TAX MANAGEMENT

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HIGHLIGHTS

IRS Appears to Argue Buy-In Includes Entire Share of Anticipated Benefits

The Internal Revenue Service is taking the position that a buy-in payment should include the entire share of a company's "reasonably anticipated benefits" under a cost sharing agreement in BMC Software Inc.'s Tax Court case, an attorney says. The Service's position is presumably that the purchase of a concern whose only asset is intangible property establishes the arm's-length price for the intangibles. **Page 295**

French Officials Reportedly Using 'Hidden Profit Split' to Retain Income

French tax officials are performing "hidden profit split" analyses during transfer pricing reviews to ensure that multinational corporations doing business in France retain some taxable income in that country, two French practitioners say. . . . An official says the government is reluctantly using secret comparables in transfer pricing reviews due to the lack of adequate public databases. **Page 310; Page 311**

Options Treatment Uncertain While Seagate's Case Pending, Attorney Says

An attorney for Seagate Technology Inc. estimates taxpayers have six more months of uncertainty about whether they need to account for employee stock options under cost sharing agreements with foreign affiliates—if the court grants the company's summary judgment motion. Otherwise, the question could remain for at least a year and a half, he says. **Page 296**

Revised German Transfer Pricing Rules to Formally Recognize Profit Splits

Germany plans to announce in 2001 that it will accept profit split methods, but that it will not modify its opposition to use of other profit-based methods, including the transactional net margin method, a leading German tax official says. **Page 312**

ANALYSIS

Economist Tackles Valuing In-Process R&D

Brian Becker of LECG Inc. in Washington, D.C., expands on the theory that arm's-length buy-in payments for acquired technology can be estimated, based on adjusted acquisition terms. **Page 323**

SPECIAL REPORT

U.K. Practitioners Discuss Law Changes Since 1997

Michael McGowan and Peter Davis of Allen & Overy's New York and London offices examine changes in U.K. transfer pricing law since 1997 and how those changes, and the new U.K. advance pricing agreement procedure, expand taxpayers' compliance options.

ALSO IN THE NEWS

PENALTIES: Transfer pricing penalties do not apply if losses exceed Section 482 adjustments, the IRS Chief Counsel's office says in the first published advice on the issue.
Page 297; Text, Page 318

APPEALS: The government says the Tax Court should determine the additional income DHL Corp. received from its trademark sale if an appeals court reverses the case. **Page 302**

BELGIUM: A revised program and new office is making it easier to obtain unilateral advance pricing agreements, an attorney says.
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POLAND: Comprehensive transfer pricing rules take effect in Poland in 2001, practitioners say. **Page 316; Text, Page 322**

OECD: The Organization for Economic Cooperation and Development suspends its transfer pricing monitoring program.
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Analysis

Valuing In-Process R&D for Acquisitions: Economic Principles Applied to Accounting Concepts

Brian C. Becker, Ph.D.*

In-process research and development is proving difficult to value for transfer pricing and other purposes because it has no intrinsic value until it has been finalized into a process or technology that can generate revenue. Besides the uncertainty with the amount of revenue that can be generated from the technology, in-process R&D is complicated by the probability that the technology will never succeed.

By contrast, "finalized" R&D by definition will generate some revenues, and its valuation can be based upon the amount of revenue (and profit) that will accrue in the future.

This issue is important for transfer pricing because U.S.-based high technology companies are entering into R&D cost sharing arrangements with foreign affiliates that require the affiliates in many instances to make arm's-length buy-in payments for pre-existing intangible properties. In other instances, the U.S. parent of a high-tech multinational enterprise will acquire a start-up company or other concern that is developing a technology.

A 1999 article by economist John Wills[1] describes problems with calculating arm's-length buy-in payments for acquisitors, saying two popular approaches are conceptually incorrect. One approach involves computing the buy-in as a pro rata share of the purchase price for the acquired company. Another approach involves preparing a valuation report after the acquisition that establishes the amount attributable to "in-process R&D." Wills' article offered a solution, concluding that arm's-length buy-in payments for acquired technology can be estimated, based on adjusted acquisition terms. This article extends Wills' discussion.

Problem

For in-process R&D, valuation is particularly difficult at the time it is sold or transferred, but it is also difficult to determine years later when the value of its resulting finalized R&D is known. The following example poses a typically difficult fact pattern:

Technology A began R&D in 1990. During the five-year period from 1990-95, Acme spent $10 million in R&D before being acquired by Kira's Manufacturing Company (KMC). KMC entered into a 50-50 cost sharing agreement with its Japanese subsidiary and finalized the technology in 2000 after incurring a total of $90 million in developing costs. By all accounts, technology A is worth $668.9 million in year 2000. For buy-in purposes, Technology A must be valued as of 1995.

Extremes of Current Practice

The current practice for estimating the value of in-process technology generally takes one of two extreme assumptions. To minimize buy-in value, practitioners assume that each dollar of R&D expenditures—whether incurred by the company itself or the acquired company—has the same impact on creating the technology, regardless of when the expenditures occurred.

As with the above example, in many of these cases, most R&D expenses occur in the late stages of development. These fact patterns lead to a large majority of the final technology value being assigned to later stage or post-acquisition R&D. In this case, the 1995 in-process R&D would only have been worth **$66.9 million** ($668.9 million multiplied by 10 percent).

Analogously, some treat the technology purchased by the parent as the "important developmental" piece, and all other expenditures incurred through cost sharing as simply follow-up and relatively riskless. This methodology essentially treats the post-acquisition R&D similar to operating expenses that should receive a modest mark-up. Under this paradigm, essentially all of the forecasted benefit of the technology is ascribed to the acquired technology, after simply netting out the costs of the cost sharing arrangement. This procedure would lead to a valuation of approximately **$578.9 million** to the 1995 in-process R&D ($668.9 million less $90 million.)[2]

Successful, Unsuccessful R&D

As is often the case, the truth is somewhere in between these two extremes. That is, non-acquisition or late stage R&D is less speculative than acquisition or early stage R&D, but it is too speculative to be consid-

[1] Wills, John, "Valuing Technology: Buy-In Payments for Acquisitions," *Global Transfer Pricing*, (CCH), February-March 1999, pp. 28-34.

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[2] Typically, such post-acquisition costs would be modestly market up to account for inflation and risk. The author has avoided this step in this calculation for mathematical simplicity. With this calculation, however, the value implied would be different from those computed above.

ered an expense requiring a simple inflation or risk markup. In essence, the probability of a technology's commercial success increases as the technology becomes more developed. Thus, successful post-acquisition R&D is more valuable than an expense, but less valuable than pre-acquisition R&D in dividing out the value of technology.[3] The above discussion does not characterize early-stage R&D as any more value-adding (valuable) than later-stage R&D; however, success probabilities dictate that **successful** early-stage R&D is more valuable than **successful** later-stage R&D. That is, since the return to unsuccessful R&D is zero, the return to successful R&D must compensate the investor for the expenses incurred in the successful technology as well as the unsuccessful technology. As such, the investor's expected return must be consistent with other investment opportunities in the market (*i.e.*, a "required rate of return"). With lower probabilities of success seen for early-stage R&D, the apparent return to successful early-stage R&D is relatively high.

Accounting Definitions of Costs

The concepts of successful versus unsuccessful R&D and success probabilities translates well into economics, but it is more difficult to apply to accounting definitions of costs. All of the expenses involved in the commercialization of a technology must be classified—from an accounting perspective—as either R&D or operating expenses, but these expenses clearly do not fall neatly into two pre-specified groups. Rather, the expenses span a continuum from purely speculative development for a product with almost no chance of commercial success to late-stage "developmental expenses" for products that have been assured of commercial success (*i.e.*, final filing fees, etc.).

Economics and finance, however, do not require the classification of costs into two categories; rather, these disciplines ascribe higher returns to investments with higher risks to account for the probability of failure. This process provides a natural methodology to value R&D along the "probability continuum." Probability theory—most closely associated with Bayes' Rule[4]—helps explain this in this example. These disciplines essentially quantify a payment mechanism whereby companies—on average (*i.e.*, expected value)—cover their costs (plus a market-based profit) for not only successful R&D, but also unsuccessful R&D.

While this structure provides a market-based profit (required rate of return) on average, it necessarily implies that firms with successful technology earn above market returns and those with unsuccessful technology earn below market returns. Only in companies that develop a large number of products can the returns begin to approximate the market return over the long run.

[3] Wills (1999, p. 31) hints at a part of this point by concluding that the treatment of future R&D as costs in a net present value type of analysis will overstate the relative value of acquired technology. While this suggests that post-acquisition or cost sharing R&D expenditures should not be considered expenses, it does not attempt to compare the relative values of R&D expenditures incurred at different points in the development cycle.

[4] Bayes' Rule provides a statistical formula for updating beliefs in a specific hypothesis (*i.e.*, the probability of an event occurring) given additional evidence and background information.

Example

Technology A's development is characterized by 10 stages, each of which takes one year to transpire. At each stage, there is a known probability of success. Products only derive value when they have succeeded through all 10 stages. As seen in the table below, the probability of commercial success seems extremely remote at the early stages and a near certainty at the later stages.

Stage or Year	Probability of Success in Stage	Probability of Commercial Success	Dollars Spent in Stage ($M)	Return Required per Successful Technology
1	50%	1.2%	1	21,683%
2	50%	2.4%	1	9,802%
3	50%	4.8%	2	4,401%
4	50%	9.5%	3	1,946%
5	60%	19.1%	3	830%
6	70%	31.8%	5	407%
7	70%	45.4%	10	223%
8	80%	64.8%	20	105%
9	90%	81.0%	25	49%
10	90%	90.0%	30	22%

Thus, a technology that successfully navigates the first five stages of development will become commercially successfully approximately one-third of the time (32 percent), while a product that has only navigated Stages One-Three (*i.e.*, beginning Stage Four) will only succeed commercially one in 10 times.

It is understood in this industry that investors require a return that is consistent with a 10-percent annual markup on costs. When all costs go to the production or marketing of a **commercial** product, the internal product-level accounting is fairly straightforward. That is, one must merely mark up the costs of producing or marketing that product by an annualized rate of 10 percent. However, the problem turns much more complicated when a portion of investment goes to technology that never becomes commercially feasible. In that case, investors will not be satisfied with only a 10-percent annualized markup on successful (commercial) products.

Different Levels of Returns

This concept translates well to the example above, as it takes different levels of returns on the commercial products to compensate investors for all of their investments. As seen above, only approximately 1 cent of each dollar invested in Stage One can ever be recovered by a commercially successful product (10 years later), while 65 cents of each dollar invested in Stage Eight will be recovered commercially (three years later).

To receive an expected market annualized return of 10 percent on all of Stage Eight investments, investors would require a **105 percent return on the successful products** to compensate for the 0 percent return on the unsuccessful products. That is, for each dollar invested in a successful technology in Stage Eight development,

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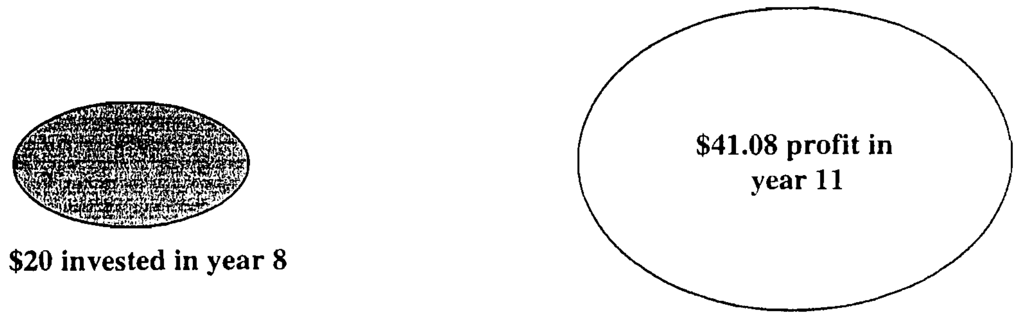
Figure 1: Ex-Post (Gross) Return to Successful Stage 8 R&D



an investor would need to earn $2.05 in profit[5] when the product became commercialized three years later:

64.8%*(X) + 35.2%*(0)	=	(110%)^3	=	133.1%
X	=	133.1%/64.8%		
X	=	$2.05		a return of 105 percent

Thus, investors that were lucky enough to invest in a successful product at Stage Eight will receive a return of 105 percent three years later; however, those investors in the non-commercially successful products will earn no return on their investments. See **Figure 1**.

This calculation becomes much more extreme—over a 21,000 percent required return—when applied to the required return on successful Stage One development costs due to the low probability of success and the 10-year wait until the product is commercialized:

1.2%*(X) + 98.8%*(0)	=	(110%)^{10}	=	259.4%
X	=	259.4%/1.2%		
X	=	$217.83		a return of 21,683 percent[6]

While this return seems particularly high, it is important to remember that only approximately one out of 100 investors will earn this return (10 years later), while the other 99 will lose their entire investment. See **Figure 2**.

Astronomical Returns

Summarizing similar calculations for each stage above, the results show that in this industry early-stage development requires astronomical returns on successful products to provide investors with a 10-percent expected annualized return on all investments.

Stage	Dollars Spent in Stage ($M) for Successful Technology	Return Required per Successful Technology (%)	Implied Value of Successful Development in Stage ($M)
1	1	21,683%	217.8
2	1	9,802%	99.0
3	2	4,401%	90.0
4	3	1,946%	61.4
5	3	830%	27.9
6	5	407%	25.4
7	10	223%	32.3
8	20	105%	41.1
9	25	49%	37.3
10	30	22%	36.7
Total	100	283%	668.9

Thus, Technology A requires $668.9 million in profits (returns) to keep investors satisfied for the $100 million in development expenses they incurred through ten stages. This table also provides a methodology to value in-process technology. More than half of the value is derived in the first three stages and through Stage Five the value is $496.1 million. This in-process valuation leaves nearly $173 million for the $90 million in successful Stages Six-Ten development. Such a "mark-up" compensates for both the risk of commercial non-viability and the 10-percent return required by investors.

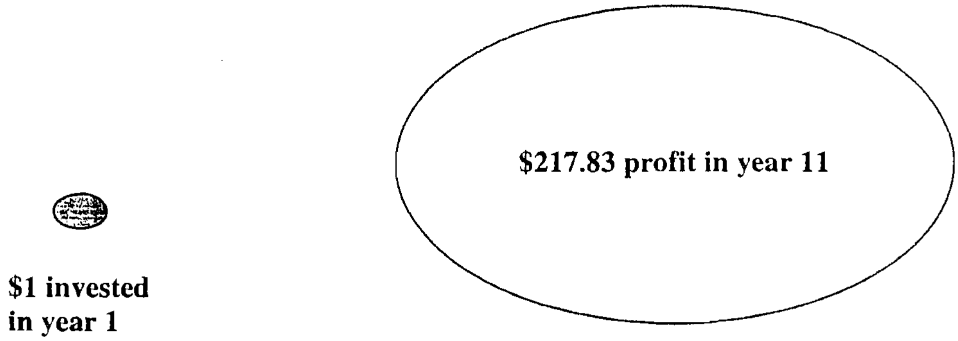
Conclusion

In-process technology valuations must consider the relative success probabilities of early- and late-stage development so that such calculations implicitly provide a return to investors for both successful and unsuccessful development. That is, returns to investors must compensate for the varying levels of risk at different stages. The example above presents known probabilities of success and expenditures at 10 different stages of development. This example allows the estimation of required returns for successful products at each stage of development and to value in-process technology.

The example provides useful insight into thinking about returns to and valuations of in-process technology, but real world R&D does not offer known probabilities and explicit stages of development. Further, the timing of each stage of development and the level of commercial success are in doubt. Nonetheless, the theories described above do bear out in many typical

[5] This $2.05 profit can be considered as the net present value of all commercial profits as of the initial date the technology is commercialized. These calculations may not compute exactly due to rounding.

Figure 2: Ex-Post (Gross) Return to Successful Stage 1 R&D



business situations. The initial development of pharmaceutical compounds includes the "scrapping" of nearly all of the compounds. Any expected return at this level of development must compensate not only for successful, but also failed development efforts. Thus, the "return" to successful R&D at this stage typically appears to be extremely high.[6] The pharmaceutical industry, in particular, has generated some research into this area, where probabilities of success, timing, and costs are estimated for each of the phases of U.S. Food and Drug Administration testing.[7]

New companies and investments (high-tech or otherwise) typically look to equity investors to start operations and, for those successful firms, often look to equity markets again a year or two later to infuse the company/investment with more capital. The initial equity investors (correctly) perceive their investments to be more speculative and require a higher return than the second set of investors. Indeed, some of these investments are perceived as more of a "lottery" than anything else, with the hope that the company will eventually go public. However, the second set of investors still face a somewhat speculative investment that may be difficult to put into an expense reimbursement type of paradigm.[8]

The problem summarized above presents another instance when accounting rules and economic theory are not consistent. Accounting rules draw a "black and white" distinction between R&D and operating expenses. The rules of such distinctions vary by industry, but it is clear that—for valuation purposes—such costs can not simply be classified as either only R&D or only operating expenses.

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[6] Thus, when pharmaceutical companies compare their returns and costs on successful products, they are clearly understating the cost basis since it should also include the many products that never became commercially viable.

[7] *Dimasi et. al.*, "The Cost of Innovation in the Pharmaceutical Industry," *Journal of Health Economics*, 1991, pp. 107-142.

[8] For example, many internet or high technology companies are purchased for their technology after their early stages of development. The prices paid for such companies often bear no relation to the historical R&D expenses incurred. That is, the value of such R&D is often 10, 20, or even 50 times the historical R&D. What is not explicitly captured in such prices is the fact that for every successful development company, there are numerous others that failed and recovered none of their R&D expenses.

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