemble the blind men and the elephant. We cannot see the whole beast. So our description of things is bound to be flawed. But lack of total knowledge is no reason for despair.

Strategy is not a game of cranking things into a computer. Strategy is about vision, about feel, about putting down your bet because you believe a particular horse will be successful.

It was Harvard, I believe, which once ran a study using perhaps 20 successful CEOs (successful because their companies measured up sufficiently in profits over time). The CEOs were tested against 20 guys off the street on their ability to predict the turn of a card, or whether a flipped coin would come up heads or tails. The CEOs beat the pants off the other people — statistically maybe three standard deviations better at the game. I don't know if this means successful CEOs have better intuitive powers or were just more fortunate. But you may remember that when Napoleon was asked what quality he most required in his generals, he replied: "Luck!"

The important thing is that successful decision makers wade right through the analyses, discarding what their instincts tell them is inappropriate, and place their bets because some mental cash register in their skulls rings up a sign saying: "This one's a winner!"

Intuition Factor

The underlying reason for my little story is this intuition factor you technology transfer executives can count on in your successful CEOs. And it may just be that we've seen the show round three times and got the plot into our thick heads! — (which we then dignify as "wisdom").

Now let me offer a few ideas you might find useful in your work. Of course I will speak primarily from my own experience over many years in the petroleum business. I'll separate this part of my discussion into three elements.

— First, the situations management faces in adequately analyzing the decision to develop technology.

— Second, the situations faced when analyzing the decision to license technology to others or not.

— And third, the question of financing those decisions.

So how do we begin?

One of the dangers in the corporate world is the very short-term nature of most decisions. Circumstances force us to cut and rationalize. We've got to be able to justify current expenditures plausibly to our masters and the inevitable second-guessers on Wall Street and in government.

In my industry, even if you believe, as I do, in several years of pretty gloomy news, we do also look at the near certainty of high real price levels for petroleum sometime in the next 10 to 15 years and probably beyond. And when prices have risen sufficiently, the world will need heavy oil and natural gas and maybe coal conversion. We'll be falling back on the frontiers, remote gas, tar sands and looking to squeeze out every possible drop of petroleum by enhanced recovery techniques. That will happen, and so it behooves us to keep some research going in preparation for that time.

But that's a long time off, and DCF tells you the present value of future earnings is zip — even if you are allowed to hold onto the profits when the time comes. So there are occasions when the CEO is torn between doing what he knows is right in the long run, and temporizing over the short term.

We have now had more than a decade of the management philosophy called the "Market Share — Ride the Experience Curve" school, with its penchant for incremental improvements of existing products and processes, primarily measured in lowered costs. Clearly, it works well in the fairly short term. But merely improving an existing process often leads to economic disaster over the long run, particularly when it has been practiced by an exponent of the "Economies of Scale" school.

Behemoths

The intuitive CEO is beginning to feel that it is the market share behemoth of which he should be careful in the future. Most leapfrog technologies are crushed by the behemoths of this world. But don't tell that to the canal builders who laughed at the railroad. Or the railroad barons who scoffed at the automobile and airplane. Or the whaling industry, for that matter. So the intuitive CEO feels a responsive kinship to the technology executive who shows him something brash and new. Your job is to help him survive while developing it.

Let me share a specific example of technology development: Producing acetic acid from naptha oxidation. At one point in my career I ran BP chemicals, so I became quite familiar with the history of naptha. Back when BP chemicals' predecessor, the Distillers Company, started playing with the idea, the value of naptha was very low. (As a young man, I was responsible for actually pumping it back down the hole in Kuwait.)

But there is often a wonderful serendipity at work. (Do you recall the nice definition of "serendipity"? It's looking for a needle in a haystack — and finding the farmer's daughter.)

Oxidizing acetic acid out of naptha was terribly inefficient. But this very inefficiency gave the researchers their angle. At high temperatures and pressures, oxidizing naptha could give you acetic acid and carbon dioxide. And the "inefficiency" was heat — and you could capture that heat in steam and electricity.

Since the prime use for naptha was as fuel for generating electricity, the acetic acid byproduct could be almost free. Of course this ignores the tiny little problem of finding materials for your plant that could stand up to the heat and corrosion you got in the process. So besides straying into metallurgy, the next step was to figure some way to make a little money from those additional byproduct chemicals. And we discovered that propionic and formic acids had marketable uses in grain and grassland preservation.

Originally, no one thought this technology would have much longevity. But somehow it has survived. The Monsanto process has overtaken it, but perhaps you've seen that BP and Monsanto have recently agreed for BP to do the licensing of the Monsanto process, as well.

Back when I was running BP Chemicals, one of our more interesting accomplishments was the invention of an attractive process for producing linear low density polyethylene. The great world technology for linear low was Union Carbide's "Unipol" — and a magnificent achievement it was, too. That may be the greatest licensing program of all time.

As newcomer, BP's competitive strategy was to emphasize not the low cost of the resulting product, but its particular utility for sophisticated users by introducing quality specific co-monomers. Product quality and differentiation.

Decision-Making Process

Now let's zero in on the decision-making process in licensing to others. Again, the decision to license may have come from DCF analysis telling the CEO that it is better to get quick dollars than future millions. The really good top-level decision on technology development and transfer — from both the buyer's and seller's viewpoint — is one which maximizes long-term results while minimizing short-term risks. (And of course that's a quest for the Holy Grail.)

Quite aside from the victories one wins through careful planning, the farmer's daughter often helps immensely when you least expect her to. This is my cue for another example out of history.

Back in the 1940s, phenol was used primarily for low-quality formaldehyde resins, so the pressure was on to reduce the processing costs. One laboratory method of studying the oxidation of hydrocarbons seemed a likely candidate to cross the threshold into the real world. So Distillers Company developed the process to produce low-cost phenol on a big-plant basis. At the same time, people at Hercules were doing exactly the same thing.

Each company developed strong patent positions and girded itself for a fight to the death. Then sanity prevailed and they forged a cross-licensing agreement. And the new supply of cheap, very pure phenol stimulated the growth of bis-phenol-A for epoxy resins and also the "Nylon 6" caprolactam technology based on phenol. The result has been very long-lived — with both companies profiting handsomely from licensing phenol technology over the past 33 years. It's an example of a very successful strategy.

In today's world, we live in a global economy, and since international licensing is the bread and water (or just maybe a bit of wine) of your careers, I should like to say a few words from the CEO's perspective about those times when the licensing project crosses national borders.

Buyers of technology today are often governments. Mere companies cannot always defend their interests effectively against sovereignty. So our only recourse is to take our marbles and go home, avoiding nations that take advantage of us. This fact imposes a stern restraint on nations in their dealings with companies. How buying nations treat selling corporations may hold the key to the success or failure of technology transfer.

How can the CEO be confident of fair and rapid technology transfer actions across national boundaries, while conducting proper stewardship of the bottom line? Things like the last Third World attempt to revise the Paris Convention don't help. Shortening the patent life and forcing the company with the technology to build a plant quickly in a country or run the risk of forfeiture of patents or having them actually used against you — these are clearly counterproductive.

The misguided credo that intellectual property is the common heritage of mankind assaults the basic morality of good business. What I have invented I own. I certainly don't mean this as a threat, but I am simply not going to license a process or build a plant in a country which turns around and steals my technology.

And the nonchalant acceptance of counterfeiting can also do great harm to the nation that pirates. From my end of the telescope, counterfeiting is theft.

The biggest problem of counterfeiting is not just lost sales, but product liability. I could mention impure or harmful pharmaceuticals and agricultural chemicals that kill people and crops; or badly made heavy equipment, and even defense weapons, which fail because they are assembled from inadequate materials; or computer software, and even chips, with critical omissions that wind up destroying vital data.

It is not merely the loss of sales (although I can sympathize with the Levi Strauss people). Counterfeiting is evil because it maims the value of the original product; because bogus products can harm or kill and destroy the rest of the world's confidence in the real product. Gresham's Law applies to far more than bad money driving out good.

Corporate Finance

How the recipient nation protects intellectual property rights and values is an inseparable part of the decision-making analysis. This brings me to my third aspect of decision making: The rapidly changing world of corporate finance, including that used in technology transfer.

Finding the funds to pay for technology development and commercialization forces strategic decisions on many companies. Let me share one final piece of history to make my point (and give you one last demonstration of my ability to pronounce chemical terms).

Standard Oil's most outstanding technological success story is the famous fluidized bed acrylonitrile process. In the mid-1950s, Standard Oil launched research into upgrading light refinery gases such as propane and propylene into large-volume petrochemicals. Standard Oil chemists decided on trying to create a fluidized bed process to regenerate a metallic oxidant. *Which* metallic oxidant was the problem.

They set out like Thomas Edison with his effort to find a lightbulb filament. It was trial and error, again and again. Finally, they came up with the one-step, recyclable, high-yield process of turning propylene into acrylonitrile. And now comes the important part of the story.

Acrylonitrile was dominated by three chemical giants: Monsanto, American Cyanamid and duPont. Standard Oil assumed incredible risks in deciding to commercialize the process. No sooner had we announced our new process than American Cyanamid announced, perhaps to discourage Standard Oil, a new 100 million pounds-per-year plant based on the old technology. Then all three giants cut their prices by 50%! Of course the higher price had been the basis for Standard Oil's decision to proceed with its new process.

Money was very short in Standard Oil in those days. The company didn't have the capital to keep acrylonitrile to itself. So the big financing decision was a given, and we pursued a vigorous campaign to license the new technology. And would you like to know the wonderful thing?

At the giants' cheap price, only the Standard Oil process was profitable! So it wasn't too long before American Cyanamid, Monsanto and duPont paid Standard Oil for licenses. Sorry about that, fellows! And bless the farmer's daughter!

Credit

Nowadays, world finance is rapidly changing, and the way a company funds its inevitable expenditures as it licenses technology must reflect both the new mobility of money and the quirks of paying and getting paid. Credit is both a boon and a bane, particularly since so many technology-buying nations are in dire straits financially.

Every CEO of an interntional company is fast becoming an expert in international finance, if he wasn't one already. I am sure they are enriched by this intellectual growth even if, like most knowledge, some of it is dearly earned.

I was struck by a statement in your keynote address last year by Mr. James A. Thwaits of 3-M. He reported that last year's world GNP passed $14 trillion, four times what it has been as recently as 1969. Given the problem of measuring real output in monetary terms in this era of shifting currency values, I am happy to add that the latest International Monetary Fund figures expect world real output to rise some 3% this year over last.

This is good news and not just for altruistic reasons. I am a firm believer in the truism that a rising tide lifts all boats — the hungry and poor of this world and my shareholders, too. But when you are dealing with poor nations, hamstrung by debt or teeming with unmet needs and a paucity of marketable goods and services, how do you strike meaningful deals when they don't have the money to pay?

This is the great question each of us must answer, somehow, if we are to increase trade. And I think this brings me a good summation for my keynote.

We must all work very hard at pulling up the less-developed countries, because closing the gap will create the markets and consumers which help us prosper. The reverse is a steady slide into chaos, famine and war. Far-sighted LDCs will be happy to reward knowledge owners for sharing this blessing. And your CEO will be happy to sign up for any project that promises proper long-range results on his company's and the world's bottom line.

The licensing of technology — the sharing of experience, of how a particular technology works and what didn't work and why — opens us vast opportunities for us as well as recipient nations. They want so much to learn how to create value, to help themselves and join the developed world. As China's remarkable Deng Xiaoping has said: "Give us chickens, not eggs." A vivid figure of speech as well as a good one.

At the beginning of my talk today, when I joked about Erasmus and his famous book, *In Praise of Folly,* I neglected to soften my joke with a proper description of his wonderful work. Let me end by making amends.

Folly, says Erasmus, is not simply stupidity and is certainly not inherently destructive. For Erasmus, "folly" describes everything humorous and human in its sweetest sense, a recognition that men and women — and heaven knows today's computers, too — are less than omniscient, less than divine.

But at the same time, Erasmus was saying that we are definitely more than beasts. We will not reach perfection, it is true. But we can certainly have fun together while we try. And on that thought, I thank you for your attention and I wish you serendipity.