

Feedback — HW4 Quiz: Market Research

You submitted this quiz on **Sat 20 Jul 2013 3:33 PM SGT (UTC +0800)**. You got a score of **13.00** out of **13.00**.

Question 1

Market Sizing: Public Comparables

For the following series of questions, use Yahoo Finance or Google Finance to look up revenue from the financial statements of public companies. A bottoms-up, constructive estimate of market size is determined by revenue: namely, how much are people willing to pay per year, in aggregate, for this product category? Note that we use the conventional notation of "100M" for 100 million, "1B" for 1 billion, "1T" for 1 trillion, and so on.

First question: using Google's 2012 [annual revenue](#) alone as a reference point, what is a lower bound for the current size of the search advertising market?

| Your Answer | Score | Explanation |
|--|-------------|-------------|
| <input type="radio"/> \$100M | | |
| <input type="radio"/> \$1B | | |
| <input checked="" type="radio"/> \$10B | 1.00 | |
| <input type="radio"/> \$100B | | |
| <input type="radio"/> \$1T | | |
| Total | 1.00 / 1.00 | |

Question Explanation

If you look at [Google's financials](#), 10B is really the right answer, as it's a lower bound. But search ads are probably going to get to 100B fairly soon, especially if you add up everyone else and take a wide view of what "search advertising" means.

Question 2

Using Illumina's 2012 revenue alone as a reference point, what is a lower bound for the current size of the sequencing hardware market?

| Your Answer | Score | Explanation |
|---------------------------------------|-------------|-------------|
| <input type="radio"/> \$100M | | |
| <input checked="" type="radio"/> \$1B | ✓ 1.00 | |
| <input type="radio"/> \$10B | | |
| <input type="radio"/> \$100B | | |
| <input type="radio"/> \$1T | | |
| Total | 1.00 / 1.00 | |

Question Explanation

[Illumina](#) did 1.15B in revenue last year. Very strong, and the market leader, but this emphasizes how young the sequencing space is at the moment.

Question 3

Using Facebook's 2012 revenue alone as a reference point, what is a lower bound for the current size of the social media advertising market?

| Your Answer | Score | Explanation |
|---------------------------------------|-------------|-------------|
| <input type="radio"/> \$100M | | |
| <input checked="" type="radio"/> \$1B | ✓ 1.00 | |
| <input type="radio"/> \$10B | | |
| <input type="radio"/> \$100B | | |
| <input type="radio"/> \$1T | | |
| Total | 1.00 / 1.00 | |

Question Explanation

[Facebook](#) did about 5B of revenue last year, so you can peg the size of the social media advertising market between 1-10B.

Question 4

Using Exxon's 2012 revenue alone as a reference point, what is a lower bound for the current size of the oil and gas market?

| Your Answer | Score | Explanation |
|---|-------------|-------------|
| <input type="radio"/> \$100M | | |
| <input type="radio"/> \$1B | | |
| <input type="radio"/> \$10B | | |
| <input checked="" type="radio"/> \$100B | 1.00 | ✓ |
| <input type="radio"/> \$1T | | |
| Total | 1.00 / 1.00 | |

Question Explanation

[Exxon](#) did \$467B in revenue last year and made \$44.8B in profit - truly astonishing numbers. Add up all oil and gas worldwide and the numbers are between 1-10T. Strictly as a lower bound based on Exxon alone, \$100B is right but it's a very conservative lower bound, so we accept both.

Question 5

Using Apple's revenue alone as a reference point, what is a lower bound for the current size of the smartphone and tablet market?

| Your Answer | Score | Explanation |
|---|-------------|-------------|
| <input type="radio"/> \$100M | | |
| <input type="radio"/> \$1B | | |
| <input type="radio"/> \$10B | | |
| <input checked="" type="radio"/> \$100B | 1.00 | ✓ |
| <input type="radio"/> \$1T | | |
| Total | 1.00 / 1.00 | |

Question Explanation

Most of Apple's 100B+ in annual revenue is coming from iPhones and iPads, and the growth is still incredible; see [here](#) and [here](#). But \$1T is still a reach.

Question 6

Basic Unit Economics

For the following series of questions, suppose that you are building widgets which have the following cost components:

- up front cost (widget design): \$1,000,000
- recurring cost (shipping): \$20 per unit
- recurring cost (manufacture): \$70 per unit
- recurring cost (product liability insurance): \$10 per unit

First question: How many units must you sell to break even if selling at \$200 apiece?

| Your Answer | Score | Explanation |
|--|-------------|-------------|
| <input type="radio"/> 1000 | | |
| <input type="radio"/> 5000 | | |
| <input checked="" type="radio"/> 10000 | ✓ 1.00 | |
| <input type="radio"/> 50000 | | |
| <input type="radio"/> 100000 | | |
| Total | 1.00 / 1.00 | |

Question Explanation

Very simple: $(\$200 - \$20 - \$70 - \$10) * 10,000 = \$1,000,000$.

Question 7

How many units must you sell to break even if selling at \$300 apiece?

| Your Answer | Score | Explanation |
|---------------------------------------|--------|-------------|
| <input type="radio"/> 1000 | | |
| <input checked="" type="radio"/> 5000 | ✓ 1.00 | |

☐ 10000☐ 50000☐ 100000

Total

1.00 / 1.00

Question Explanation

At \$300, your margin doubles to \$200 per unit, so it only requires half as many sales to break even. That's a big difference.

Question 8

What is the minimum amount of initial capital required for this business?

| Your Answer | Score | Explanation |
|-------------|-------|-------------|
|-------------|-------|-------------|

☐ \$10k☐ \$100k☒ \$1M

1.00

☐ \$10M☐ \$100M

Total

1.00 / 1.00

Question Explanation

Yeah, this is an easy one.

Question 9

Suppose you could spend \$500,000 to decrease the cost of manufacture from \$70 to \$50. How many incremental units would you need to sell at \$200 for this to be worthwhile?

| Your Answer | Score | Explanation |
|-------------|-------|-------------|
|-------------|-------|-------------|

☐ 10,000☒ 25,000

1.00

☐ 50,000

☐ 70,000

☐ 200,000

Total

1.00 / 1.00

Question Explanation

Any cost reduction is purely accretive to margin, so the price doesn't impact this. The calculation is simple: $\$500,000/(\$70-\$50) = 25,000$.

Question 10

Thinking like a VC: What's a doable deal?

For the following series of questions, consider two hypothetical businesses.

- The first is a social gaming company which requires three people for six months to build out a product. The timeframe involves wireframing, coding both Android and iOS versions, and playtesting. Assume the annual spend for casual social gaming is [around 5B](#), and the projection is that this product, if successful, will make a very strong 10M per year (.2% of the market) in the first 1 year after launch. Assume finally that the probability of success (of shipping a product) is 5% due to [technical risk](#).
- The second is a drug company which requires thirty people for [ten years](#) to build out a treatment for a disease. The timeframe involves not just doing the basic scientific research, but going through the US FDA's Phase I/II/III/IV process rather than working from the willing-patient/willing-doctor model of Banting and Best ([October 1920 concept to mid-1923 scaled production](#)). Salaries must be paid during this time period. The annual spend for this disease is 10B, and the projection is that this product, if successful, will make an incredible 1.5B per year (15% of the market) in the first 1 year after launch due to IP and [regulatory monopolies](#). Assume finally that the probability of success (of shipping a product) is 5%, due to technical and [regulatory risk](#).

Assume for extreme simplicity that the only cost in both businesses is salary. Assume further that the first business has employees at near-market salary for the Bay Area (say \$100,000 per year per person, all-inclusive) while the second business has dedicated, passionate people that will take 50% of market (say \$50,000 per year per person, all-inclusive) for the duration of the company. Finally, assume that each company does zero revenue until the launch of their product, at which point they pull up.

First question: what is the minimum total capital required for the first business?

Your Answer

Score

Explanation

☐ \$15,000

☒ \$150,000



1.00

☐ \$1,500,000

☐ \$15,000,000

☐ \$150,000,000

Total

1.00 / 1.00

Question Explanation

3 people x 1/2 year x \$100,000 = \$150,000, assuming salaries are the only constraint.

Question 11

What is the minimum total capital required for the second business?

Your Answer

Score

Explanation

☐ \$15,000

☐ \$150,000

☐ \$1,500,000

☒ \$15,000,000



1.00

☐ \$150,000,000

Total

1.00 / 1.00

Question Explanation

30 employees x 10 years x \$50,000 = \$15,000,000.

Question 12

Assume that a VC is trying to optimize the quantity:

$$\left(\frac{QMP}{SNT} \right)^{1/T}$$

Where:

- Q: probability of success, or one minus risk
- M: market size (in dollars)
- P: percent of the market attained in the first year
- S: average salary per person (in dollars per year)
- N: headcount
- T: time to market (in years)

This can be thought of as the amount of money returned divided by the cost of generating that money. Note that for extreme simplicity now we are assuming that revenue linearly corresponds to profit, and that margins are equally high in both businesses, so that we can think of "revenue" as corresponding to "money returned". The exponent comes from the fact that money returned in one year can, in theory, be reinvested in the next year in a new company. Thus a 2X growth factor per year is better than a nominally larger 3X growth factor over two years, as $2^2=4 > 3$. (A more sophisticated quantity is the [IRR](#)). That said, in general as more capital is deployed the growth factors tend to slow down: it's harder to get \$10M from \$1M than it is to get \$1M from \$100k. Still, just by this metric -- which business is better by the measure of first-year-revenue divided by cost to get to first-year-revenue, renormalized for time to market?

| Your Answer | Score | Explanation |
|---|-------------|-------------|
| <input checked="" type="radio"/> Business 1 (Social Gaming Company) | ✓ 1.00 | |
| <input type="radio"/> Business 2 (Drug Company) | | |
| Total | 1.00 / 1.00 | |

Question Explanation

That exponent is a killer, isn't it? Compounding is everything.

Question 13

In this example, which factor contributes most to the difference between the two companies?

| Your Answer | Score | Explanation |
|---|--------|-------------|
| <input type="radio"/> Salary | | |
| <input checked="" type="radio"/> Time to market | ✓ 1.00 | |
| <input type="radio"/> Headcount | | |

☐ Probability of success due to technical factors

☐ Market size

Total

1.00 / 1.00

Question Explanation

Time to market is everything, due to the compounding effect. This is a second and crucial consideration in addition to sheer market size.