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### HDTV Systems

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# HDTV SYSTEMS

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## CASE DESCRIPTION

*The primary subject matter of HDTV Systems is capital budgeting within a mid-size electronics firm, and analysis of a possible merger with a large firm of international scale. HDTV Systems is recommended for students who have already had exposure to capital budgeting, cost of capital, and valuation techniques; thus, it is most appropriate for upper-level undergraduate students and second year graduate students. The case can be taught in two class hours, and student preparation should require no more than two hours.*

## CASE SYNOPSIS

*This case involves both quantitative and qualitative aspects of capital budgeting in a firm whose principal owner desires growth and new products but finds constraints primarily due to the size of the company. The case begins with a description of HDTV Systems as a closely-held company with limitations to growth. It presents limitations to funding and shortfalls in analytical processes. Cash flow estimates for a new consumer television product are presented as well as the project's internal rate of return and payback period. The student will learn that capital budgeting is a complex process going beyond calculations of investment worth.*

*As the analysis of the capital expenditure is carried out, HDTV Systems entertains being acquired by Global Electronics. The combination is seen as perhaps offering a more realistic setting for the large capital expenditure for manufacturing the new television project. The case draws out financial motivations for the potential merger, as well as projections of free cash flow for HDTV Systems as a division of Global.*

## INTRODUCTION

Capital budgeting constitutes one of the most critical processes in any business enterprise that seeks to take advantage of market opportunities while meeting the needs of its customers and shareholders. The accuracy of the estimation of revenues and operating costs will impact the reliability of actual cash flows, and the comparison of projected cash flows with the cash flows that ultimately result casts a picture of financial health for the organization. Management has the

responsibility to consider the challenges faced by the company to deliver profitable growth and cash generation in the midst of intense competition and increasing cost pressures.

## **BACKGROUND**

HDTV Systems, an electronics company, has been in business for the past 25 years. Its founder, David Carlson, recognized an opportunity for a regional television manufacturing company to satisfy the growing needs of an emerging middle class in the U.S. Early product designs were simple but adequate and the firm prospered as limited competition existed at the time. But as technology became more advanced and consumer income rose, consumer demand included more features and better quality, and new firms entered the market to compete for a share of the expanding business.

To stay ahead of competition, HDTV Systems undertook an ambitious expansion of the business by designing new models in response to changing customer needs. The Company also increased production capacity in order to maintain its market share in the region. Following these years of heavy investing activity, David Carlson placed his eldest son George in charge of a special assignment to review all recent capital expenditures of the firm. George was asked to evaluate all the major capital proposals presented by the managers of the organization and determine, in retrospect, which ones had truly merited implementation on the basis of the analysis provided and the projected versus actual cash flows. These capital expenditures were made based on the internal rate of return (IRR) measure, as well as the payback period. He felt that the IRR addressed the revenues and operating costs, and if a project's IRR covered the cost of capital and had something left over, the firm should benefit. George viewed the payback period as an indication of how long the firm's investment was at risk; however, he was uncertain about how quickly a payback should be.

George's evaluation of prior capital expenditures indicated that the majority of the projects underperformed relative to projections. Worse yet, all of the projects with large dollar investment were producing cash flows below projections. Similarly, the majority of projects were not on target to achieve their originally estimated payback periods. George began to wonder how the Company's future profitability would look given the disappointing actual cash flows from recent capital expenditures.

In the summer of 2005, George and his father held a meeting to review the performance of the business to discuss which direction the firm should take going forward. It appeared to David that the competition seemed to be gaining a larger share of the market. In turn, his company needed to aim for even higher thresholds of return in each decision it entertained or else it would find itself an average performer amidst increasingly superior competition. David, who had worked so hard to build the company, was unsure that his son appreciated the seriousness of the situation following their review of actual results.

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As a means to revive the company's financial performance, David and George began to explore the possibility of offering a new type of high definition television. They considered which components to make within the company, which to out-source, how to exploit the company's existing marketing/distribution channels, and product pricing. They estimated the following capital budgeting inputs:

- ◆ The project would have a total plant and equipment cost of \$22 million, and one-time start-up costs of 5% of the plant and equipment costs.
- ◆ The estimated life of cash generation by the project was eight years.
- ◆ Expenses were estimated at 89% of revenues.
- ◆ MACRS seven year depreciation was used; a 37% marginal, blended federal and state income tax rate was used.
- ◆ Investment in working capital was projected at 20% of the change in revenues.
- ◆ Product price was \$900, with expected unit sales as shown in Exhibit 1 below.

The high definition project was projected to earn a 13.5% IRR, which was very close to HDTV Systems 13% weighted average cost of capital. Also, the payback period was slightly over six years. While David wanted to move the company toward new products and becoming more profitable, he knew the analysis indicated the capital expenditure was only marginally feasible. He was also concerned that the actual cash flows from the project might fall short of predictions as other large projects had in the past. Last, he was concerned about the magnitude of funds that would have to be raised externally, and whether the cost of capital could turn out to be higher than 13% once the funds were sought and obtained. Ultimately, David decided to hold off on the project.

After long consideration, David decided to search for an outside buyer for the company which would have the resources and knowledge to insure the continued growth and prosperity of the organization after he was gone. He reasoned that a larger company could carry out his high definition television project more profitably through scale economies and access to lower cost capital. Along with a team of financial advisors, David began negotiating with a leading company in consumer electronics called Global Electronics.

From an operating point of view, there were a number of strengths that HDTV could bring to Global. First, HDTV Systems offered an opportunity to increase Global's business activity in a market where it has had a marginal presence. Global wanted to grow in various markets, and acquisitions appeared to be a cheaper and faster way to do so. HDTV has a product line similar to that of Global and had a distribution network in place as well as suppliers of long-standing. In addition, HDTV Systems' factories were filled with non-union workers, who were "cheaper" than its own workforce.

EXHIBIT 1 - Analysis of Capital Expenditure for Television Product by HDTV Systems															
IRR (Internal Rate of Return) Inputs and Calculation (in millions)															
Inputs:															
Project Capital, 100% at Year 0														\$22	
Revenues are Estimated over Eight Years															
Expenses as a % of Revenues														89%	
One-time up-front expenses as % of project costs														5%	
Depreciation based on MACRS Seven Year Depreciable Life															
Working Capital based on Change in Revenues														20%	
Tax Rate														37%	
Salvage Value is included in Net Cash Flow on an after-tax basis															
Annual NCF = (Change in Rev. - Change in Exp. - Change in Deprec.) * (1 - Tax Rate) + Change in Deprec. - Change in Work. Cap.															
Year	Change in Revenue	Change in Expenses	Change in Deprec.	Subtotal	Subtotal After Tax	Change in Deprec	Change in Work. Cap.	Salvage Value	Annual NCF	SUPPLEMENTAL DATA					
										Year	Product Price	Expected Quantity	Cost per Unit <sup>1</sup>	Operating Margin <sup>2</sup>	Total Rev. (Millions)
0									-22.0						
1	31.5	29.1	3.1	-0.7	-0.5	3.1	6.3		-3.7	1	900.00	35,000	579.87	0.36	31.5
2	67.5	60.1	5.5	1.9	1.2	5.5	7.2		-0.5	2	900.00	75,000	550.83	0.39	67.5
3	109.5	97.5	3.7	8.3	5.2	3.7	8.4		0.6	3	900.00	121,667	524.00	0.42	109.5
4	123.0	109.5	2.9	10.7	6.7	2.9	2.7		6.9	4	900.00	136,667	517.81	0.42	123.0
5	180.0	160.2	2.0	17.8	11.2	2.0	11.4		1.8	5	900.00	200,000	510.87	0.43	180.0
6	163.5	145.5	2.0	16.0	10.1	2.0	-3.3		15.4	6	900.00	181,667	511.50	0.43	163.5
7	120.0	106.8	2.0	11.2	7.1	2.0	-8.7		17.7	7	900.00	133,333	513.99	0.43	120.0
8	82.5	73.4	0.9	8.2	5.2	0.9	-7.5	3.0	15.4	8	900.00	91,667	510.68	0.43	82.5
<b>IRR = 13.5%</b>															
<b>PAYBACK PERIOD INPUTS AND CALCULATION (in millions)</b>														Notes:	
Payback = Year before Full Cost Recovery + (Unrecovered Cost at Beginning of Year / NCF Flow During Year)														1. Cost per unit is based on the change in expenses including depreciation, on an after tax basis.	
	Annual	Cumulative	Full cost recovery occurs just after the beginning of the sixth year.												
Year	NCF	NCF													
1	-3.7	-3.7													
2	-0.5	-4.2													
3	0.6	-3.6													
4	6.9	3.3													
5	1.8	5.1													
6	15.4	20.5													
7	17.7	38.2													
Payback = 6.09 Y=years														2. Operating Margin is based on product price and cost per unit.	

In addition, acquiring HDTV meant one less competitor out of the picture and although it was a horizontal merger, it did not appear that there would be any antitrust issues raised given the size of HDTV relative to the total industry. HDTV management had good connections with the existing customers of the firm as well as suppliers, and thus, the operations of the division would not be disrupted by the acquisition.

Furthermore, HDTV had already begun exploring the possibility of introducing a new product on the market similar to the one that Global was thinking about, but HDTV was further ahead in its market analysis and engineering design. Global had enough debt capacity (including available lines of credit) and cash reserves on hand to pay for its acquisition and thus financing costs would be brought to a minimum.

As Global management began to analyze the value of HDTV Systems, financial statements of HDTV were obtained. Based on these statements and other analyses, Global management developed the necessary inputs to a discounted cash flow (DCF) approach to the valuation. Importantly, certain synergies were identified primarily involving reduction in administrative costs; however, from the viewpoint of an acquiring firm, these potential savings would be excluded from the initial offering price it is willing to pay for the target.

Global management used the following assumptions and estimates in developing a DCF-based value of HDTV Systems:

1. Base year sales (2005) of \$250 million,
2. Growth rate in sales of 11.5% in the first forecasted year, and 5% per year thereafter,
3. Cost of goods sold at 51.8% of revenues based on historical cost of goods sold; this implies a gross profit of 48.2%,
4. Operating and administrative expenses at 42.5% of revenues,
5. Non-operating expenses at .2% of revenues,
6. Blended federal and state tax rate of 37%,
  - ◆ Depreciation at 2% of revenues,
  - ◆ Working capital at 3% of the change in revenues,
  - ◆ Capital expenditures for replacements at 3% of revenues,
  - ◆ A discount rate of 14%, and
  - ◆ Interest-bearing debt of \$15 million.

Using this input data, a value calculation of the target was made based on discounted cash flows as shown below as Exhibit 2. The analysis indicates an equity value of HDTV Systems of \$86,453,000.

Exhibit 2: Valuation Analysis of HDTV SYSTEMS Discounted Cash Flow Method Valuation									
				(Dollar amounts are in thousands)					
Description	Basis for Forecast		Base Year Amount	Year 1	Year 2	Year 3	Year 4	Year 5	
Net Sales Revenue, growing annually	See Note		\$250,000	\$ 278,750	\$ 292,688	\$ 307,322	\$ 322,688	\$ 338,822	
Less: Cost of Goods Sold	51.8%	Revenue		144,393	151,612	159,193	167,152	175,510	
Gross Profit	48.2%			134,357	141,076	148,129	155,536	163,312	
Less: Operating & Admin. Expenses	42.5%	Revenue		118,469	124,392	130,612	137,142	143,999	
Less: Non-operating Expenses	0.2%			558	585	615	645	678	
EBIT				15,331	17,269	18,132	19,039	19,991	
Less: Blended Income Tax	37%	EBIT		5,672	6,390	6,709	7,045	7,397	
Subtotal				9,659	10,879	11,423	11,994	12,594	
Plus: Depreciation	2.0%	Revenue		5,575	5,854	6,146	6,454	6,776	
Less: Working Cap.	3.0%	Change in Rev.		863	418	439	461	484	
Subtotal				14,371	16,315	17,130	17,987	18,886	Residual
Less: Capital Expenditures, Replacements	3.00%	Revenue		8,363	8,781	9,220	9,681	10,165	Value
Free Cash Flow				\$ 6,008	\$ 7,535	\$ 7,910	\$ 8,307	\$ 8,721	\$ 130,815
Times: Discount Factor	12.0%			0.8929	0.7972	0.7118	0.6355	0.5674	0.5674
Discounted Cash Flow				\$ 5,365	\$ 6,007	\$ 5,630	\$ 5,279	\$ 4,948	\$ 74,224
Sum of Discounted Cash Flows				\$ 101,453					
Less: Interest-bearing Debt				15,000					
Total Equity Value Indication				\$ 86,453					
Note: Estimated growth rate of sales is 11.5% in year 1, and 5% annually in all subsequent years.									

In late 2006, the firm was purchased for \$79 million by Global Electronics. Global wanted the complementary products that HDTV Systems produced and also benefited from the well-established distribution network that HDTV Systems enjoyed. This new acquisition became known as the HDTV Division of Global Electronics. Global was also highly interested in the high definition television project that HDTV Systems had developed recently, but had postponed thus far.