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T.I.M 105

Homework 8
Product Strategy and economic analysis of Product Development

Schedule:
Review the homework -(5 minutes)
Brainstorm-(5 minutes)
Work on structure problem solving-(120 minutes)
Define the problem-(5 minutes)
Plan the treatment of the problem-(10 minutes)
Execute the plan-(30 minutes)
Check your work-(10 minutes)
Learn and generalize-(20 minutes)
Total time-(200 minutes)

1. Problem 1 Intel and Apple Platform and Product lines

Define the problem:

Create an appropriate table or diagram to summarize Apple and Intel's product platform / product line strategy, or lack thereof. Fill your table with appropriate information regarding Apple and Intel

If I were in charge what would I do differently

Plan the treatment

What information is available for solving the problem?
Notes
Class Handout on Apple and Intel product platform

Execute

Apple & Intel product platform/Product line strategy

Apple's product platform/ Product strategy	Intel's product platform / product strategy
• Apple, I created "build your – own" computer kit but turned into a microcomputer board for $667 • 1978 Apple II platform created • Apple III platform based on synertek 8 bit 650A microprocessor running at 2 MHz along with a keyboard and 143k internal disk drive was recalled for quality problems. • Apple III replaced 2 original models of Apple II	• 1971 created the first microprocessor product platform 4004 followed by the 8008 which is used in products such as traffic lights, gas pumps • 1974, 8008 microprocessors developed as an improved version • 1978 8086 16-bit platform introduced

• January 1983 the Lisa is introduced weighing 48lbs and featured a Motorola 6800 microprocessor, two 860k floppy drives and 5MS hard disk, detachable keyboard, one button mouse and a 12-inch built in monochrome display • January 1985 Lisa 2 renamed the McIntosh XL and an emulation program released to run Macintosh software in order to use a single brand • 1979 Macintosh platform begins releasing in 1984 • 1990's apple created several derivative platforms Mac II and Mac -LC platforms launched • 1991 -1992 Apple created Performa and Quadra platforms and powerbook which was a portable computer platform • 1987 Apple development a completely different product platform the newton, a personal digital assistant with ability to recognize handwriting as a primary user interface.	• 1982: 80286 platform introduced, and intel began to release multiple products for each platform • 1985: 80386 platform based on new 32 bit architecture increasing performance to 12 MHz • 1989: 80486 platform replaces the DX family and the SX family and had a built-in math coprocessor and performance that ranged from 25-33 MHz • 1993: Intel introduced Pentium platform w/5x the performance of 80486 • 1995: P6 architecture with the release of the Pentium pro platform which incorporated a second die with a high- speed memory cache to accelerate performance increasing to 200 MHZ • 1997: Pentium II platform introduced, and Intel optimized its design to deliver exceptional performance for business applications with a derisive platform created for mobile products • **Strategy shift** - Original: Powerful processors aimed at top end of computer segment as previous generation platforms migrated to lower-end market segment - **New** – used one core technology as foundation for developing several platforms to meet needs of multiple markets with multiple products

Apple –

Apple is a company, which thrives upon its success through its company brand. They focus on vertical integration for their microprocessors and software since it is only compatible

with Apple products. Although Apple created a product platform strategy, it wasn't efficient. They had poor planning and as we can see from the handout, their products were simply failures of the Apple III, the Lisa, and the Newton. In otherworld's, these products were inconsistent. However, the product that had the most success was the Macintosh; the mackintosh's success allowed apple to product more producers form there.

Intel –

Intel is a company that initially began with one product and then branched off from there to create a diverse range of product. They created a generation of products that proceed to be successful through its speed and quality. By developing one core technology, Intel was able to use its as foundation to develop several platforms to meet the needs of multiple markets with multiple products. As the diversity of its products increased, intel had to maintain a high-quality product. Not only did intel's product platform strategy show growth in its markets, it also showed an evolution of intel's platform management skills. Them structed strategic planning involved an introduction of new product every 3 to 4 years.

What would you do differently

If I oversaw Apple product strategy during the time-period 1976-1999, I would change the company's focus on creating numerous technologies but rather. I would focus on marketing them. Similar to the success of intel, I would tell the company to focus on one core technology that will become successful and will become the foundation to create derivative producers and other technologies. If this were the case. Other companies would perceive this 'core technology' as a formula for success and attempt to recreate it, thus giving apple the upper hand. In addition. I do not agree with apples strategy to use vertical integration, thus only allowing apple hardware and software to only work with other apple products. As of today, it would seem like this is a very god idea since a majority of consumers rely solely on apple products, but there was no way that could have been foreseen in the past and I feel that there would have been a great deal of revenue to be made if apple branched out and allowed their products to be compatible with everyone else. Lastly apple should fully test products before making them public to the market since its apparent that apple has a quality issue introducing new products.

Check your work

I believe that what intel did would lead to more success thus Apple should follow and beat intel to the punch

Learn and Generalize

Intel's product platform strategy was significant more effective than Apple's Intel used a core technology that other companies had access to, thus allowing them to collocate and product a wide diversity of products. I also learned that having a platform/Line strategy is very important because it guides the product with efficient planning, thus resulting in more successful product.

2. **<u>Product Platform/Product Line Strategy for an indoor mobile robot</u>**

Define the problem

Develop a simple product platform and product lines based on a well-defined product strategy for the indoor mobile robot design in the previous homework set. This mobile robot should be capable of performing moving indoors, climbing stairs, and performing useful tasks like cleaning

Plan the treatment of the problem

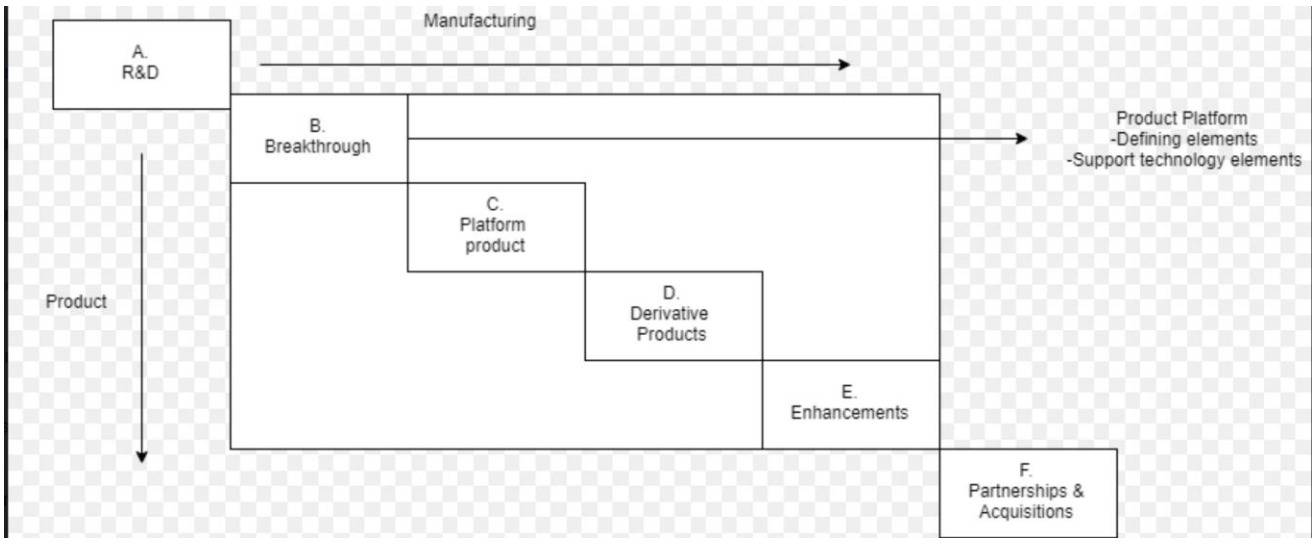
What information is available for solving the problem ?

Previous homework

Lecture notes

Execute the plan

Create the product platform strategy



Target Market Segments

SOHO	5% annual	5% annual	n/a	8% annual
College Students	10 annual	4% annual	6% annual	5% annual
Single households	7% annual	8% annual	8% annual	10% annual
	Robo cop	Kitchen aid	Bathruba tub	HardwoodX

We should market towards single households first because the weighted average is higher than other market segments. Derivative products seem more concentrated in certain areas of the home.

Multi-tasking capabilities while performing its main function, cleaning. Different styles and products allow for different functions and capabilities. Product line. Must be able to climb stairs, clean spills, vacuum, avoid walls. Introduce this product line in a manner to over the different market segments

Check your work

Learn and Generalize

By creating a product platform for the mobile indoor robot, we can determine what functions our products can do. These derivative products show what areas our potential products can specialize in. By doing this, we can reach out to a specific target customer if they prefer certain functions over others.

3. Financial Modeling for Technology Development

Define the problem

- Perform sensitivity analysis with respect to development cost, development time, unit manufacturing cost, and sales volume.
- Provide at least one specific trade off law, e.g, tradeoff between development cost and NPV.
- If manufacturing cost increases to $500/unit, what sales volume would be required to yield the same NPV? What strategic actions would be necessary to increase the sales volume ?

Plan the Treatment

What information is available for solving the problem?

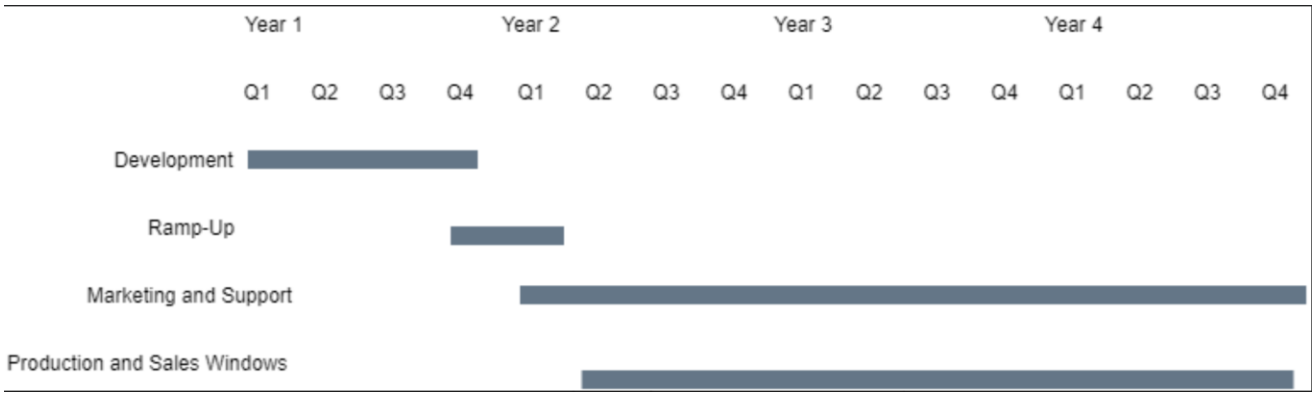
- Getting started using Excel
- Excel tutorial
- Product Development Economics

Execute the plan

Step 1 Establish the cash flow, presents and future associated with product development and commercialization

Base Case

Development Cost	$5 million
Ramp-up Cost	$2 million
Market and Support Cost	$1 million
Unit production cost	$400 per unit
Sales and production volume	20,222 units per year
Unit price	$ 800 per unit



1. All Cash Flows are converted to present value
2. Present value: “A Dollar today is worth more than a dollar a year form today”
3. All future cash flows needs to be discounted using the Discounted Cash flow Analysis
4. The Net Present value(NPV) is the sum of all the present values
5. [P] presents the value of cash($) and F is the future value of cash ($)
   Present value is the “inverse” of compound interest
   Present value: P=fm/(1+d)^n
   Compounded: Fn=P(1+r)^n

Development Cost

	Year 1			
Values in thousands	Q1	Q2	Q3	Q4
Development Cost	-1,250	-1,250	-1,250	-1,250
Period Cash Flow	-1,250	-1,250	-1,250	-2,250
PV Year 1, r=10%	-1,250	-1,220	-1,190	-2,089

Project NPV: 8203

+15% change in Development cost

	Year 1			
Values in thousands	Q1	Q2	Q3	Q4
Development Cost	-1,440	-1,440	-1,440	-1,440
Period Cash Flow	-1,440	-1,440	-1,440	-2,440
PV Year 1, r=+15%	-1,440	-1,440	-1,370	-2,265

New Project NPV: (Year 1 + rest) = -6475 + 13951 = 7476

-15% change in Development cost

	Year 1			
Values in thousands	Q1	Q2	Q3	Q4
Development Cost	-1,060	-1,060	-1,060	-1,060
Period Cash Flow	-1,060	-1,060	-1,060	-2,060
PV Year 1, r=-15%	-1,060	-1,035	-1,010	-1,910

New Project NPV: (Year 1 + rest) = -5015 + 13951 = 8936

Based off the charts, we can see that increasing development cost by 15% while holding other factors constant, causes the new project NPV to drop to 7476. The new total development cost increases form $5million to $5.75 million. If development time remains unchanged (one year), the spending during each quarter will increase from $1.25 million to $1.44 million. On the other hand, decreasing development cost by 15% while holding another factors constant causes the new project NPV to increases to 8936. The new total development cost Decreases from $5 million to $4.25 million. If development time remains unchanged (on year), then the spending during each quarter will decrease.

Development Time

	Year 1			
Values in thousands	Q1	Q2	Q3	Q4
Development Cost	-1,250	-1,250	-1,250	-1,250
Period Cash Flow	-1,250	-1,250	-1,250	-2,250
PV Year 1, r = 10%	-1,250	-1,220	-1,190	-2,089

Project NPV: 8203

+25% Development Time

	Year 1				Year 2	
Values in Thousands	Q1	Q2	Q3	Q4	Q1	Q2
Development Cost	-1,000	-1,000	-1,000	-1,000	-1,000	
Ramp-Up Cost					-1,000	-1,000
Market & Support						-250
Period case Flow	-1,000	-1,000	-1,000	-1,000	-2,000	-1,250
PV Year 1, r=10%	-1,000	-976	-952	-929	-1,812	-1,105

New Project NPV: 6,764

-25% Development Time

	Year 1				Year 2	
Values in Thousands	Q1	Q2	Q3	Q4	Q1	Q2
Development Cost	-1,666	-1,667	-1,667			
Ramp-Up Cost			-1,000	-1,000		
Market & Support				-250		
Period case Flow	-1,666	-1,666	-2,667	-1,250	-1,750	1,750
PV Year 1, r=10%	-1,666	-1626	-2,538	-1,161	-1,585	-1,547

New Project NPV: Development cost and Rev= =6991 + 15536 = 854

Unit Manufacturing Cost

	Year 2			Year 3				Year 4			
Values in thousands	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Production cost	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000
Volume	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000
Unit Cost	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
Period Cash Flow	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750
Pv Yr1, R= 10%	1,547	1,509	1,472	1,436	1,401	1,367	1,334	1,301	1,269	1,239	1,208

Project NPV: 8,203

+25 Unit Manufacturing Cost

	Year 2			Year 3				Year 4			
Values in thousands	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Production cost	-2,500	-2,500	-2,500	-2,500	-2,500	-2,500	-2,500	-2,500	-2,500	-2,500	-2,500
Volume	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000
Unit Cost	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Period Cash Flow	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250
Pv Yr1, R= 10%	1,105	1,078	1,052	1,026	1,001	977	953	929	907	885	863

Project NPV: -6881+10776=3895

-25 Unit Manufacturing Cost

	Year 2			Year 3				Year 4			
Values in thousands	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Production cost	-1,500	-1,500	-1,500	-1,500	-1,500	-1,500	-1,500	-1,500	-1,500	-1,500	-1,500
Volume	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000
Unit Cost	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Period Cash Flow	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250
Pv Yr1, R= 10%	1,989	1,940	1,893	1,847	1,802	1,715	1,673	1,715	1,632	1,592	1,554

Project NPV: -6881+19395=12514

The Difference between -25%/normal/+25% unit manufacturing cost are large. The corresponding NPVs are 3895,8203, or 12514. Lowering cost -25% allows for a fain of 52% in NPV and 25% greater cost, with a loss in NPV of 52%.

Sales Volume

	Year 2			Year 3				Year 4			
Values in thousands	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Production cost	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000
Volume	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000
Unit Cost	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
Period Cash Flow	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750
Pv Yr1, R= 10%	1,547	1,509	1,472	1,436	1,401	1,367	1,334	1,301	1,269	1,239	1,208

Project NPV: 8,203

+15% Sales Volume

	Year 2			Year 3				Year 4			
Values in thousands	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Production cost	-2,300	-2,300	-2,300	-2,300	-2,300	-2,300	-2,300	-2,300	-2,300	-2,300	-2,300
Volume	-5,750	-5,750	-5,750	-5,750	-5,750	-5,750	-5,750	-5,750	-5,750	-5,750	-5,750
Sales revenue	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600
Period Cash Flow	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050
Pv Yr1, R= 10%	1,812	1,768	1,725	1,683	1,641	1,601	1,562	1,524	1,487	1,451	1,415

Project NPV: -6881 +17669=10788

-15% Sales Volume

	Year 2			Year 3				Year 4			
Values in thousands	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Production cost	-1,700	-1,700	-1,700	-1,700	-1,700	-1,700	-1,700	-1,700	-1,700	-1,700	-1,700
Volume	-4,250	-4,250	-4,250	-4,250	-4,250	-4,250	-4,250	-4,250	-4,250	-4,250	-4,250
Sales revenue	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400
Period Cash Flow	1,450	1,450	1,450	1,450	1,450	1,450	1,450	1,450	1,450	1,450	1,450
Pv Yr1, R= 10%	1,282	1,250	1,220	1,190	1,161	1,133	1,105	1,078	1,052	1,026	1,001

Project NPV: -6881 +12498=5617

Provide at least one specific trade-off law, e.g., tradeoff between development costs and NPV.

As we can see from the charts above, the differences between -15% normal and +15% sales volume are significant. A 15% decrease in sales volume causes the NPV to drop by 31% where as a 15% increase causes and increase of 31%.

There is a negative correlation between NPV and Development Costs. As you can see from the graph above, an increase in development costs leads to lower NPV, and a decrease in development costs lead to higher NPV.

Check your Work

Followed the excel tutorial and use lecture notes as reference. I can assume that my work is correct.

Learn and Generalize

From this assignment, I learned that the sensitivity analysis shows the trade-offs in a simple and easily navigate-able manner. However, the senility analysis may be very difficult to produce without the initial information base case. What I Learned from this problem is that development time takes a toll on the outcome of the project. In, addition, the internal values of a project are just important as the externals.