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### HDTV Division of Global Electronics, Inc.

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# HDTV DIVISION OF GLOBAL ELECTRONICS, INC.

**Alan J. Kirkpatrick, Andrews University**  
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## CASE DESCRIPTION

*The primary objective of this case is to describe realistic capital budgeting issues within a large organization. The case illustrates ways that staff inside a corporate finance department (and in related departments) position themselves in the capital planning process. The case also stresses steps that a large firm can take to leverage its size to gain the maximum benefit of investment projects. Further,, the case demonstrates sensitivity analyses in the capital budgeting process, and the resulting internal rates of return.*

*We suggest the case be used to follow the related case “HDTV Systems”, which shows the firm as a medium-sized enterprise and its capital budgeting issues before becoming a division of Global Electronics. This case should be used for students who have been exposed to capital budgeting in a prior course, either undergraduate or graduate. Class time should not exceed two hours, with approximately four hours of student preparation time.*

## CASE SYNOPSIS

*This case involves a need for a decision regarding a large capital expenditure. Students will find that capital planning involves not only the use of accepted capital budgeting techniques, but also a considerable impact based on staff viewpoints that reflect their particular department’s biases. Also explicitly presented are multiple levels of investment worth based on alternative, realistic assumptions. Students can verify IRR and payback calculations using Excel, and they will see that capital budgeting involves fragile forecasts and biases that managers bring to the analytical process.*

## INTRODUCTION

In the age of economic globalization, the survival and prosperity of most businesses depends on their ability to recognize new markets, identify higher quality yet cheaper sources of inputs, and establish well-coordinated networks between its internal units in order to take advantage of scale and strategic locations. Optimal capital budgeting procedures must take all these influences on

revenues and operating expenses into consideration in meeting the expectations of shareholders. This perspective must permeate all layers of the organization and take root in its culture in order for the broad objectives of the enterprise to be achieved. A higher standard for capital allocation must be utilized demonstrating the opportunity available to better align resources with enterprise objectives and realize greater returns.

## **BACKGROUND**

Global Electronics, Inc. is a multinational, multi-billion dollar enterprise. It operates several regional organizations across the globe, comprised of numerous operating divisions with the stated goals of creating customer loyalty, maximizing return on invested capital, and maintaining a competitive advantage. It faces challenges similar to many other large organizations as it attempts to ensure that its operating units have aligned goals, and that those goals reflect the realities and requirements for achieving success for the organization. The HDTV Division, which Global had recently acquired, manufactures strategically important products and is considered crucial to the corporation's future success. Its acquisition by Global Electronics added essential products to Global's full line of electronic products.

HDTV Division had demonstrated limited growth potential and lackluster profitability due to the saturated market it serves and fierce competition in the electronics industry. Although the division has managed to control operating costs through an aggressive productivity focus, the level of profitability has remained below that which is expected by the parent company. It was becoming increasingly evident that disparities exist between the incremental returns projected in capital proposals and the aggregated investment portfolio outcomes that are actually achieved. In addition, no significant strides have been made in market share.

In early 2007, at the urging of the headquarters' office, the division general manager, Mr. Bill Walsh, commissioned a review of the products the HDTV Division offered and the changes required to leverage the division's sales growth into improved pre-tax income and cash flow. It had become apparent that the division was falling behind in recognizing the changing tastes of a more sophisticated consumer. The general manager also recognized that sub-optimal production techniques were still in-place at a number of plants, which resulted in unfavorable product costs. It was extremely difficult to pass on those costs in terms of higher prices. The overall resulting division financial picture over the past five years was mediocre as seen below:

Year	2002	2003	2004	2005	2006
IRR	10%	13%	13%	12%	11%
Cost of Capital	9.25%	9.5%	10%	10.25%	10.50%

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Global Electronics evaluated capital expenditures using the same measurements as HDTV Systems, namely the IRR and the payback period. However, there was little that Global could do to affect the cost of capital since its determination was largely based on monetary policy, the cost of financing sources available to the firm, and taking the firm's debt usage as given. Therefore, the challenge was in improving sales and operational efficiency to significantly improve the returns from invested capital.

### **The New HDTV Project**

After conducting a market study, a proposal was made to introduce a new high-definition television using a new, leading edge display technology. This was an adaptation of the high definition project that HDTV Systems had considered but postponed. The product was named "UHDTV" to reflect the ultra high definition picture that the television delivers. In the first phase, the construction of a modern factory was recommended to build the new line of televisions. The general manager felt confident that consumers would rush to retail stores to replace their current television sets.

Ms. Violet Cunningham, the division capital planning manager, was keenly aware of the importance of the new product to the marketing staff. She was also aware of the importance of the project to the division which was already operating below capacity, yet the new product involved a capital proposal for a new plant. Therefore, she anticipated a close examination of the capital request.

### **Capital Expenditure Analysis**

The existing capital request process started with divisional evaluation of projects. The finance department at headquarters then gathered the requests from the various divisions and verified the conformance of the analysis submitted with company capital expenditure policy. Next, the finance department assembled the final group of requests that met the approval criteria and final approval from executive management was sought.

Ms. Cunningham knew that in order to get a project approved, she must be able to convincingly present the qualitative and quantitative benefits of the project. To accomplish this, she used the Company's standard Capital Request form which is divided into sections labeled "Project Rationale" and "Expected Financial Benefits".

The plant manager, Mr. Gene Thomson, has worked with the General Manager (Mr. Walsh) for 11 years and in general, they view capital requests similarly. In particular, they agree on the following basic premises:

1. Capital requests are competitive across divisions. Divisions making the best case for their projects tend to get more projects funded.
2. In the past, executive management has looked favorably upon non-traditional factors like quality improvements, even when the project did not meet the overall payback and rate of return thresholds. Additionally, the corporate finance department has in the past applied varying financial thresholds, so requested projects sometimes face an ambiguous level of scrutiny.
3. The management and employees of the division prefer to manufacture as many of their product's components as possible to reduce reliance on external vendors and to provide employment security. Mr. Walsh feels his division was "burned" with two recent relationships that involved components made by other suppliers (one was another company division) that had quality shortfalls. In another instance, the division felt they could have manufactured a component at a lower price than was available from an outside vendor but could not secure the capital to do so. In the end, it was very difficult to balance total cost of quality impacts, current and future capital availability, and near-term pressures to reduce factory costs.
4. Marketing has historically made decisions for new model launches that frequently left minimal time to transform designs and manufacturing specifications into next-generation finished products. The demands of consumers and increasing competition have led to this compressed idea-to-production time cycle.

In April 2007, after consulting with Mr. Thomson and Mr. Walsh, Ms. Cunningham began preparing the capital request for the new television product and developed an initial range of IRR outcomes. Her first analysis resulted in a calculated IRR of 10%, while her second analysis resulted in an IRR of 13.5%. She also calculated a payback period of just over six years. The IRR and payback estimates were surprisingly similar to the estimates developed by HDTV Systems. The development of the IRR and payback is shown in the Exhibit below. The 13.5% IRR level clears the 12.5% cost of capital threshold for approval, but Ms. Cunningham is concerned that her initial calculation which produced an IRR of 10% might actually occur, because that IRR was based on assumptions about price and expenses that could actually result after the capital was spent.

<b>EXHIBIT - Analysis of Capital Expenditure for Television Project by Global Electronics</b>															
IRR (Internal Rate of Return) Inputs and Calculations (in millions)															
Inputs:															
Project Capital, 100% at Year 0											\$22				
Revenues are Estimated over Eight Years															
Expenses as a % of Revenues											89%				
One-time upfront start-up expenses as % of project costs											5%				
Depreciation based on MACRS 7 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															
Price Decline assumption											4%				
Annual Net Cash Flow (NCF) Determination:															
NCF =(Change in Rev. - Change in Exp. - Change in Deprec.) * (1 - Tax Rate) + Change in Deprec.- Change in Work.Cap. + Salvage Value															
<b>OUTCOME I : INITIAL DIVISION ANALYSIS</b>															
	Change in	Change in	Change in	Subtotal	Subtotal	Change in	Change in	Salvage	Annual		SUPPLEMENTAL DATA - INITIAL DIVISION ANALYSIS				
Ye ar	Revenue	Expenses	Deprec.		After Tax	Deprec	Work. Cap.	Value	NCF		Product	Expected	Cost per	Operating	Total Revenue
0									-22.0	Year	Price	Quantity	Unit <sup>1</sup>	Margin <sup>2</sup>	(Millions)
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>INITIAL DIV. ANALYSIS IRR =</b>			<b>13.5%</b>												
<b>OUTCOME II : IRR with ANNUAL PRICE DROP in YEARS 4 through 8 and LOWER DEMAND</b>															
	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 8		SUPPLEMENTAL DATA - OUTCOME III				
	Change in	Change in	Change in	Subtotal	Subtotal	Change in	Change in	Salvage	Annual			90%	of original demand		
Ye ar	Revenue	Expenses	Deprec.		After Tax	Deprec	Work. Cap.	Value	NCF		Product	Expected	Cost per	Operating	Total Revenue
0									-22.0	Year	Price	Quantity	Unit <sup>1</sup>	Margin <sup>2</sup>	(Millions)
1	28.4	26.3	3.1	-1.1	-0.7	3.1	5.7		-3.3	1	900.00	31,500	588.23	0.35	28.4
2	60.8	54.1	5.5	1.2	0.7	5.5	6.5		-0.2	2	900.00	67,500	555.96	0.38	60.8
3	98.6	87.7	3.7	7.1	4.5	3.7	7.6		0.7	3	900.00	109,500	526.15	0.42	98.6
4	106.3	94.6	2.9	8.8	5.6	2.9	1.5		6.9	4	864.00	123,000	499.09	0.42	106.3
5	149.3	132.9	2.0	14.4	9.1	2.0	8.6		2.5	5	829.44	180,000	472.00	0.43	149.3
6	130.2	115.9	2.0	12.3	7.8	2.0	-3.8		13.6	6	796.26	163,500	454.09	0.43	130.2
7	91.7	81.6	2.0	8.1	5.1	2.0	-7.7		14.8	7	764.41	120,000	439.00	0.43	91.7

EXHIBIT - Analysis of Capital Expenditure for Television Project by Global Electronics															
8	60.5	53.9	0.9	5.8	3.6	0.9	-6.2	3.0	12.8	8	733.84	82,500	418.18	0.43	60.5
<b>OUTCOME II : IRR</b>		<b>11.9%</b>													
OUTCOME III : IRR from OUTCOME II plus 10% PURCHASE PRICE SAVINGS															
	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 8		SUPPLEMENTAL DATA - OUTCOME III				
	Change in	Change in	Change in	Subtotal	Subtotal	Change in	Change in	Salvage	Annual			90%	of original demand		
Year	Revenue	Expenses	Deprec.		After Tax	Deprec	Work. Cap.	Value	NCF		Product	Expected	Cost per	Operating	Total Revenue
0									-19.8	Year	Price	Quantity	Unit <sup>1</sup>	Margin <sup>2</sup>	(Millions)
1	28.4	26.3	2.8	-0.8	-0.5	2.8	5.7		-3.4	1	900.00	31,500	582.07	0.35	28.4
2	60.8	54.1	5.0	1.7	1.1	5.0	6.5		-0.4	2	900.00	67,500	550.83	0.39	60.8
3	98.6	87.7	3.4	7.5	4.7	3.4	7.6		0.5	3	900.00	109,500	524.00	0.42	98.6
4	106.3	94.6	2.6	9.1	5.7	2.6	1.5		6.8	4	864.00	123,000	497.63	0.42	106.3
5	149.3	132.9	1.8	14.6	9.2	1.8	8.6		2.4	5	829.44	180,000	471.30	0.43	149.3
6	130.2	115.9	1.8	12.5	7.9	1.8	-3.8		13.5	6	796.26	163,500	453.33	0.43	130.2
7	91.7	81.6	1.8	8.3	5.2	1.8	-7.7		14.7	7	764.41	120,000	437.96	0.43	91.7
8	60.5	53.9	0.8	5.9	3.7	0.8	-6.2	3.0	12.8	8	733.84	82,500	417.51	0.43	60.5
<b>OUTCOME III : IRR</b>		<b>13.2%</b>									Notes: 1. Cost per unit is based on the change in expenses including depreciation, on an after tax basis. 2. Operating Margin is based on product price and cost per unit.				

As the division continued its analysis of the television capital request, Ms. Cunningham received a call from an analyst named Mr. Joe Vitera in the Company's corporate finance department:

J. Vitera: "Violet, we are nearly finished with our follow-up analysis of your prior television projects. I want to share our findings with you."

V. Cunningham: "Sure, how are we coming out on that project?"

J. Vitera: "Your expected IRR was 15%, but the actual return so far is only 11.5% by our estimation. We know that prices have held fairly steady and production volumes are OK, but our analysis shows that expenses eroded the expected return. My manager believes that either we have to cut costs or the project could be at risk."

V. Cunningham: "The labor agreement in late 2004 didn't help with increased wage and medical costs. We were advised by headquarters back in 2001 to assume more slowly escalating labor costs. Also, electrical components we buy from an outside supplier have been priced higher than originally projected. We were able to reduce other component costs, but not by enough to offset".

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J. Vitera: “Yes, I agree with your explanations, but the return on the television project is still coming up too low. You may also need to factor in that Federated Electronics (a major competitor) is undercutting us on electronic product prices right now. Even though we’ve assumed fairly stable pricing, there are current indicators that this environment may be unfavorably changing. We may have to meet that threat while only realizing a modest price premium for our quality differential.”

Based on this telephone call, Ms. Cunningham surmises that while both the division and corporate headquarters want this and other capital projects to show high returns, the capital request for the UHDTV project will continue to receive close examination. She returns to work on the capital request with this additional informational burden and she is increasingly aware of the concern at headquarters about pricing.

As the capital budgeting process continued for 2007, Ms. Cunningham tries to factor in all the various considerations that she can call upon in arriving at the final capital request for the new television line. Her estimates include a 4% annual price drop beginning in the fourth year of the project life, as well as a forecast of lower unit demand. These changes reduce the expected IRR to 11.9%, below the 12.5% cutoff (see Outcome II in the Exhibit). Since the 11.9% IRR is below the threshold, division management begins to believe the project is only viable with a “protect position” argument where the investment has the benefit of maintaining the company’s presence in the market. Before the August 2007 capital request deadline, the division prepares to submit the project as an exception to the threshold. However, Mr. Walsh receives an email from the Procurement department indicating that another division of the company is putting in a capital request requiring equipment that can be purchased from the same vendor that the HDTV division plans to use for the new television production, and negotiations are underway to secure a discount from that vendor. This could benefit the UHDTV project.

Given the expected vendor discount, Ms. Cunningham is instructed by Mr. Walsh to assume a 10% reduction in the acquisition price of the production equipment. Based on the reworked capital request with the product price drop, the reduced demand forecast, and the reduction in the capital acquisition price from \$22 million to \$19.8 million, the expected IRR now stands at 13.2% (see Outcome III in the Exhibit).

Ms. Cunningham begins work on the “Project Rationale” section of the capital request form. She decides that she will develop this section by relating key company business objectives to the UHDTV project:

1. The product is expected to deliver innovation to the consumer through its leading edge display electronics not currently available on any current competitor models.



It is believed that the company will be the sole producer of the UHDTV technology for several years.

2. By offering a technologically advanced television at a small price premium over the competition, the division expects to increase market share. The estimated production volumes are modestly conservative.
3. While product quality is partially unknown at the outset and is better understood after the television is in use, tests of prototypes thus far are favorable even though the complexity of the product design has increased substantially. If high reliability occurs as planned, customers will become more likely to infer high quality attributes into other company products.
4. Because of the added costs for quality improvement and the cost of the sophisticated display, year-over-year targeted expense reductions are a weakness in the current plan.

The regional vice president, Ms. Lydia Parker, called her capital planning director, Mr. John Fremont, to discuss ways to identify winning projects that would enhance the overall performance of the HDTV Division and for that matter, all other divisions within the region. As a result of that discussion, the HDTV Division general manager, Mr. Bill Walsh, was asked to form a pilot committee of key people who would look at different aspects of capital budgeting. Using the new improvements identified, they were further requested to identify a new capital project that would make a significant impact on the bottom line of the division, utilizing the new capital budgeting processes to justify the proposal.

Meanwhile, when John Fremont saw the recommendation for the UHDTV television project arrive in his office mail, he requested that the division reconsider this capital proposal in light of the work the pilot committee was about to undertake. It might change their view toward the request.

### **The Pilot Committee**

As Bill Walsh considered membership for the special assignment, he found that many of the same people who had been involved in the UHDTV project would also make strong candidates for the general capital study. He named the following people to the pilot committee:

- Gene Thomson, the plant manager for the existing television factory (and the slated plant manager for the new UHDTV facility)
- Violet Cunningham, the capital planning manager supporting the division
- Joan Wolford, the marketing manager for the television business
- David Maroney, the procurement manager for televisions, and

- 
- Walter Blevins, a new but talented young design engineer just 11 months with the division

They were given six weeks to evaluate the current capital approaches, make recommendations for improvement, and identify and justify the next capital decision that the division should undertake to improve performance in a dramatic way. Following are additional elements of background information on the particular viewpoints taken by each team representative during the six week study and some direct excerpts from the report-outs where the team presented its conclusions and recommendations.

### **Marketing**

Joan Wolford had led the extensive market research that resulted in many of the specifics of the UHDTV project. She remained a strong advocate for that project as it was proposed and was adamantly opposed to any delays to its launch schedule.

Joan recognized that the historical performance trends for the division were merely average, in her terms, but also believed the finance staff had assumed all the worst in the financial sensitivities for the UHDTV project. She felt the UHDTV was a hit and would be the investment that would begin to turn the division's performance around.

### **Marketing Conclusions / Recommendations**

1. High definition televisions were strategically critical to the division. In Joan's view, however, this product category had been under-funded for several years and this was contributing significantly to lagging behind the competition and generating lackluster financial performance.
2. Through some new research, Joan discovered a complementary marketing opportunity that, if packaged with the UHDTV project, could turn a big hit into a mega-hit. Joan recommended that, for another \$4.5 million in capital, the division could enter production of a television stand with built-in surge suppression and wiring. Given an additional \$2 million in capital, the division could double available capacity for producing the stands. Joan believed they should enter the market strongly and secure commanding share quickly.

### **Design Engineering**

Walter had not directly supported the UHDTV project, but in quickly reviewing the project's background, he determined there were in fact significant advances in electronics and picture quality.

It seemed to him that the HDTV Division had moved beyond some historical technical competencies in the design of this new product.

There were many parts and component designs that the UHDTV shared with other products, but there were also even more new parts, new dimensions and new materials. Out of curiosity, Walter contacted one of his counterparts in another region to check on the marketed designs and specifications there. He found many, very close similarities but few exact matches. During a committee meeting Walter had inquired about this observation but was quickly educated that unique consumer requirements on a region to region basis made it impossible to borrow much from elsewhere in the company.

### **Design Engineering Conclusions / Recommendations**

1. Walter was not completely aligned with Joan's recommendations within the Marketing report. He did not dispute the research findings and agreed the design of the stand was "fairly straight-forward". However, he felt the stand did not draw upon any existing engineering organization talent, nor did it significantly leverage current equipment, products or designs.
2. Walter highlighted the risks of introducing new technologies, new materials, parts and components for what he termed, "essentially a hi-tech modification to our traditional product" – a comment that displeased Joan greatly.

### **Procurement**

David Maroney had been with the HDTV division for a long time. He knew all the suppliers, and he knew the plant staff held strong opinions about approaches to strategic sourcing.

David had been instrumental in identifying the opportunities for leveraging the manufacturing equipment purchases that had been added late to the UHDTV financial justification. In the minds of some, it could save the project. David had combined purchases from two U.S. divisions, and approached a familiar U.S.-based supplier with volume-leveraged price negotiations.

There were dozens upon dozens of details that made up the UHDTV capital request. David had worked closely with the project manager on identifying supplier sources, which activities they would do in-house, and which parts would be bid to new suppliers. David and the project manager had tried to minimize the number of new relationships and long-distance supply-chain arrangements because they knew from experience how these situations jeopardize an on-time and successful product launch.

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**Procurement Conclusions / Recommendations**

1. David didn't have a strong opinion on the television stand idea, but he did have a strong opinion about not wanting to be bothered with setting up suppliers (both equipment and materials) to support this new product.
2. David dismissed looking at suppliers of manufacturing equipment in China and elsewhere. He and the plant staff had heard the horror stories of mistakes in specifications, delays in deliveries, shortage of parts and seven day delays to get support in the plant when the equipment went down. David recommended using the familiar supply base names in the UHDTV proposal.

**Plant Manager**

Gene was excited about the UHDTV proposal. There was nothing better than taking over a new facility. Gene was an engineer by training and experience. He believed in his ability to successfully run a complex plant and this confidence extended into his opinions about outsourcing versus manufacturing in-house. Gene had never encountered a part that someone on the outside could make better than he could.

**Plant Manager Conclusions /Recommendations**

1. Gene liked the idea of the stand. It would be simple to make and would utilize floor space in the new plant, which would keep people busy.
2. Gene supported the capital recommendations as presented. He argued that many of the details – which showed a high degree of investment in support areas of production – proved that the plant could manufacture at a lower piece price than any of the outside supplier options. This would help his unit cost results.
3. Gene reluctantly disagreed with some of David's recommendations on supplier selection. Although he was very sympathetic to the risks to the operation by going to low-cost country sources, he could not dismiss some of the sizable capital savings projected. Gene considered saving capital on some of the supplier sources but re-investing the released funds back into the UHDTV/stand project in other ways, like flexible manufacturing equipment or spare tooling.
4. Gene sided with Walter's concern about the risks being introduced to the manufacturing environment through the complexity and changes to product designs. Gene's year-end performance evaluation was heavily influenced by product quality.

## Capital Planning

Violet was most familiar with the calculations of financial risk and return inherent in the UHDTV proposal. Privately, she had mixed feelings. Even at 13.2% IRR, it was difficult to view this as a spectacular return project, poised to turn the business around. To her, the facts did not support Joan's view that the analysis was overly conservative. Violet had a growing concern that maybe the downside was underestimated but she had already signed-off on the analysis.

Violet found elements of the project exciting in terms of consumer relevant benefits. It all sounded innovative when explained in detail by either the marketing or engineering organization. Yet, why didn't that seem to translate into a better pricing assumption?

Violet thought the television stand idea was interesting, but while Joan promoted it as clear, breakthrough innovation and growth, Violet could not help but wonder if this was really true.

## Capital Planning Conclusions / Recommendations

Violet ran the numbers on the television stand proposal and then folded the results into the previous UHDTV analysis. Her initial range of return estimates was 14-16.3%.

1. Violet was questioned during the team conference about the historical performance of the business and whether it warranted taking such a large investment gamble? Violet's reply sounded a lot like "this is the best we could come up with", and was unconvincing in terms of a total business turnaround. However, Violet did mention that if you doubled the television stand volume assumption and increased the share and pricing variables by enough, you could get the project to exciting return levels above 20%.
2. Violet was asked about opportunities to lower the amount of capital here or there and still maintain the overall financial attractiveness of the project. She commented that it was extremely difficult to accurately detach the capital and related benefit of particular product elements and the final pricing assumptions. In a sense, it was hard to really tell what was innovative, what was needed to support the innovation, and what was essentially traditional investing to add capacity, change a part, update a feature, or preserve existing market share.