

Valuing and Selecting Investment Opportunities

Part 3

Valuation and Investment

TABLE A
Comparison of
Project Cash Flows*
(\$ thousands)

Project	Type of Cash Flow	Year of Cash Flow			
		Year 0	Year 1	Year 2	Year 3
A	Investment	(\$10,000)			
	Revenue		\$21,000		
	Operating expenses		\$1,000		
B	Investment	(\$10,000)			
	Revenue		\$15,000	\$12,000	
	Operating expenses		\$2,500	\$2,500	
C	Investment	(\$10,000)			
	Revenue		\$10,000	\$11,000	\$10,000
	Operating expenses		\$5,500	\$4,500	\$5,500
	Salvage value				\$10,000
D	Investment	(\$10,000)			
	Revenue		\$10,000	\$10,000	\$10,000
	Operating expenses		\$5,500	\$5,500	\$5,500

*All revenues and operating expenses can be considered cash items.

Each of these projects is considered to be of equivalent risk. The investment will be depreciated to zero on a straight-line basis for tax purposes. GEI's marginal corporate tax rate on taxable income is 40%. None of the projects will have any salvage value at the end of their respective lives. For purposes of analysis, it should be assumed that all cash flows occur at the end of the year in question.

This case was prepared as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. Problem 1 appears in the case, "Introduction to Investment Evaluation Techniques," (HBS case no. 285-113) by Professor Dwight B. Crane and was revised for inclusion in this case. Problems 2 and 4 appear in the case, "Investment Analysis and Lockheed Tri-Star," (HBS case no. 291-031) by Professor Michael E. Edleson and were also revised for inclusion in this case.

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Valuing and Selecting Investment Opportunities

Valuing Capital Investment Projects

1. Growth Enterprises, Inc. (GEI) has \$40 million that it can invest in any or all of the four capital investment projects, which have cash flows as shown in Table A below.

TABLE A
Comparison of
Project Cash Flows*
(\$ thousands)

Project	Type of Cash Flow	Year of Cash Flow			
		Year 0	Year 1	Year 2	Year 3
A.	Investment	(\$10,000)			
	Revenue		\$21,000		
	Operating expenses		11,000		
B.	Investment	(\$10,000)			
	Revenue		\$15,000	\$17,000	
	Operating expenses		5,833	7,833	
C.	Investment	(\$10,000)			
	Revenue		\$10,000	\$11,000	\$30,000
	Operating expenses		5,555	4,889	15,555
D.	Investment	(\$10,000)			
	Revenue		\$30,000	\$10,000	\$5,000
	Operating expenses		15,555	5,555	2,222

*All revenues and operating expenses can be considered *cash* items.

Each of these projects is considered to be of equivalent risk. The investment will be depreciated to zero on a straight-line basis for tax purposes. GEI's marginal corporate tax rate on taxable income is 40%. None of the projects will have any salvage value at the end of their respective lives. For purposes of analysis, it should be assumed that all cash flows occur at the *end* of the year in question.

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- A. Rank GEI's four projects according to the following four commonly used capital budgeting criteria:
- (1) Payback period.
 - (2) Accounting return on investment. For purposes of this exercise, the accounting return on investment should be defined as follows:

$$\frac{\text{Average annual after-tax profits}}{(\text{Required investment})/2}$$

- (3) Internal rate of return.
 - (4) Net present value, assuming alternately a 10% discount rate and a 35% discount rate.
- B. Why do the rankings differ? What does each technique measure and what assumptions does it make?
- C. If the projects are independent of each other, which should be accepted? If they are mutually exclusive (i.e., one and only one can be accepted), which one is best?
2. Electronics Unlimited was considering the introduction of a new product that was expected to reach sales of \$10 million in its first full year, and \$13 million of sales in the second year. Because of intense competition and rapid product obsolescence, sales of the new product were expected to remain unchanged between the second and third years following introduction. Thereafter, annual sales were expected to decline to two-thirds of peak annual sales in the fourth year, and one-third of peak sales in the fifth year. No material levels of revenues or expenses associated with the new product as expected after five years of sales. Based on past experience, cost of sales for the new product was expected to be 60% of total annual sales revenue during each year of its life cycle. Selling, general, and administrative expenses were expected to be 23.5% of total annual sales. Taxes on profits generated by the new product would be paid at a 40% rate.

To launch the new product, Electronics Unlimited would have to incur immediate cash outlays of two types. First, it would have to invest \$500,000 in specialized new production equipment. This capital investment would be fully depreciated on a straight-line basis over the five-year anticipated life cycle of the new product. It was not expected to have any material salvage value at the end of its depreciable life. No further fixed capital expenditures were required after the initial purchase of equipment.

Second, additional investment in net working capital to support sales would have to be made. Electronics Unlimited generally required 27¢ of net working capital to support each dollar of sales. As a practical matter, this buildup would have to be made by the *beginning* of the sales year in question (or, equivalently, by the end of the previous year). As sales grew, further investments in net working capital ahead of sales would have to be made. As sales diminished, net working capital would be liquidated and cash recovered. At the end of the new product's life cycle, all remaining net working capital would be liquidated and the cash recovered.

Finally, Electronics Unlimited expected to incur tax-deductible introductory expenses of \$200,000 in the first year of the new product's sales. These costs would not be recurring over the product's life cycle. Approximately \$1.0 million had already been spent developing and test marketing the new product. These expenditures were also one-time expenses that would not be recurring during the new product's life cycle.

- A. Estimate the new product's future sales, profits, and cash flows throughout its five-year life cycle.
- B. Assuming a 20% discount rate, what is the product's net present value? (Except for changes in net working capital, which must be made before the start of each

sales year, you should assume that all cash flows occur at the end of the year in question.) What is its internal rate of return?

- C. Should Electronics Unlimited introduce the new product?

3. You are the CEO of Valu-Added Industries, Inc. (VAI). Your firm has 10,000 shares of common stock outstanding, and the current price of the stock is \$100 per share. There is no debt; thus, the "market value" balance sheet of VAI appears as follows:

VAI Market Value Balance Sheet

Assets	\$1,000,000	Equity	\$1,000,000
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You then discover an opportunity to invest in a new project that produces positive net cash flows with a present value of \$210,000. Your total initial costs for investing and developing this project are only \$110,000. You will raise the necessary capital for this investment by issuing new equity. All potential purchasers of your common stock will be fully aware of the project's value and cost, and are willing to pay "fair value" for the new shares of VAI common.

- A. What is the net present value of this project?
- B. How many shares of common stock must be issued, and at what price, to raise the required capital?
- C. What is the effect, if any, of this new project on the value of the stock of the existing shareholders?

4. Lockheed Tri Star and Capital Budgeting¹

In 1971, the American aerospace company, Lockheed, found itself in Congressional hearings seeking a \$250 million federal guarantee to secure bank credit required for the completion of the L-1011 Tri Star program. The L-1011 Tri Star Airbus was a wide-bodied commercial jet aircraft with a capacity of up to 400 passengers, competing with the DC-10 trijet and the A-300B airbus.

Spokesmen for Lockheed claimed that the Tri Star program was economically sound and that their problem was merely a liquidity crisis caused by some unrelated military contracts. Opposing the guarantee, other parties argued that the Tri Star program had been economically unsound and doomed to financial failure from the very beginning.

The debate over the viability of the program centered on estimated "break-even sales"—the number of jets that would need to be sold for total revenue to cover all accumulated costs. Lockheed's CEO, in his July 1971 testimony before Congress, asserted that this break-even point would be reached at sales somewhere between 195 and 205 aircraft. At that point, Lockheed had secured only 103 firm orders plus 75 options-to-buy, but they testified that sales would eventually exceed the break-even point and that the project would thus become "a commercially viable endeavor." Lockheed also testified that it hoped to capture 35%–40% of the total free-world market of 775 wide bodies over the next decade (270–310 aircraft). This market estimate had been based on the optimistic assumption of 10% annual growth in air travel. At a more realistic 5% growth rate, the total world market would have been only about 323 aircraft.

¹Facts and situations concerning the Lockheed Tri Star program are taken from U. E. Reinhardt, "Break-Even Analysis for Lockheed's Tri Star: An Application of Financial Theory," *Journal of Finance* 27 (1972), 821–838, and from House and Senate testimony.

Costs

The preproduction phases of the Tri Star project began at the end of 1967 and lasted four years after running about six months behind schedule. Various estimates of the initial development costs ranged between \$800 million and \$1 billion. A reasonable approximation of these cash outflows would be \$900 million, occurring as follows:

End of Year	Time "Index"	Cash Flow (\$ millions)
1967	t=0	-\$100
1968	t=1	-\$200
1969	t=2	-\$200
1970	t=3	-\$200
1971	t=4	-\$200

According to Lockheed testimony, the production phase was to run from the end of 1971 to the end of 1977 with about 210 Tri Stars as the planned output. At that production rate, the average unit production cost would be about \$14 million per aircraft.² The inventory-intensive production costs would be relatively front-loaded, so that the \$490 million (\$14 million per plane, 35 planes per year) annual production costs could be assumed to occur in six equal increments at the end of years 1971 through 1976 (t=4 through t=9).

Revenues

In 1968, the expected price to be received for the L-1011 Tri Star was about \$16 million per aircraft. These revenue flows would be characterized by a lag of a year to the production cost outflows; annual revenues of \$560 million could be assumed to occur in six equal increments at the end of years 1972 through 1977 (t=5 through t=10). Inflation-escalation terms in the contracts ensured that any future inflation-based cost and revenue increases offset each other nearly exactly, thus providing no incremental net cash flow.

Deposits toward future deliveries were received from Lockheed customers. Roughly one-quarter of the price of the aircraft was actually received two years early. For example, for a single Tri Star delivered at the end of 1972, \$4 million of the price was received at the end of 1970, leaving \$12 million of the \$16 million price as cash flow at the end of 1972. So, for the 35 planes built (and presumably, sold) in a year, \$140 million of the \$560 million in total annual revenue was actually received as a cash flow two years earlier.

Discount Rate

Experts estimated that the cost of capital applicable to Lockheed's cash flows (prior to Tri Star) was in the 9%–10% range. Since the Tri Star project was quite a bit riskier (by any measure) than the typical Lockheed operation, the appropriate discount rate was almost certainly higher than that. Thus, 10% was a reasonable (although possibly generous) estimate of the appropriate discount rate to apply to the Tri Star program's cash flows.

²This figure excludes preproduction cost allocations. That is, the \$14 million cost figure is totally separate from the \$900 million of preproduction costs shown in the table above.

Break-Even Revisited

In an August 1972 *Time* magazine article, Lockheed (after receiving government loan guarantees) revised its break-even sales volume: "[Lockheed] claims that it can get back its development costs [about \$960 million] and start making a profit by selling 275 Tri Stars."³ Industry analysts had predicted this (actually, they had estimated 300 units to be the break-even volume) even prior to the Congressional hearings.⁴ Based on a "learning curve" effect, production costs at these levels (up to 300 units) would average only about \$12.5 million per unit, instead of \$14 million as above. Had Lockheed been able to produce and sell as many as 500 aircraft, this average cost figure might even have been as low as \$11 million per aircraft.

- At originally planned production levels (210 units), what would have been the estimated value of the Tri Star program as of the end of 1967?
- At "break-even" production of roughly 300 units, did Lockheed break even in terms of net present value?
- At what sales volume would the Tri Star program have reached true economic (as opposed to accounting) break-even?
- Was the decision to pursue the Tri Star program a reasonable one? What effects would you predict the adoption of the Tri Star program would have on shareholder value?

³*Time* (August 21, 1972), 62.

⁴Mitchell Gordon, "Hitched to the Tri Star—Disaster at Lockheed Would Cut a Wide Swathe," *Barron's* (March 15, 1971), 5–14.

Merck & Company: Evaluating a Drug Licensing Opportunity

Rich Kender, Vice President of Financial Evaluation & Analysis at Merck, was working with his team to decide whether his company should license Davanrik, a new drug with the potential to treat both depression and obesity. The small pharmaceutical concern that developed the drug, LAB Pharmaceuticals, lacked the resources to complete the lengthy approval process, manufacture the compound, and market the drug. LAB had approached Merck with an offer to license the compound. Under this agreement, Merck would be responsible for the approval of Davanrik, its manufacture, and its marketing. The company would pay LAB an initial fee, a royalty on all sales, and make additional payments as Davanrik completed each stage of the approval process.

Merck

In 2000, Merck & Co., Inc., was a global research-driven pharmaceutical company that discovered, developed, manufactured, and marketed a broad range of human and animal health products, directly and through its joint ventures, and provided pharmaceutical benefit management services (PBM) through Merck-Medco Managed Care. Since 1995, Merck had launched 15 new products including Vioxx™ for the treatment of osteoarthritis, Fosamax™ for the treatment of osteoporosis, and Singulair™ for treating asthma. The Company earned \$5.9 billion on 1999 sales¹ of \$32.7 billion, about a 20% increase from 1998. Exhibits 1 and 2 contain Merck's Income Statement and Balance Sheet.

A handful of Merck's most popular drugs, Vasotec™, Mevacor™, Prinivil™, and Pepcid™, generated \$5.7 billion in worldwide sales. The patents for these drugs, however, would expire by 2002.² Once the patents expired, Merck anticipated that the sales of these drugs would decline substantially as generic substitutes became available. The only way to counter the loss of sales from drugs going off patent was to develop new drugs and constantly refresh the company's portfolio. The company develops new compounds primarily through internal research, but complements this through initiatives with biotechnology companies to ensure Merck is on the leading edge of select therapeutic categories.

¹Including \$15.2 billion in Medco (PBM) sales.

²Deutsche Bank Equity Analyst Report, January 2000.

David Krieger (MBA '00) and Professor Richard S. Ruback prepared this case. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

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Davanrik

LAB Pharmaceuticals originally developed Davanrik to treat depression. Antidepressant drugs work by affecting certain parts of the central nervous system. Various receptors in the human brain, when stimulated or blocked, create or inhibit various moods. The serotonin system controls nervousness, depression, insomnia, hunger, sexual dysfunction, nausea, and headaches. Through a combination of chemical compounds, the receptors in this system of cells can be stimulated or blocked to treat a patient with one or more of the given symptoms.³ Davanrik seemed not only to stimulate the receptor that promotes antidepressation, but also to block the receptor that causes hunger.

At the time of LAB's offer, Davanrik was in pre-clinical development, ready to enter the three-phase clinical approval process required for pharmaceuticals in the United States. In Phase I, the drug is given to a small number of healthy volunteers to test for safety. This usually takes about 1½ years. In Phase II, a larger number of patients are tested to determine if the drug is effective in treating a certain condition and to measure potential side effects. This usually takes about 2½ years. Finally, in Phase III, a large number of patients are tested for safety and efficacy. This phase takes about 3 years to complete. Exhibit 3 summarizes the FDA approval process.

LAB Pharmaceuticals specializes in developing compounds for the treatment of neurological disorders. While the company was only 15 years old and though it had a few drugs in Phase II and Phase III testing, none had successfully completed the FDA approval process. In fact, the FDA had recently denied approval of another of LAB's compounds that had completed all three phases of clinical testing; LAB's stock price fell by over 30% in response to this decision. As a result, LAB was hesitant to issue additional equity to finance the testing of Davanrik and was seeking a larger pharmaceutical company to license the drug and provide LAB with some much-needed cash. The licensee would design, administer, and fund the clinical testing of the compound, its manufacturing, and its marketing. The licensor, LAB, would receive an initial payment followed by additional payments as Davanrik completes each clinical testing phase. LAB would also receive a royalty on the eventual sales of Davanrik.

Davanrik's Potential Cash Flows

Rich Kender assembled a team to evaluate the potential profitability of Davanrik. Senior researchers evaluated scientific aspects of the compound, and marketers evaluated the market size, potential competition, and requirements to successfully launch the drug. Meanwhile, manufacturing managers determined the capital required to produce the drug, and people in Kender's own department built a financial analysis of the licensing decision.

The evaluation team determined the costs and likelihood of completing each stage of the FDA approval process along with a forecast of profitability of the drug if it successfully completed the approval process. Overall, the approval process was expected to consume about seven years. LAB obtained a patent on the product which is estimated to have a remaining life, including all possible extensions, of 17 years. Therefore, the product would have a 10 year period of exclusivity, beginning in 7 years.

³From The Merck Manual of Diagnosis and Therapy, Section 15, Chapter 189 (Mood Disorders).

Phase I

Davanrik would be administered to 20–80 healthy people to determine if the drug was safe enough to continue into the efficacy stages of clinical testing. Phase I would take two years to complete. It was expected to cost \$30 million, including an initial \$5 million fee to LAB for licensing the drug. There was a 60% chance that Davanrik would successfully complete Phase I.

Phase II

In this phase, Davanrik would be given to 100–300 patient volunteers to determine its efficacy for treating depression and/or weight loss and to document any side effects. To complete the efficacy tests, Davanrik would have to demonstrate a statistically significant impact on patients suffering from depression, obesity, or both. The Merck team estimated a 10% probability that Phase II would show that Davanrik would be efficacious for depression only, a 15% probability for weight loss only, and a 5% probability that it would be efficacious for both depression and weight loss at the same time.⁴ Like Phase I, Phase II would require two years of clinical testing to complete. Phase II was expected to cost \$40 million, including a \$2.5 million licensing milestone payment to LAB.⁵

Phase III

In Phase III, Davanrik would be administered to 1000–5000 volunteers to determine safety and efficacy in long term use. Because of the number of volunteers and nature of testing, this was the most costly of the phases and was expected to take three years to complete. The costs and probabilities of success depended on the outcome from Phase II. If Davanrik was effective for only depression, Phase III trials would cost \$200 million including a \$20 million payment to LAB, and have an 85% chance of success. If it was effective for weight loss only, it would cost \$150 million (including a \$10 million LAB payment), and have a 75% chance of success. If, however, it was efficacious for both weight loss and depression, more specialized trials would be required to determine efficacy for the dual indication. The total cost of the Phase III clinical tests for the two separate indications together with the dual indication was expected to be \$500 million, including a \$40 million licensing payment to LAB, and had a 70% chance of successful outcome. Under this scenario, there was a 15% chance of a successful outcome for depression only, and a 5% chance of a successful outcome for weight loss only. The probability of complete failure of the dual indications or either separate indication was only 10%.

Davanrik had substantial potential profits, especially if it was effective as a treatment for both depression and weight loss. If the drug were approved only for the treatment of depression, it would cost \$250 million to launch, and had a commercialization present value of \$1.2 billion.⁶ If Davanrik were only approved for weight loss, it would cost \$100 million to launch, and would have a PV of \$345 million. However, if Merck could launch the product with claims for both indications, it would cost \$400 million to launch and have a PV of \$2.25 billion.

⁴According to the FDA, a pharmaceutical must prove dual indications in addition to proving each indication separately if it wants to be able to claim therapeutic effects for people suffering from both disorders.

⁵All cash flows are expressed as after-tax present values discounted to time zero, including capital expenditures.

⁶This PV was calculated as the after-tax present value of 10 years' worth of cash flows from the drug discounted back to today. It was believed that after 10 years, the drug had very little value to the company since it would be off its patent by then (and thus a terminal value of zero was used in the calculation).

EXHIBIT 1
Consolidated
Statement of Income
and Retained
Earnings

 Source: 1999 Merck & Co.
 Annual Report.

	Year Ended December 31,		
	1999	1998	1997
Sales	32,714.0	26,898.2	23,636.9
Costs, Expenses, and Other Materials and Production	17,534.2	13,925.4	11,790.3
Marketing and Administrative	5,199.9	4,511.4	4,299.2
Research and Development	2,068.3	1,821.1	1,683.7
Acquired Research	51.1	1,039.5	0
Equity Income from Affiliates	(762.0)	(884.3)	(727.9)
Gains on Sales of Businesses	0	(2,147.7)	(213.4)
Other (income) Expense, Net	3.0	499.7	342.7
	<u>24,094.5</u>	<u>18,765.1</u>	<u>17,174.6</u>
Income Before Taxes	8,619.5	8,133.1	6,462.3
Taxes on Income	2,729.0	2,884.9	1,848.2
Net Income	<u>5,890.5</u>	<u>5,248.2</u>	<u>4,614.1</u>
Basic Earnings per Common Share	2.51	2.21	1.92
Earnings per Common Share Assuming Dilution	<u>2.45</u>	2.15	<u>1.87</u>
Retained Earnings Balance, January 1	20,186.7	17,291.5	14,772.2
Net Income	5,890.5	5,248.2	4,614.1
Common Stock Dividends Declared	(2,629.3)	(2,353.0)	(2,094.8)
Retained Earnings Balance, December 31	<u>23,447.9</u>	<u>20,186.7</u>	<u>17,291.5</u>

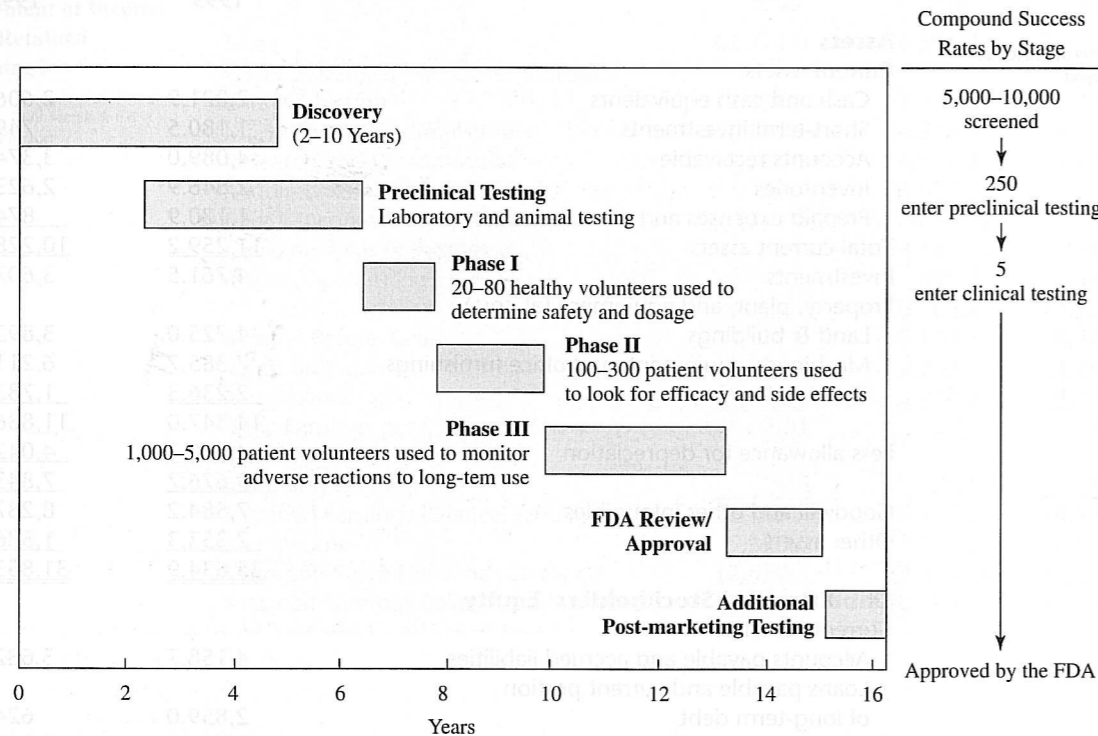
EXHIBIT 2
Consolidated Balance
Sheet

 Source: 1999 Merck & Co.
 Annual Report.

	Year Ended December 31,	
	1999	1998
Assets		
Current assets		
Cash and cash equivalents	2,021.9	2,606.2
Short-term investments	1,180.5	749.5
Accounts receivable	4,089.0	3,374.1
Inventories	2,846.9	2,623.9
Prepaid expenses and taxes	1,120.9	874.8
Total current assets	<u>11,259.2</u>	<u>10,228.5</u>
Investments	4,761.5	3,607.7
Property, plant, and equipment (at cost)		
Land & buildings	4,725.0	3,892.8
Machinery, equipment, and office furnishings	7,385.7	6,211.7
Construction in progress	2,236.3	1,782.1
	<u>14,347.0</u>	<u>11,886.6</u>
Less allowance for depreciation	<u>4,670.3</u>	<u>4,042.8</u>
	<u>9,676.7</u>	<u>7,843.8</u>
Goodwill and other intangibles	7,584.2	8,287.2
Other assets	<u>2,353.3</u>	<u>1,886.2</u>
	<u>35,634.9</u>	<u>31,853.4</u>
Liabilities and Stockholders' Equity		
Current liabilities		
Accounts payable and accrued liabilities	4,158.7	3,682.1
Loans payable and current portion of long-term debt	2,859.0	624.2
Income tax payable	1,064.1	1,125.1
Dividends payable	677.0	637.4
Total current liabilities	<u>8,758.8</u>	<u>6,068.8</u>
Long-term debt	3,143.9	3,220.8
Deferred income taxes and noncurrent liabilities	7,030.1	6,057.0
Minority interests	<u>3,460.5</u>	<u>3,705.0</u>
Stockholders' equity		
Common stock	29.7	29.7
Other paid-in capital	5,920.5	5,614.5
Retained earnings	23,447.9	20,186.7
Accumulated other comprehensive income (loss)	8.1	(21.3)
	<u>29,406.2</u>	<u>25,809.6</u>
Less treasury stock, at cost	<u>16,164.6</u>	<u>13,007.8</u>
Total stockholders' equity	<u>13,241.6</u>	<u>12,801.8</u>
	<u>35,634.9</u>	<u>31,853.4</u>

EXHIBIT 3 Compound Success Rates by Stage

Source: PhRMA, based on data from Center for the Study of Drug Development, Tuft University, 1995.



Tree Values

Joe Smith, a forest owner in southern New Hampshire, sought Karen Bennett's help after receiving an unsolicited but attractive offer from a local businessman for some of his timber. Ms. Bennett, a forest resource specialist with the University of New Hampshire Cooperative Extension, provided non-industrial private forest owners with advice on managing their forests. Ms. Bennett had visited Mr. Smith and walked his property with him. She aimed to help Mr. Smith understand the alternatives available to him so that he could make an informed decision about whether he should cut his trees.

Earning Potential of Trees

Mr. Smith inherited the woodland from his father. He always considered the forestland an asset but, aside from occasionally checking on the prices of land in the region, he had given little thought to the value of his holding. The logger who approached Mr. Smith about a timber sale proposed cutting the trees that were 12" DBH (diameter at breast height, i.e., 4½ feet above ground) and larger, leaving more space for the smaller trees to grow. He said this selective harvest would leave the smaller, fastest growing trees to provide for future harvests.

On her visit to Mr. Smith, Ms. Bennett observed that the acreage included a variety of New England hardwoods, including Sugar Maples, Paper Birches, Red Maples, and Red Oaks. Although Mr. Smith was curious about the value of individual trees, Ms. Bennett explained that foresters usually think and talk in terms of total board feet of a forest area rather than the price of individual trees. Timber is a high volume business, and prices for standing timber (or stumpage prices) were given in dollars per thousand board feet (MBF). Stumpage prices varied according to species, property location, tree size and quality, and ease of access. Current prices for Red Oak in central New Hampshire ranged from \$40-\$1200 per MBF, and prices for Sugar Maples were \$90-\$900 per MBF.¹

Ms. Bennett explained that the value of a tree depended on the volume of usable lumber that could be cut from it, and also on the tree's quality, or grade. As trees grew larger their volume increased, and larger trees provided more board feet of lumber. Exhibit 1 contains information on average hardwood volumes. For example, a 12" DBH tree would yield about 60 board feet of lumber; a 14" DBH tree would provide about 110 board feet. Trees smaller than about 12" DBH had little commercial value except as firewood. The rate of physical growth of trees could vary widely because of differences in sites and conditions. In general, a good quality hardwood tree growing on a

¹NHTOA Quarterly Forest Product Market Report, 1st Quarter 2000 (January-March).

Research Associate Kathleen S. Luchs prepared this case under the supervision of Professor Richard S. Ruback as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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well managed site in New England would grow about 2" in diameter in ten years, while lower quality trees on inferior or unmanaged sites might grow at only half that rate.²

In addition to physical size, a tree's value also depended on its quality. As trees grew larger they provided not just more lumber, but also better quality lumber, especially if the trees had sufficient growing space and few defects such as knots or wormholes. The U.S. Forest Service had a system of log grades for assessing timber quality but there was no law requiring the use of this system. Individual mills often defined their own standards and some foresters used a system of tree grades to value a stand. Whatever method was used to measure the quality of timber, a tree's value increased significantly as its quality improved.³ Quality or tree grade increases peaked for most New England hardwoods at around 20 inches DBH, although a tree continued to grow in diameter.⁴ Trees could be a similar size and provide about the same board feet of lumber, but their value could be very different depending on the grade of that lumber. Exhibit 2 presents average hardwood prices by tree grade.

Tree values also depended on increases in timber prices. Prices of hardwood timber had steadily increased over the last 20 years and would likely continue to do so. One authority estimated that prices for New England hardwoods were currently increasing 1-3% above the rate of inflation.⁵

Woodland Management

Like many New England woodlands, Mr. Smith's forest was "middle aged," with most of the trees around 50 to 60 years old, most likely having grown on former farmland. Although there were as many as 300 trees per acre on the property, most of these trees had no commercial use except for firewood because of their species, size, or quality. Ms. Bennett estimated that on the 40 acres of forestland there were about 60 crop trees per acre. The crop trees were about evenly divided between 12" DBH and 14" DBH trees. While the site was favorable, the land had not been actively managed, and many of the trees were crowded. The size and current condition of the crop trees meant they were mostly tree grade 4. The smaller trees in the forest were not necessarily younger than the larger trees. Some of them were simply slow growing because of genetics, stress, disease, or poor growing conditions.

Ms. Bennett suggested that if Mr. Smith was interested in improving his forestland, he should consider thinning, including cutting about half of the 12" and 14" trees. Selecting and cutting the lower quality trees would eliminate competition. Such thinning would allow the better quality trees to grow as much as 2" in diameter over 10 years. Exhibit 3 shows that these trees were also more likely to move into the next tree grade. Mr. Smith would need to hire a private forester to select which trees to thin and to develop an overall management plan for his forest.

²Gary Gof and Peter Smallidge, "Tree Value: A Basis of Woodland Management," <http://www.dnr.cornell.edu/ext/forestry/publications%20&%20articles/proceedings/sawtimber_economics_goff.htm>

³Robert R. Morrow, "Tree Value: A Basis for Woodland Management," An Extension Publication of the Department of Natural Resources, New York State College of Agriculture and Life Sciences at Cornell University, Ithaca, New York, vol. 19, no. 4 (Fall 1981).

⁴Mark J. Ducey, "How Fast Do Quality Hardwoods Grow?" Proceedings for Tree Investment Workshop, Caroline A. Fox Research and Demonstration Forest, Hillsborough, NH, Oct. 15 and 29, 1999.

⁵ibid.

EXHIBIT 1 Average Hardwood Volumes

Source: Karl Davies, "The Myth of Low Tree Value Growth Rates," *Massachusetts Woodland Steward*, vol. 29, no. 4 (Fall 1999) and additional information provided by author.

DBH (inches)	Number of 16 ft Logs	Board Feet/Tree
10	0.50	20
11	0.75	40
12	1.00	60
13	1.25	85
14	1.50	110
15	1.75	145
16	2.00	180
17	2.25	230
18	2.50	280
19	2.50	315
20	2.50	350
21	2.50	385
22	2.50	430

EXHIBIT 2 Average Hardwood Stumpage Prices by Tree Grade

Source: New Hampshire Forest Market Report 1998-1999, University of New Hampshire Cooperative Extension; additional values estimated by case writer.

Tree Grade	\$MBF
4	40
3	120
2	260
1	445
Veneer	845

EXHIBIT 3 Probabilities of Tree Grade Increases with Each 2" Growth in DBH

Source: Estimates provided by Karl Davies based on his research and paper "Grade Value Increase Rates for Northeastern Timber Species" (Second draft). A first draft of this paper is available at <http://www.daviesand.com/Papers/Economics/GVI_Rates/index.html>

Tree Grade Change	4 to 3	3 to 2	2 to 1	1 to Veneer
Trees on unthinned, unmanaged forestland	60%	50%	40%	10%
Trees on thinned, managed forestland	80%	70%	60%	20%

The Super Project

In March 1967, Crosby Sanberg, a financial analysis manager at General Foods Corporation, told a casewriter, "What I learned about incremental analysis at the Business School doesn't always work." He was convinced that under some circumstances sunk costs were relevant to capital project evaluations. He was also concerned that financial and accounting systems did not provide an accurate estimate of incremental costs and revenues, and that this was one of the most difficult problems in measuring the value of capital investment proposals. Mr. Sanberg used the Super project as an example.¹

Super was a new instant dessert, based on a flavored, water-soluble, agglomerated powder.² Although four flavors would be offered, it was estimated that chocolate would account for 80% of total sales.

General Foods was organized along product lines in the United States, with foreign operations under a separate division. Major U.S. product divisions included Post, Kool-Aid, Maxwell House, Jell-O, and Birds Eye. Financial data for General Foods are given in Exhibits 1, 2, and 3.

The \$200,000 capital investment project request for Super involved \$80,000 for building modifications and \$120,000 for machinery and equipment. Modifications would be made to an existing building, where Jell-O was manufactured. Since available capacity of a Jell-O agglomerator would be used in the manufacture of Super, no cost for the key machine was included in the project. The \$120,000 machinery and equipment item represented packaging machinery.

The Market

A Nielsen survey indicated that powdered desserts constituted a significant and growing segment of the total dessert market, as shown in Table A. On the basis of test market experience, General Foods expected Super to capture a 10% share of the total dessert market. Eighty percent of this expected Super volume would come from growth in total market share or growth in the powders segment, and 20% would come from erosion of Jell-O sales.

Production Facilities

Test market volume was packaged on an existing line, inadequate to handle long-run requirements. Filling and packaging equipment to be purchased had a capacity of 1.9 million units on a two-shift, five-day workweek basis. This represented considerable excess capacity, since 1968 requirements were expected to reach 1.1 million units, and the national potential was regarded as 1.6 million units. However, the extra capacity resulted from purchasing standard equipment, and a more economical alternative did not exist.

¹The name and nature of this new product have been disguised to avoid the disclosure of confidential information.

²Agglomeration is a process by which the processed powder is passed through a steam bath and then dried. This fluffs up the powder particles and increases solubility.

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Harvard Business School case 112-034. This case was written by Richard F. Vancil.

TABLE A
Dessert Market,
August–September
1966 Compared with
August–September
1965

Desserts	Market Share Aug.–Sept. 1966	Change from Aug.–Sept. 1965	
		Share Points	Volume (%)
Jell-O	19.0%	3.6	40.0
Tasty	4.0	4.0	(new)
Total powders	25.3	7.6	62.0
Pie fillings and cake mixes	32.0	-3.9	(no change)
Ice cream	42.7	-3.4	5.0
Total market	100.0%		13.0

Capital Budgeting Procedure

The General Foods Accounting and Financial Manual identified four categories of capital investment project proposals: (1) safety and convenience; (2) quality; (3) increased profit; and (4) other. Proposal procedures and criteria for accepting projects varied according to category (Exhibit 4). In discussing these criteria, Mr. Sanberg noted that the payback and return guidelines were not used as cutoff measures and added:

Payback and return on investment are rarely the only measures of acceptability. Criteria vary significantly by type of project. A relatively high return might be required for a new product in a new business category. On the other hand, a much lower return might be acceptable for a new product entry which represented a continuing effort to maintain leadership in an existing business by, for example, filling out the product line.

Super fell into the third category, as a profit-increasing project. Estimates of payback and return on funds employed were required for each such project requiring \$50,000 or more of new capital funds and expense before taxes. The payback period was the length of time required for the project to repay the investment from the date the project became operational. In calculating the repayment period, only incremental income and expenses related to the project were used.

Return on funds employed (ROFE) was calculated by dividing 10-year average profit before taxes by the 10-year average funds employed. Funds employed included incremental net fixed assets plus or minus related working capital. Start-up costs and any profits or losses incurred before the project became operational were included in the first profit and loss period in the financial evaluation calculation.

Capital Budgeting Atmosphere

A General Foods accounting executive commented on the atmosphere within which capital projects were reviewed:

Our problem is not one of capital rationing. Our problem is to find enough good solid projects to employ capital at an attractive return on investment. Of course, the rate of capital inputs must be balanced against a steady growth in earnings per share. The short-term impact of capital investments is usually an increase in the capital base without an immediate realization of profit potential. This is particularly true in the case of new products.

The food industry should show a continuous growth. A cyclical industry can afford to let its profits vary. We want to expand faster than the gross national product. The key to our capital budgeting is to integrate the plans of our eight divisions into a balanced company plan which meets our overall growth objectives. Most new products show a loss in the first two or three years, but our divisions are big enough to introduce new products without showing a loss.

Documentation for the Super Project

Exhibits 5 and 6 document the financial evaluation of the Super project. Exhibit 5 is the summary appropriation request prepared to justify the project to management and to secure management's authorization to expend funds on a capital project. Exhibit 6 presents the backup detail. Cost of the market test was included as "Other" expense in the first period, because a new product had to pay for its test market expense, even though this might be a sunk cost at the time capital funds were requested. The "Adjustments" item represented erosion of the Jell-O market and was calculated by multiplying the volume of erosion times a variable profit contribution. In the preparation of this financial evaluation form, costs of acquiring packaging machinery were included, but no cost was attributed to Jell-O agglomerator capacity to be used for the Super project, because the General Foods Accounting and Financial Manual specified that capital project requests be prepared on an incremental basis:

The incremental concept requires that project requests, profit projections, and funds-employed statements include only items of income and expense and investment in assets which will be realized, incurred, or made directly as a result of, or are attributed to, the new project.

Exchange of Memos on the Super Project

After receiving the paperwork on the Super project, Mr. Sanberg studied the situation and wrote a memorandum arguing that the incremental approach advocated by the manual should not be applied to the Super project. His superior agreed with the memorandum and forwarded it to the corporate controller with the covering note contained in Appendix A. The controller's reply is given in Appendix B.

Appendix A Memos to Controller

To: J. C. Kresslin, Corporate Controller

From: J. E. Hooting, Director, Corporate Budgets and Analysis

March 2, 1967

Super Project

At the time we reviewed the Super project, I indicated to you that the return on investment looked significantly different if an allocation of the agglomerator and building, originally justified as a Jell-O project, were included in the Super investment. The pro rata allocation of these facilities, based on the share of capacity used, triples the initial gross investment in Super facilities from \$200,000 to about \$672,000.

I am forwarding a memorandum from Crosby Sanberg summarizing the results of three analyses evaluating the project on an

1. Incremental basis
2. Facilities-used basis
3. Fully allocated facilities and costs basis

Crosby has calculated a 10-year average ROFE using these techniques. Please read Crosby's memo before continuing with my note.

* * *

Crosby concludes that the fully allocated basis, or some variation of it, is necessary to understand the long-range potential of the project.

I agree. We launch a new project because of its potential to increase our sales and earning power for many years into the future. We must be mindful of short-term consequences, as indicated by an incremental analysis, but we must also have a long-range frame of reference if we are to really understand what we are committing ourselves to. This long-range frame of reference is best approximated by looking at fully allocated investment and “accounted” profits, which recognize fully allocated costs, because in fact, over the long run all costs are variable unless some major change occurs in the structure of the business.

Our current GF preoccupation with only the incremental costs and investment causes some real anomalies that confuse our decision making. Super is a good example. On an incremental basis the project looks particularly attractive because, by using a share of the excess capacity built on the coattails of the lucrative Jell-O project, the incremental investment in Super is low. If the excess Jell-O capacity did not exist, would the project be any less attractive? In the short term, perhaps yes because it would entail higher initial risk; but in the long term, it is not a better project just because it fits a facility that is temporarily unused.

Looking at this point from a different angle, if the project exceeded our investment hurdle rate on a short-term basis but fell below it on a long-term basis (and Super comes close to doing this), should we reject the project? I say yes, because over the long run, as “fixed” costs become variable and as we have to commit new capital to support the business, the continuing ROFE will go under water.

In sum, we have to look at new project proposals from both the long-range and the short-term point of view. We plan to refine our techniques of using a fully allocated basis as a long-term point of reference and will hammer out a policy recommendation for your consideration. We would appreciate any comments you may have.

To: J. E. Hooting, Director, Corporate Budgets and Analysis

From: C. Sanberg, Manager, Financial Analysis

February 17, 1967

Super Project: A Case Example of Investment Evaluation Techniques

This will review the merits of alternative techniques of evaluating capital investment decisions using the Super project as an example. The purpose of the review is to provide an illustration of the problems and limitations inherent in using incremental ROFE and payback, and thereby provide a rationale for adopting new techniques.

Alternative Techniques

The alternative techniques to be reviewed are differentiated by the level of revenue and investment charged to the Super project in figuring a payback and ROFE, starting with incremental revenues and investment. Data related to the alternative techniques are summarized at the end of this memo.

Alternative 1. Incremental Basis

Method

The Super project as originally evaluated considered only incremental revenue and investment, which could be directly identified with the decision to produce Super. Incremental fixed capital (\$200M) basically included packaging equipment.

Result

On this basis, the project paid back in 7 years with a ROFE of 63%.

Discussion

Although it is General Foods' current policy to evaluate capital projects on an incremental basis, this technique does not apply to the Super project. The reason is that Super extensively utilizes existing facilities, which are readily adaptable to known future alternative uses.

Super should be charged with the “opportunity loss” of agglomerating capacity and building space. Because of Super, the opportunity is lost to use a portion of agglomerating capacity for Jell-O and other products that could potentially be agglomerated. In addition, the opportunity is lost to use the building space for existing or new product volume expansion. To the extent there is an opportunity loss of existing facilities, new facilities must be built to accommodate future expansion. In other words, because the business is expanding, Super utilizes facilities that are adaptable to predictable alternative uses.

Alternative 2. Facilities-Used Basis

Method

Recognizing that Super will use half of an existing agglomerator and two thirds of an existing building, which were justified earlier in the Jell-O project, we added Super's pro rata share of these facilities (\$453M) to the incremental capital. Overhead costs directly related to these existing facilities were also subtracted from incremental revenue on a shared basis.

Result

A ROFE of 34% results.

Discussion

Although the existing facilities utilized by Super are not incremental to this project, they are relevant to the evaluation of the project because, potentially, they can be put to alternative uses. Despite a high return on an incremental basis, if the ROFE on a project were unattractive after consideration of the shared use of existing facilities, the project would be questionable. Under these circumstances, we might look for a more profitable product for the facilities.

In summary, the facilities-used basis is a useful way of putting various projects on a common ground for purposes of *relative* evaluation. One product using existing capacity should not necessarily be judged to be more attractive than another practically identical product that necessitates an investment in additional facilities.

Alternative 3. Fully Allocated Basis

Method

Further recognizing that individual decisions to expand inevitably add to a higher overhead base, we increased the costs and investment base developed in Alternative 2 by a provision for overhead expenses and overhead capital. These increases were made in year 5 of the 10-year evaluation period, on the theory that, at this point, a number of decisions would result in more fixed costs and facilities. Overhead expenses included manufacturing costs, plus selling and general and administrative costs on a per unit basis equivalent to Jell-O. Overhead capital included a share of the distribution system assets (\$40M).

Result

A ROFE of 25% results.

Discussion

Charging Super with an overhead burden recognizes that overhead costs in the long run increase in proportion to the level of business activity, even though decisions to spend more overhead dollars are made separately from decisions to increase volume and provide the incremental facilities to support the higher volume level. To illustrate, the Division-F1968 Financial Plan budgets about a 75% increase in headquarters' overhead spending in F1968 over F1964. A contributing factor was the decision to increase the sales force by 50% to meet the demands of a growing and increasingly complex business. To illustrate further, about half of the capital projects in the F1968 3-year Financial Plan are in the "nonpayback" category. This group of projects comprised largely "overhead facilities" (warehouses, utilities, etc.), which are not directly related to the manufacture of products but are necessary components of the total business activity as a result of the cumulative effect of many decisions taken in the past.

The Super project is a significant decision that will most likely add to more overhead dollars, as illustrated above. Super volume doubles the powdered dessert business category; it increases the Division businesses by 10%. Furthermore, Super requires a new production technology: agglomeration and packaging on a high-speed line.

Conclusions

1. The incremental basis for evaluating a project is an inadequate measure of a project's worth when existing facilities with a known future use will be utilized extensively.
2. A fully allocated basis of reviewing major new product proposals recognizes that overheads increase in proportion to the size and complexity of the business and provides the best long-range projection of the financial consequences.

Alternative Evaluations of Super Project (thousands of dollars)

	1. Incremental Basis	2. Facilities-Used Basis	3. Fully Allocated Basis
<i>Investment</i>			
Working capital	\$267	\$267	\$267
Fixed capital			
Gross	200	653	672
Net	113	358	367
Total net investment	380	625	634
Profit before taxes ^a	239	211	157
ROFE	63%	34%	25%
<i>Jell-O Project</i>			
Building	$\$200 \times \frac{2}{3} = \133		
Agglomerator	$\frac{640 \times \frac{1}{2} = 320$		
	<u>\$453</u>		

Note: Figures based on 10-year averages.
^aAssumes 20% of Super volume will replace existing Jell-O business.

Appendix B Controller's Reply

To: Mr. J. E. Hooting, Director, Corporate Budgets and Analysis

From: Mr. J. C. Kresslin, Corporate Controller

Subject: Super Project

March 7, 1967

On March 2 you sent me a note describing Crosby Sanberg's and your thoughts about evaluating the Super project. In this memo you suggest that the project should be appraised on the basis of fully allocated facilities and production costs.

In order to continue the dialogue, I am raising a couple of questions below.

It seems to me that in a situation such as you describe for Super, the real question is a *management decision* as to whether to go ahead with the Super project or not go ahead. Or to put it another way, on the basis of our current knowledge, are we or are we not better off in the aggregate if we use half of the agglomerator and two thirds of an existing building for Super?

It might be assumed that, for example, half of the agglomerator is being used and half is not and that a minimum economically sized agglomerator was necessary for Jell-O and, consequently, should be justified by the Jell-O project itself. If we find a way to utilize it sooner by producing Super on it, aren't we better off in the aggregate, thus rendering the different ROFE figure for the Super project by itself somewhat irrelevant? A similar point of view might be applied to the portion of the building. Or if we charge the Super project with half an agglomerator and two thirds of an existing building, should we then go back and relieve the Jell-O projects of these costs in evaluating the management's original proposal?

To put it another way, since we are faced with making decisions at a certain point in time on the basis of what we know, I see very little value in looking at the Super project all by itself. Better we should look at the total situation before and after to see how we fare.

As to allocated production costs, the point is not so clear. Undoubtedly, over the long haul, the selling prices will need to be determined on the basis of a satisfactory margin over fully allocated costs. Perhaps this should be an additional requirement in the course of evaluating capital projects, as we seem to have been surprised at the low margins for "Tasty" after allocating all costs to the product.

I look forward to discussing this subject with you and with Crosby at some length.

EXHIBIT 1
Consolidated Balance Sheet of General Foods Corporation at April 1, 1967
(millions of dollars)

Cash	\$ 20
Marketable securities	89
Receivables	180
Inventories	261
Prepaid expenses	14
Current assets	564
Land, buildings, equipment (at cost, less depreciation)	332
Long-term receivables and sundry assets	7
Goodwill	26
Total assets	\$929
Notes payable	\$ 22
Accounts payable	86
Accrued liabilities	73
Accrued income taxes	57
Current liabilities	238
Long-term notes	39
3 3/4% debentures	22
Other noncurrent liabilities	10
Deferred investment tax credit	9
Total liabilities	318
Common stock issued	164
Retained earnings	449
Common stock held in treasury, at cost	(2)
Stockholders' equity	611
Total liabilities and stockholders' equity	\$929
Common stock—no. of shares outstanding at year-end	25,127,007

EXHIBIT 2
Common Stock Prices of General Foods Corporation, 1958-1967

	Low	High
1958	\$24	\$ 39½
1959	37½	53½
1960	49½	75½
1961	68½	107½
1962	57¾	96
1963	77¾	90½
1964	78¼	93¼
1965	77½	89¾
1966	62¾	83
1967	65¼	81¾

EXHIBIT 3 Summary of Statistical Data of General Foods Corporation, Fiscal Years 1958-1967 (millions of dollars except assets per employee and figures on a share basis)

	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Earnings										
Sales to customers (net)	\$1,009	\$1,053	\$1,087	\$1,160	\$1,189	\$1,216	\$1,338	\$1,478	\$1,555	\$1,652
Cost of sales	724	734	725	764	769	769	838	937	965	1,012
Marketing, admin., and general expenses	181	205	236	261	267	274	322	362	406	449
Earnings before income taxes	105	115	130	138	156	170	179	177	185	193
Taxes on income	57	61	69	71	84	91	95	91	91	94
Net earnings	\$ 48	\$ 54	\$ 61	\$ 67	\$ 72	\$ 79	\$ 84	\$ 86	\$ 94	\$ 99
Dividends on common shares	24	28	32	35	40	45	50	50	53	55
Retained earnings—current year	24	26	29	32	32	34	34	36	41	44
Net earnings per common share ^a	\$ 1.99	\$ 2.21	\$ 2.48	\$ 2.69	\$ 2.90	\$ 3.14	\$ 3.33	\$ 3.44	\$ 3.73	\$ 3.93
Dividends per common share ^a	1.00	1.15	1.30	1.40	1.60	1.80	2.00	2.00	2.10	2.20
Assets, Liabilities, and Stockholders' Equity										
Inventories	\$ 169	\$ 149	\$ 157	\$ 189	\$ 183	\$ 205	\$ 256	\$ 214	\$ 261	\$ 261
Other current assets	144	180	200	171	204	206	180	230	266	303
Current liabilities	107	107	126	123	142	162	202	173	219	238
Working capital	\$ 206	\$ 222	\$ 230	\$ 237	\$ 245	\$ 249	\$ 234	\$ 271	\$ 308	\$ 326
Land, buildings, equipment, gross	203	221	247	289	328	375	436	477	517	569
Land, buildings, equipment, net	125	132	148	173	193	233	264	283	308	332
Long-term debt	49	44	40	37	35	34	23	37	54	61
Stockholders' equity	287	315	347	384	419	454	490	527	569	611
Stockholders' equity per common share ^a	\$11.78	\$12.87	\$14.07	\$15.46	\$16.80	\$18.17	\$19.53	\$20.99	\$22.64	\$24.32
Capital Program										
Capital additions	\$ 28	\$ 24	\$ 35	\$ 40	\$ 42	\$ 57	\$ 70	\$ 54	\$ 65	\$ 59
Depreciation	11	14	15	18	21	24	26	29	32	34
Employment Data										
Wages, salaries, and benefits	\$ 128	\$ 138	\$ 147	\$ 162	\$ 171	\$ 180	\$ 195	\$ 204	\$ 218	\$ 237
Number of employees (000s)	21	22	22	25	28	28	30	30	30	32
Assets per employee (\$ 000s)	\$ 21	\$ 22	\$ 23	\$ 22	\$ 22	\$ 23	\$ 24	\$ 25	\$ 29	\$ 29

Note: Column totals may not add exactly because of rounding.
^aPer share figures calculated on shares outstanding at year-end and adjusted for 2-for-1 stock split in August 1960.

EXHIBIT 4 Criteria for Evaluating Projects by General Foods Corporation

Source: The General Foods Accounting and Financial Manual.

The basic criteria to be applied in evaluating projects within each of the classifications are set forth in the following schedule:

Purpose of Project	Payback and ROFE Criteria
<p>a. Safety and Convenience:</p> <p>1. Projects required for reasons of safety, sanitation, health, public convenience, or other overriding reason with no reasonable alternatives. Examples: Sprinkler systems, elevators, fire escapes, smoke control waste disposal, treatment of water pollution, etc.</p> <p>2. Additional nonproductive space requirements for which there are no financial criteria. Examples: Office space, laboratories, service areas (kitchens, rest rooms, etc.)</p>	<p>Payback—return on funds projections not required but the request must clearly demonstrate the <i>immediate</i> need for the project and the lack or inadequacy of alternative solutions.</p> <p>Requests for nonproductive facilities, such as warehouses, laboratories, and offices should indicate the advantages of owning rather than leasing, unless no possibility to lease exists. In those cases where the company owns a group of integrated facilities and wherein the introduction of rented or leased properties might complicate the long-range planning or development of the area, owning rather than leasing is recommended. If the project is designed to improve customer service (such as market-centered warehouses), this factor is to be noted on the project request.</p>
<p>b. Quality:</p> <p>Projects designed primarily to improve quality.</p>	<p>If payback and ROFE cannot be computed, it must be clearly demonstrated that the improvement is identifiable and desirable.</p>
<p>c. Increased Profit:</p> <p>1. Projects justified primarily by reduced costs.</p> <p>2. Projects designed primarily to increase production capacity for an existing product.</p> <p>3. Projects designed to provide facilities to manufacture and distribute a new product or product line.</p>	<p>Projects with a payback period <i>up to ten years</i> and a ten year return <i>on funds as low as 20%</i> PBT are considered worthy of consideration, provided (1) the end product involved is believed to be a reasonably permanent part of our line or (2) the facilities involved are so flexible that they may be usable for successor products.</p> <p>Projects for a proven product where the risk of mortality is small, such as coffee, Jell-O gelatin, and cereals, should assure a payback in <i>no more than ten years</i> and a ten-year PBT return on funds of <i>no less than 20%</i>.</p> <p>Because of the greater risk involved, such projects should show a high potential return on funds (not less than a ten-year PBT return of 40%). The payback period, however, might be as much as <i>ten years</i> because of losses incurred during the market development period.*</p>
<p>d. Other</p> <p>This category includes projects which by definition are excluded from the three preceding categories. Examples: standby facilities intended to insure uninterrupted production, additional equipment not expected to improve profits or product quality and not required for reasons of safety and convenience, equipment to satisfy marketing requirements, etc.</p>	<p>While standards of return may be difficult to set, some calculation of financial benefits should be made where possible.</p>

*These criteria apply to the United States and Canada only. Profit-increasing capital projects in other areas in categories c1 and c2 should offer at least a ten-year PBT return of 24% to compensate for the greater risk involved. Likewise, foreign operation projects in the c3 category should offer a ten-year PBT return of at least 48%.

EXHIBIT 5 Capital Project Request Form of General Foods Corporation

Source: General Foods.

NY 1292-C 10-64
PTD. In USA
"Super" Facilities 66-42
Division & Location
Jell-O Division — St. Louis
Division & Location

December 23, 1966
Date

New Request Supplement
Expansion-New Product A
Purpose B

Project Description
To provide facilities for production of Super, chocolate dessert. This project included finishing a packing room in addition to filling and packaging equipment.

Summary of Investment	
New Capital Funds Required	\$200M
Expense Before Taxes	--
Less: Trade-in or Salvage, If Any	--
Total This Request	\$200M
Previously Appropriated	--
Total Project Cost	\$200M

Financial Justification	
ROFE (PBT Basis) - 10 Yr. Average	62.9
Payback Period	6.83 Yrs.
Not Required	<input type="checkbox"/>
* Based on Total Project Cost and Working Fund of	\$510M

Estimated Expenditure Rate	
Quarter Ending Mar. F19 67	\$160M
Quarter Ending June F19 68	40M
Quarter Ending F19	
Quarter Ending F19	
Remainder	

Other Information	
Major <input type="checkbox"/> Specific <input type="checkbox"/> Blanket <input type="checkbox"/> Ordinary	
Included in Annual program Yes <input type="checkbox"/> No <input type="checkbox"/>	
Percent of Engineering Completed	80%
Estimated Start-Up Cost	\$15M
Estimated Start-Up Date	April

Level of Approval Required	
<input type="checkbox"/> Board <input type="checkbox"/> Chairman <input type="checkbox"/> Exec. V.P. <input type="checkbox"/> Gen. Mgr.	

For Division Use—Signatures	
Name & Title	Date

Signatures		Date
Director Corp. Eng.		
Director B&A		
General Manager		
Exec. Vice President		
President		
Chairman		

EXHIBIT 5 (concluded)

INSTRUCTIONS FOR CAPITAL PROJECT REQUEST FORM NY 1292-A

The purpose of this form is to secure management's authorization to commit or expend funds on a capital project. Refer to Accounting and Financial Manual Statement No. 19 for information regarding projects to which this form applies.

NEW REQUEST-SUPPLEMENT—Check the appropriate box.

PURPOSE—Identify the primary purpose of the project in accordance with the classifications established in Accounting and Financial Statement No. 19, i.e., Sanitation, Health and Public Convenience, Non-Productive Space, Safety, Quality, Reduce Cost, Expansion—Existing Products, Expansion—New Products, Other (specify). Also indicate in the appropriate box whether the equipment represents an addition or a replacement.

PROJECT DESCRIPTION—Comments should be in sufficient detail to enable Corporate Management to appraise the benefits of the project. Where necessary, supplemental data should be attached to provide complete background for project evaluation.

SUMMARY OF INVESTMENT

New Capital Funds Required—Show gross cost of assets to be acquired.

Expense Before Taxes—Show incremental expense resulting from project.

Trade-In or Salvage—Show the amount expected to be realized on trade-in or sale of a replaced asset.

Previously Appropriated—When requesting a supplement to an approved project, show the amount previously appropriated even though authorization was given in a prior year.

FINANCIAL JUSTIFICATION

ROFE—Show the return on funds employed (PBT basis) as calculated on Financial Evaluation Form NY 1292-C or 1292-F. The appropriate Financial Evaluation Form is to be attached to this form.

Not Required—Where financial benefits are not applicable or required or are not expected, check the box provided. The nonfinancial benefits should be explained in the comments.

In the space provided, show the sum of The Total Project Cost plus Total Working Funds (line 20, Form NY 1292-C, or line 5, Form NY 1292-F) in either of the first three periods, whichever is higher.

ESTIMATED EXPENDITURE RATE—Expenditures are to be reported in accordance with accounting treatment of the asset and related expense portion of the project. Insert estimated quarterly expenditures beginning with the quarter in which the first expenditure will be made. The balance of authorized funds unspent after the fourth quarter should be reported in total.

OTHER INFORMATION—Check whether the project is a major, specific ordinary, or blanket, and whether or not the project was included in the Annual Program. Show estimated percentage of engineering completed; this is intended to give management an indication of the degree of reliability of the funds requested. Indicate the estimated start-up costs as shown on line 32 of Financial Evaluation Form NY 1292-C. Insert anticipated start-up date for the project; if start-up is to be staggered, explain in comments.

LEVEL OF APPROVAL REQUIRED—Check the appropriate box.

EXHIBIT 6 Financial Evaluation Form of General Foods Corporation (thousands of dollars)

Source: General Foods.

NY 1292-C 10-64
PTD. In USA

Project Request Detail	St. Louis Location					The Super Project					67-89		Date
	1st Per.	2nd Per.	3rd Per.	4th Per.	5th Per.	6th Per.	7th Per.	8th Per.	9th Per.	10th Per.	11th Per.	10-Yr. Avg.	Supplement No.
1. Land	\$												
2. Buildings	80												
3. Machinery & Equipment	120												
4. Engineering													
5. Other (Explain)													
6. Expense Portion (Before Tax)													
7. Sub Total	\$200												
8. Less: Salvage Value (Old Asset)													
9. Total Project Cost*	\$200												
10. Less: Taxes on Exp. Portion													
11. Net Project Cost	\$200												
*Same as Project Request													
Return of New Funds Employed—10-Yr. Avg.													
												PBT (C ÷ A)	PBT (B ÷ A)
A - New Funds Employed (Line 11)												\$380	\$380
B - Profit Before Taxes (Line 35)													\$239
C - Net Profit (Line 37)												\$115	
D - Calculated Return												30.2%	62.0%
Part Year Calculation for First Period													
Part Year Calculation for First Period												— Yrs.	
Number of Full Years to Pay Back												6.00 Yrs.	
Part Year Calculation for Last Period												0.83 Yrs.	
Total Years to Pay Back												6.83 Yrs.	
Funds Employed													
12. Net Project Cost (Line 11)	\$200	200	200	200	200	200	200	200	200	200	200		
13. Deduct Depreciation (Cum.)	19	37	54	70	85	98	110	121	131	140			
14. Capital Funds Employed	\$181	163	146	130	115	102	90	79	69	60			113
15. Cash													
16. Receivables	124	134	142	157	160	160	169	169	178	178			157
17. Inventories	207	222	237	251	266	266	281	281	296	296			260
18. Prepaid & Deferred Exp.													
19. Less Current Liabilities	(2)	(82)	(108)	(138)	(185)	(184)	(195)	(195)	(207)	(207)			(150)
20. Total Working Funds (15 Thru 19)	329	274	271	264	241	242	255	255	267	267			267
21. Total New Funds Employed (14 + 20)	\$510	437	417	394	356	344	345	334	336	327			380
Profit and Loss													
22. Unit Volume (in thousands)	1100	1200	1300	1400	1500	1500	1600	1600	1700	1700			1460
23. Gross sales	\$2200	2400	2600	2800	3000	3000	3200	3200	3400	3400			2920
24. Deductions	88	96	104	112	120	120	128	128	136	136			117
25. Net Sales	2112	2304	2496	2668	2880	2880	3072	3072	3264	3264			2803
26. Cost of Goods Sold	1100	1200	1300	1400	1500	1500	1600	1600	1700	1700			1460
27. Gross Profit	1012	1104	1196	1288	1380	1380	1472	1472	1564	1564			1343
Gross Profit % Net Sales													
28. Advertising Expense	1100	1050	1000	900	700	700	730	730	750	750			841
29. Selling Expense													
30. Gen. and Admin. Cost													
31. Research Expense													
32. Start-Up Costs	15												2
33. Other (Explain) Test Mkt.	360												36
34. Adjustments (Explain) Erosion	180	200	210	220	230	230	240	240	250	250			250
35. Profit Before Taxes	\$(643)	(146)	(14)	168	450	450	502	502	564	564			239
36. Taxes	(334)	(76)	(7)	87	234	234	261	261	293	293			125
36A. Add: Investment Credit	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	-	-			(1)
37. Net Profit	(308)	(69)	(6)	82	217	217	242	242	271	271			115
38. Cumulative Net Profit	\$(308)	(377)	(383)	(301)	(84)	133	375	617	888	1159			
39. New Funds to Repay (21 less 38)	\$818	814	800	695	440	211	(30)	(283)	(552)	(832)			

See Accounting & Financial Manual Policy No. 19 for Instructions.

INSTRUCTIONS FOR PREPARATION OF FORM NY 1292-C FINANCIAL EVALUATION

This form is to be submitted to Corporate Budget and Analysis with each profit-increasing capital project request requiring \$50,000 or more of capital funds and expense before taxes.

Note that the ten-year term has been divided into eleven periods. The first period is to end on the March 31st following the operational date of the project, and the P & L projection may thereby encompass any number of months from one to twelve, e.g., if the project becomes operational on November 1, 1964, the first period for P & L purposes would be 5 months (November 1, 1964 through March 31, 1965). The next nine periods would be fiscal years (F'66, F'67, etc.) and the eleventh period would be 7 months (April 1, 1974 through October 30, 1974). This has been done primarily to facilitate reporting of projected and actual P & L data by providing for fiscal years. See categorized instructions below for more specific details.

PROJECT REQUEST DETAIL—Lines 1 through 11 show the breakdown of the Net Project Cost to be used in the financial evaluation. Line 8 is to show the amount expected to be realized on trade-in or sale of a replaced asset. Line 9 should be the same as the "Total Project Cost" shown on Form NY 1292-A, Capital Project Request. Space has been provided for capital expenditures related to this project which are projected to take place subsequent to the first period. Indicate in such space the additional costs only; do not accumulate them.

EXHIBIT 6 (continued)

FUNDS EMPLOYED

Capital Funds Employed—Line 12 will show the net project cost appearing on line 11 as a constant for the first ten periods except in any period in which additional expenditures are incurred; in that event show the accumulated amounts of line 11 in such period and in all future periods.

Deduct cumulative depreciation on line 13. Depreciation is to be computed on an incremental basis, i.e., the net increase in depreciation over present depreciation on assets being replaced. In the first period depreciation will be computed at one half of the first year's annual rate; no depreciation is to be taken in the eleventh period. Depreciation rates are to be the same as those used for accounting purposes.

Exception: When the depreciation rate used for accounting purposes differs materially from the rate for tax purposes, the higher rate should be used. A variation will be considered material when the first full year's depreciation on a book basis varies 20% or more from the first full year's depreciation on a tax basis.

The ten-year average of Capital Funds Employed shall be computed by adding line 14 in each of the first ten periods and dividing the total by ten.

Total Working Funds—Refer to Financial Policy No. 21 as a guide in computing new working fund requirements. Items which are not on a formula basis and which are normally computed on a five-quarter average shall be handled proportionately in the first period. For example, since the period involved may be less than 12 months, the average would be computed on the number of quarters involved. Generally, the balances should be approximately the same as they would be if the first period were a full year.

Cash, based on a formula which theorizes a two weeks' supply (2/52nds), should follow the same theory. If the first period is for three months, two-thirteenths (2/13ths) should be used; if it is for 5 months, two-twenty-firsts (2/21sts) should be used, and so forth.

Current liabilities are to include one half of the tax expense as the tax liability. The ten-year averages of Working Funds shall be computed by adding each line across for the first ten periods and dividing each total by ten.

PROFIT AND LOSS PROJECTION

P & L Categories (Lines 22–34)—Reflect only the incremental amounts which will result from the proposed project; exclude all allocated charges. Include the P & L results expected in the individual periods comprising the first ten years of the life of the project. Refer to the second paragraph of these instructions regarding the fractional years' calculations during the first and eleventh periods.

Any loss or gain on the sale of a replaced asset (see line 8) shall be included in line 33.

As indicated in the caption Capital Funds Employed, no depreciation is to be taken in the eleventh period.

The ten-year averages of the P & L items shall be computed by adding each line across for the eleven periods (10 full years from the operational data) and dividing the total by ten.

Adjustments (Line 34)—Show the adjustment necessary, on a before-tax basis, to indicate any adverse or favorable incremental effect the proposed project will have on any other products currently being produced by the corporation.

Investment Credit is to be included on line 36-A. The Investment Credit will be spread over 8 years, or fractions thereof, as an addition to PAT.

RETURN ON NEW FUNDS EMPLOYED—Ten-year average returns are to be calculated for PAT (projects requiring Board approval only) and PBT. The PAT return is calculated by dividing average PAT (line 37) by average new funds employed (line 21); the PBT return is derived by dividing average PBT (line 35) by average new funds employed (line 21).

PAYBACK YEARS FROM OPERATIONAL DATE

Part Year Calculation for First Period—Divide number of months in the first period by twelve. If five months are involved, the calculation is $5/12 = .4$ years.

Number of Full Years to Payback—Determined by the last period, excluding the first period, in which an amount is shown on line 39.

Part Year Calculation for Last Period—Divide amount still to be repaid at the end of the last full period (line 39) by net profit plus the annual depreciation in the following year when payback is completed.

Total Years to Payback—Sum of full and part years.

NetFlix.com, Inc.

In July 2000, Reed Hastings, chairman and CEO of NetFlix.com, Inc., faced a critical decision. Three months earlier, following one of the worst episodes on record for the NASDAQ market, NetFlix had submitted its S-1 filing for its initial public offering (IPO).¹ As a result of the market downturn, many Internet companies had been forced to withdraw their IPOs. Investment bankers indicated to Hastings that NetFlix would need to show positive cash flows within a twelve-month horizon in order to have a successful offering. Hastings knew that NetFlix was at a crucial stage. With revenues doubling every six months, NetFlix was enjoying tremendous success. But continued success depended on the company's ability to sustain triple-digit growth for the foreseeable future. Soon, Hastings would have to decide whether or not to proceed with the company's anticipated IPO.

Hastings asked Barry McCarthy, the chief financial officer, to reevaluate the cash flow requirements of the company's current business plan, to suggest modifications that would improve the company's projected cash flows, and to make a recommendation on whether the company should go forward with its planned offering. As McCarthy reviewed the existing NetFlix business model, he considered possible changes that might allow the company to proceed with its planned IPO and yet sustain the type of future growth that would be necessary for the company to achieve its long-run objectives. McCarthy was acutely aware of the company's current financing need, but he worried about the effect that changes to the business plan might have on the company's current operations.

The Company

NetFlix.com, Inc., was founded in 1997 by Reed Hastings and Marc Randolph. NetFlix operated an Internet-based unlimited rental subscription service for digital video disc (DVD) formatted movies. The DVD provided a new technology for storing and playing movies with image and sound quality exceeding that of traditional videocassettes. A DVD was similar in size to an audio compact disc and was capable of holding an entire feature-length film, as well as additional information such as subtitles in different languages, additional shorter videos about the making of the film or other related subject matter, and information about the actors, director, and producers. With its high quality and additional features, the new DVD technology provided an attractive alternative to

¹After reaching a historical high of 5,048 on March 10, 2000, the NASDAQ Composite Index had fallen 25% to 3,794 by April 18, 2000, the day of the NetFlix S-1 filing.

Professor E. Scott Mayfield prepared this case. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

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