

*Technology Ventures: From Idea to Enterprise*  
**End-of-Chapter Exercises: Answer Key for Selected Exercises (in Red)**  
**Authors: Byers, Dorf, and Nelson**  
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## Chapter 1

### **1.1 What is the difference between an idea and an opportunity? Why is this difference important to entrepreneurs?**

The primary purpose of this question is to ensure the student understands the distinction between having an idea for a company and the process of assessing if the idea is a viable opportunity. Many of the chapters and frameworks in this book address a number of the key questions an entrepreneur must answer about their idea to determine if it is worth pursuing and investing time and money to make happen. An opportunity can be considered a fully vetted idea where the customer need is clear, the market potential is assessed, the competitive landscape is understood, the market context is addressed, the barriers to competition and defensibility over time are understood, and the next steps that must be taken to start the new venture are clear. The business plan and business presentations are common methods of communicating and refining an idea to a specific, targetable opportunity. Figure 1.1 provides some of the key characteristics of an attractive opportunity.

1.2 Consider opportunities that have occurred to you over the past month and list them in a column. Then, describe your strong interests and passions, and list them in a second column. Finally, create a list of your capabilities in a third column. Is there a natural match of opportunity, interests, and capabilities? If so, does this opportunity appear to offer a good chance to build an enterprise? What would you need to do to make this opportunity an attractive chance to build an enterprise business?

### **1.3 Name an entrepreneur that you personally admire. Why do you consider this person to be an entrepreneur? What sets him or her apart from other business leaders? What path did this person take to entrepreneurship? What personal sacrifices or investments did this person make in the journey? What people were important to this person's success?**

There is no right or wrong answer to this question. But hopefully the student takes the characteristics of an entrepreneur outlined in this chapter and apply these characteristics to a role model. Some of the founders of companies in Table 1.1 would be appropriate. Table 1.3, Table 1.5, Table 1.6 and Table 1.7 outline many of the key personality characteristics associated with being an entrepreneur. It would be helpful for students to think about founders that have emerged from different parts of the organization. Many founders come from engineering background. However there are also many successful entrepreneurs from sales and other parts of an organization. The opportunities entrepreneurs identify are in many cases heavily weighted to past experiences and what levels of customer interaction are experienced. Repeat successful entrepreneurs are also a unique breed given the repeatability of delivering on their visions.

Personal sacrifices hints at the potentially all-consuming nature of starting a new business. Being an entrepreneur in many cases requires a significant investment of time and effort, at the expense of other life activities. It is important to recognize this tradeoff and address it honestly. Many successful entrepreneurs also point to key mentors they have had throughout their carriers. Mentors can provide guidance and much needed sounding boards for ideas.

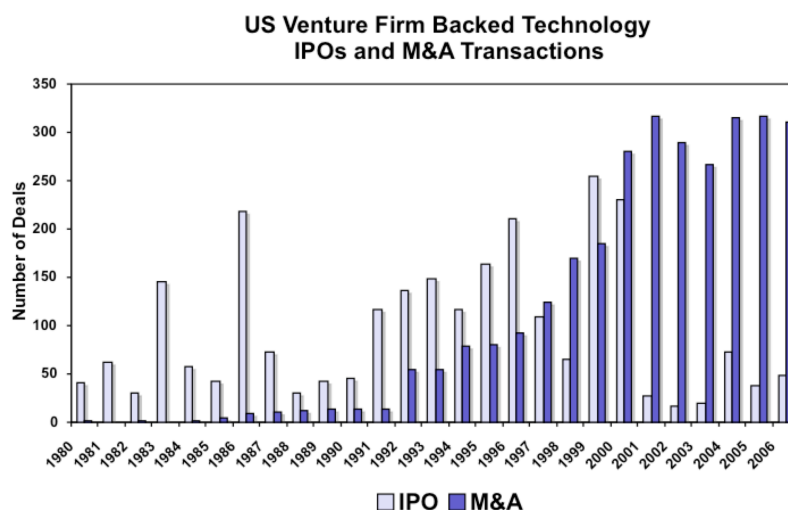
Entrepreneurs must have the ability to build a team of intelligent, passionate, hardworking people to help them fulfill their dream. Studeunts should be able to recognize this skill in the entrepreneur that they personally admire.

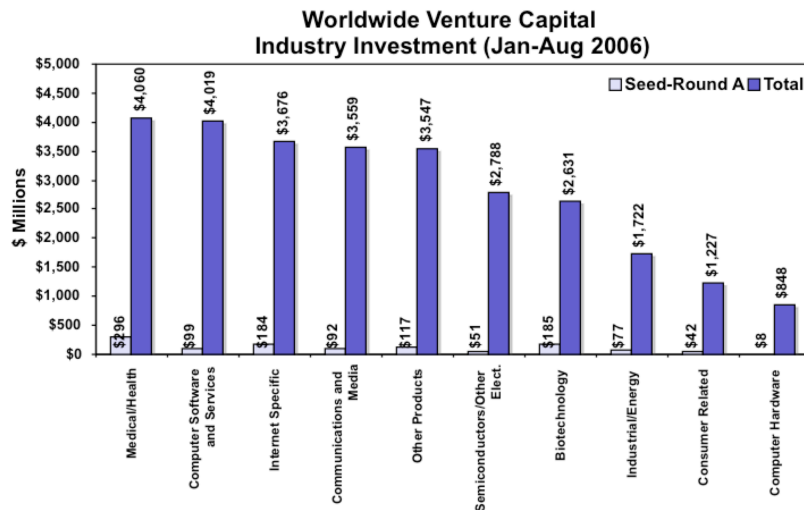
1.4 Name a successful entrepreneurial team you personally admire. How would you classify it in the context of the entrepreneur types defined in Table 1.5? Do the elements of entrepreneurship apply to it?

**1.5 Research the number of companies that either had an IPO (initial public offering) or have been acquired in the last five years. What industries were these companies in? Where is the number of IPOs vs. M&As (mergers and acquisitions) trend leading? What implications does this have on the number of new ventures being started?**

Since the dot com explosion and a tougher overall economic environment, it can be seen that acquisition is a more likely exit than IPO. The total number of exits has increased, however this should be weighed against the total exit valuations. IPOs have traditionally led to higher exit valuations than M&A. It is always dangerous for entrepreneurs to think too much or target specific types of exits. An entrepreneur should build his or her company as if it will be an independent stand-alone company. But it is relevant to consider the specific market dynamics the new venture is operating in and how value is being rewarded. For example, in the drug discovery space, it is unnecessary for the vast majority startups to create a go to market strategy, relying on a larger partner to take successful drugs to market (either in partnership or via acquisition).

Example charts:





**1.6** Given an understanding of the waves of innovation throughout history (Figure 1.5), explore opportunities that are created in a wave after the peak. For example, how can an entrepreneur take advantage of a mature or declining market?

For example, the vending machine marketplace is a declining market but vendors selling into that market are creating demand by wirelessly enabling machines that accept credit cards, track specific cash put into the machine, and phone home when they are out of a particular product.

## Chapter 2

### **2.1 One approach to classifying market entry is by (a) creating a new market, (b) attacking an existing market, or (c) resegmenting an existing market. Using Table 2.1, indicate how each of these categories of opportunities would be applicable to these market-entry approaches.**

Use Table 2.1 to analyze each of the above scenarios.

Creating a new market is challenging since there is no precedence (by definition) and users must be educated about the product or service. This can be expensive and require large marketing expenditures. It is also challenging if any type of consumer behavior change is expected or necessary for the company to be successful.

Attacking an existing market has the benefit that customers and price points are well understood. However, there are usually large competitors and challenges in stealing market share or differentiating from existing market options.

Resegmenting an existing market is usually focused on meeting an underserved need or segmenting the most attractive customers in a market. There are benefits since the market is established and the market size can be estimated. However similar to existing markets, there will be competitors to some degree.

Very different product and market entry strategies are recommended given these 3 different market types. Table 2.1 provides a list of suggested opportunities these market approaches would fall under.

### **2.2 What were some of the key customer, technology, and market trends that drove entrepreneurship during the last decade? What factors do you predict will drive entrepreneurial challenges in the next decade?**

The Internet (dot com and dot bomb), semiconductors, bio-tech, wireless, the ability to analyze large amounts of data, the emergence of smart devices, and medical devices are some of the frequently mentioned areas of change. Many of these markets have exhibited exponential growth rates and orders of magnitude performance improvements or cost declines. In defining these types of markets, characterizing each market opportunity as either a new market, a re-segmented market or an existing market is helpful in understanding the motivation for the trend. New markets are most often associated with entrepreneurs, creating a product where one did not exist before and bringing it to market. Many entrepreneurs have also looked at existing markets and either re-segmented the customers or improved upon what is currently done (process related, operational costs, distribution channels, etc.).

Convergence is a key theme in many forward looking markets. Old media navigating a new medium in the Internet is creating a number of new opportunities for both established and new companies. The Internet and the proliferation of mobile devices has created new channels and usage patterns of media. Social networking is in the middle of many media and communication

trends. Bio-tech investment continues to attract a significant amount of investment. With rising energy costs, investments in renewable energy or processes that are more efficient is expected to be a significant growth area into the future.

**2.3 The next big wave of innovation may be the convergence of bio-, info-, and nano-technologies. Each holds promise in its own right, but together, they could give rise to many important products. Describe one opportunity motivated by the convergence of these new areas, and write a story about the opportunity.**

Example: BACKGROUND: Ovarian cancer is the fifth leading cause of cancer deaths among U.S. women. It accounted for an estimated 25,400 new cases and 14,300 deaths in 2003. The 5-year survival rate is approximately 95% if it is detected early. However, symptoms usually do not become apparent until the cancer has reached an advanced stage (III/IV) at which point the survivability falls to 35%. CHALLENGE: Current protocol recommends screening only for women deemed to be at high risk because of personal or family history (up to 10 million in the U.S.). For this population it is recommended that Cancer Antigen (CA)-125 protein blood tests be performed on a regular basis. If CA-125 levels in the blood become elevated, the next step is a transvaginal ultrasound (TVUS). If the results of the ultrasound are abnormal, surgery is performed. This strategy is so poor that it is estimated that it takes four “needless” surgeries to find one case of ovarian cancer in asymptomatic women. This protocol does nothing for normal-risk women or those who develop ovarian cancer without elevated CA-125 levels. Still, an estimated \$80 million is spent on CA-125 tests annually in the US. RESOLUTION: Glycans (polymers of sugar) are fundamental to many biological processes including fertilization, immune defense, viral replication, parasitic infection, cell growth, cell-cell adhesion and inflammation. Dr Carlito Lebrilla of UC Davis, a leading expert in glycan analysis using mass spectrometry, has developed patent-pending techniques for identifying glycan biomarkers. In particular, he has discovered glycan biomarkers exclusively linked to ovarian cancer cells. Using only a chemical test of blood serum, his process accurately identifies not only the presence of ovarian cancer, but also the sub-type of and stage of cancer. The ovarian cancer test is currently in small-scale clinical trials. Dr. Lebrilla is confident that within the next year tests will also be developed for other adenocarcinoma (in the lining or inner surface of an organ) such as breast, prostate, lung, and pancreatic cancers. Glycometrix plans to become a leading cancer screening and monitoring company providing highly accurate, non-invasive, and cost-effective products for early stage cancer detection using novel proprietary glycan-based blood-serum testing technologies. If their ovarian cancer screening test were offered at \$100/test/year, the potential in this market would be 10 million (high risk population) times \$100/person, or \$1B/year. For more information, visit [www.glycometrix.com](http://www.glycometrix.com).

**2.4** Some imagine that within a few years it will be possible, through the use of stem cells, to create new cells and eventually new organs to replace those that fail. Summarize the potential opportunity for stem cell enterprises. How would you begin to estimate the size of this opportunity? Develop a story depicting the opportunity.

**2.5** As energy costs rise and the impact on the environment becomes clearer, clean tech has become an area of significant new investment. Quantify the trends driving this renewed investment interest. How would you evaluate and market size the clean tech opportunity?

- 2.6 Consider a software application you use regularly. What task(s) does it improve or enable? Suggest three ways the application could be improved. Would any of these improvements be considered an opportunity for a new venture? Why or why not?
- 2.7 **Global sales of radio frequency identification tags (RFID) and related equipment have been forecasted to explode multiple times in the last decade. Describe the problems solved by RFID and the opportunities presented. What have been the barriers to commercialization of this technology? What types of opportunities will be created when RFID tags are widely adopted in products?**

The RFID market received a huge endorsement and boost when Walmart mandated many suppliers in their supply chain move to RFID in the tagging of inventory. Walmart in a strong push towards inventory management improvement regards RFID as a key distribution network differentiator they can leverage to provide lower cost goods to their stores. The majority of the tagging is focused on warehouse level inventory tracking. There are a number of opportunities to expand RFID into the retail stores and into the vehicle distribution networks.

Walmart mandating a large number of their suppliers implement RFID has addressed one of the largest hurdles with RFID adoption. RFID tagging becomes valuable only when the flow of goods through the supplier network are enabled. Since it is an added cost to suppliers, they must have a strong financial incentive to make changes at such a drastic scale.

One of the key drivers of RFID will continue to be the cost of the RFID tags and readers and the accuracy of RFID detection. Passive and active RFID tags imply different costs (depending on if battery power is required or not in the tag). As RFID tags become cheaper, it becomes easier to embed in items. Currently, the majority of RFID tagging is targeted at pallets and larger collections of items. Many futurists believe RFID will eventually be cheap enough to embed in all sold items (including clothes and smaller items). Security becomes a larger concern when this occurs. Embedding passports with RFID tags has been at the center of much of the RFID security debate. If individuals only need to be within a certain distance of readers, large risks to personal privacy are created (especially if sensitive individual identification information is included in the tag).

Another area where RFID is expected to motivate change is in near field communications (NFC) which is enabled contactless commerce, connectivity, and content. This market is just emerging. The majority of NFC focus has been focused on the integration of NFC and cell phones, allowing easy payment to goods, transportation and other daily purchases. There are also examples of RFID tags that are used at gas stations for purchasing gas and items. NFC is focused on taking advantage of the simplicity of not requiring contact for a payment mechanism (i.e. requiring a credit card reader). It is still unclear where this market will go but strong wireless markets like Japan are exhibiting strong adoption of these NFC technologies.

- 2.8 The trend of performance of two electronic technologies is given in Figure 2.9. Determine the performance trend of another technology, and prepare a chart of its performance over time.**

Recognize both examples are on log scales, indicating both are improving at exponential rates.

A few additional examples might include: watts produced per meter squared for solar panels, accuracy of mammogram measurements, etc.