

Engineering Entrepreneurship: The Startup Life

ENGR 4302/5302; EE 4302/5302



**WHAT EVERY ENGINEER
SHOULD KNOW ABOUT
STARTING A
HIGH-TECH
BUSINESS
VENTURE**

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Some numbers

- ▶ In 2006:
 - ▶ VCs: 45B invested in startups
 - ▶ Feds: 77B to small firms (out of 340B total contracts)
 - ▶ SBIRs: 1.9B
-
- ▶ Message: Don't forget the **feds**; sometimes a way to start

ACCORDING TO ENTREPRENEURS

Would you give up your small business to earn more?

No — 61%

Yes — 39%

Source: Discover Small Business Watch.

The top reasons why individuals desire to start their new business:

- Identification of a market need — 29%
- Autonomy and independence — 18%
- Desire to make more money — 18%
- Desire to use knowledge and experience — 16%
- Enjoyment of self-employment — 7%
- Desire to show that it could be done — 5%

ACCORDING TO ENTREPRENEURS

Why did you start your own business?

The 2006 QuickBooks Small Business Survey by Intuit asked 1,300 small business owners why they decided to start their own businesses.

- Desired to be my own boss — 40%
- To turn my passion into a business — 23%
- Needed a job to supplement my income — 10%
- Desired more flexible hours — 10%
- Saw the need for the business in the marketplace — 9%
- Wanted to spend more time with family — 4%
- Wanted better pay — 3%

WHO'S WHO OF SUCCESSFUL STARTUPS

Successful startups are a verifiable who's who of our daily consumer life.

- We buy our books from **Amazon.com**, our iPods from **Apple Computers**, our computers from **Compaq** with **Intel** chips inside, and drugs developed by **Amgen** and **Genentech**.
- We search online with **Google** or **Yahoo!**.
- We send our packages with **FedEx**.
- We use software from **Microsoft** and **Oracle**.
- We buy office supplies and home building items from **Staples** and **Home Depot**.
- We get our coffee from **Starbucks**.
- We eat at **Outback Steakhouse**.
- We listen to concerts at the **House of Blues**.
- We buy groceries from **Whole Foods**.

Who just bought Whole Foods for a cool \$13.7B ?

LIKELIHOOD OF A STARTUP SUCCESS

The thought of building the next Google or establishing the next Genentech is obviously very attractive to a budding entrepreneur, but the likelihood of success for an entrepreneur is far from certain. In a 1998 article, author Bob Zider laid out the fragile environment for startups. According to Zider, if a startup company had an 80% probability of success in each of the eight key factors set forth in the study, the combined probability of success was only 17%, and, if just one of the factors for a company dropped to 50%, then the combined probability of success was only 10%. These eight factors are set forth below.

Individual event probability of success:

- Management is capable and focused — 80%
- Product development goes as planned — 80%
- Production and components sourcing goes as planned — 80%
- Competitors behave as expected — 80%
- Customers want the product — 80%
- Pricing is forecasted correctly — 80%
- Patents are issued and are enforceable — 80%
- Company has sufficient capital/resources — 80%

Combined probability of success — 17%

Source: "How Venture Capital Works" by Bob Zider, *Harvard Business Review*, November–December 1998.

ACCORDING TO ENTREPRENEURS

How much do you work?

- 28% of business owners surveyed work at least six days a week.
- 52% took off seven days or fewer for the year (*only* 36% of the overall population took off seven or fewer days).
- 36% of the small-business owners surveyed described a day off as “not working at all.”

Source: Discover Small Business Watch.

ACCORDING TO ENTREPRENEURS

Healthcare

Do you provide healthcare to your employees?

No — Approximately 75%

Yes — Approximately 25%

If you offer healthcare, have you considered curtailing coverage for yourself or your employees because of costs?

No — Approximately 33%

Yes — Approximately 66%

Source: Discover Small Business Watch.

ACCORDING TO ENTREPRENEURS

Peter Kooiman asked “Entrepreneur’s Hot 100” business owners about their “health” habits. This is what he found:

Smoker

Yes — 21.1%

No, I quit — 31.6%

No, I never have — 47.4%

The worst personal habit!

Work-life balance

Average hours per week you work — 59.39

Average hours per week you relax — 16.93

Body weight

Overweight — 13.9%

Average weight — 83.3%

Underweight — 2.8%

How often do you exercise?

Regularly — 52.6%

Some of the time — 42.1%

I don’t — 5.3%

Exercise = Energy!

Do you suffer from

High blood pressure — 10.5%

Headaches — 10.5%

Ulcers — 2.67%

Backaches — 13.2%

Stress — 34.2%

Source: <http://www.entrepreneur.com>, November 2000.

YOUR (OTHER) SIGNIFICANT OTHER

What could happen

You are considering starting a new business, but your spouse is highly skeptical of your plans.

Got to get that spouse happy!

What to expect

Starting a new business is a stressful endeavor; add to that a skeptical or even unsupportive spouse or family and the process could move from difficult to nearly impossible. Although this may seem obvious to some, starting your own business isn't simply like changing jobs. Being your own boss involves greater risk and uncertainty and may take some time before you regain the financial stability you find at a more established business. If possible, you should discuss the expectations of a new business venture with your spouse early in the process and hopefully try to obtain an agreement with respect to the amount of jointly held funds you are both willing to use in the endeavor. In addition, you and your spouse should discuss the increased work hours involved in forming a new business venture, the limits of vacation, and the fluctuations in the ability to draw a salary from the company. Some cities have organizations for spouses of entrepreneurs that can help provide more information and a support structure for the nonparticipating spouse.

TIP: Don't forget to include your spouse in your decision-making process to pursue a new business venture.

Do you have what it takes to be an entrepreneur?

Entrepreneurs share certain personality traits, including the following:

- Restlessness
- Independence
- Certain level of isolation
- High levels of self confidence

ACCORDING TO ENTREPRENEURS

What traits are important in successful entrepreneurs?

The 2006 QuickBooks Small Business Survey by Intuit asked 1,300 small business owners what they felt was the most important characteristic to be a successful entrepreneur. The respondents identified the following traits as the top three most important:

Hard work — 37%

Visionary — 19%

Good people skills — 18%

ACCORDING TO ENTREPRENEURS

What were you like as a kid?

A Small Business Survey asked 1,300 small business owners what they were like as a kid. The respondents identified themselves as follows:

- Loner — 43%
- Nerd — 25%
- Class clown — 20%
- Jock — 11%
- Bully — 1%

The takeaway from this survey? Looks like self-described bullies don't grow up to be entrepreneurs!

Source: 2006 QuickBooks Small Business Survey by Intuit.

Ask yourself these questions to see whether you have some of the right personality traits that are typically seen in startup founders.

- Do you like unpredictable situations?
- Can you be impulsive?
- Can you make important decisions without all the information?
- **Are you a hard worker?**
- Are you comfortable without lots of free time?
- Do you enjoy meeting people and building up a network of contacts and associates?
- Do you like to try new things?
- **Are you able to take criticism, learn from it, and then quickly brush it off?**
- Are you comfortable being uncomfortable?
- Do you listen to others when you make decisions?
- **Do you like to build up a team and lead it?**
- Do you enjoy forging your own path when rules, records, and protocol aren't yet written?
- Is your life and your family flexible when things come up?
- **Do you like the challenge of difficult problems with complex solutions?**
- Do you enjoy working as a part of a team?
- Do you read books, articles, and websites to learn everything you can about a new challenge?

ADDITIONAL RESOURCES

What Color Is Your Parachute? A Practical Manual for Job-Hunters and Career-Changers by Richard Nelson Bolles

If you are still wondering whether starting your own business is for you, consider this book. The book identifies two types of job hunts: a traditional job hunt and a life-changing job hunt. If you are considering starting your own business, check out the book or visit <http://www.jobhuntersbible.com> for more information.

StrengthsFinder 2.0: A New and Upgraded Edition of the Online Test from Gallup's Now, Discover Your Strengths by Tom Rath

This book is based on the popular personality assessment test from Gallup used by individuals to identify their strengths and weaknesses and find careers that most closely match these talents. Check out the book or take the assessment online at <http://www.strengthsfinder.com>.

Site works <http://www.jobhuntersbible.com/>

<https://www.gallupstrengthscenter.com/home/en-us/strengthsfinder>

A FEW COMMON “FOUNDER TYPES”

In their book, James Swanson and Michael Baird paint a picture of several common types of founder “characters” they’ve seen. Here are a few of those individuals:

- **Smart, passionate executioners:** These founders are very focused on the customer, approach the business with passion and discipline, and are the most likely to build successful businesses.
- **The paranoid:** These individuals are very hesitant to disclose any information and will require their own mother to sign a nondisclosure agreement before talking about their ideas. Oftentimes, once you get inside to hear about the idea, you realize it isn’t quite the revolution they’ve sold you on.
- **Entitled youngsters:** These founders “know people” who have made lots of money and seemingly done it without any effort. Obviously, for them, it won’t be that hard. They admire the soon-to-come rewards (and planning how to spend it) when success comes their way.
- **Dreamers:** Also known as “idea people,” they continue to spit out idea after idea and are convinced that “one of them will stick.” There is no separation of good versus bad ideas, nor is there any talk of execution. They don’t get distracted with implementation because it just prevents them from thinking about the “next big idea.”

A FEW COMMON “FOUNDER TYPES”(CONTINUED)

- **The “funding is the only problem” founders:** These founders are entirely focused on receiving venture capital. In fact, venture capital money becomes the endgame in and of itself. These founders are oftentimes more concerned about how they can get paid after raising the investment rather than building the business.
- **The “one pizza slice” founders:** The idea of these founders is too narrow, too limited, or too incremental to be a true business. Hence, they focus on their individual slice of the pizza rather than looking at selling the entire pizza. This could be a great “additional feature” of an existing product but probably can’t be a stand-alone business.
- **The “never met a customer” founders:** This is the true technocrat of the entrepreneurial world. This founder believes it is all about the product, in which the product is so “technologically superior” or “revolutionary” that customers will rush to buy it. If I build it, they will come. . . .

Based on information from Swanson, James A. and Baird, Michael L. *Engineering Your Start-Up*. Professional Publications Inc. 2003.

Am I too young?

- Many founders were at the ages of 25–27 at the time they formed companies such as Yahoo!, Skype, Google, YouTube, and MySpace
- Data shows (600 samples) that the median and mean ages of founders of European companies were 38 and 39.5 years, respectively. Founders of IT companies tend to be younger than in other fields.

THINK YOU ARE TOO YOUNG TO BE A SUCCESSFUL ENTREPRENEUR?

A quick look at a few examples of “young” entrepreneurs and their ages at the time they formed their companies:

- Michael Dell (Dell Computers, age 19)
- Mark Zuckerberg (Facebook, age 19)
- Bill Gates (Microsoft, age 20)
- Steve Jobs (Apple Computers, age 21)

Another famous example, Warren Buffett (Bill Gates' bridge partner and the chairman of Berkshire Hathaway) purchased his first stock at age 11, his first farm at the age of 14, and, at age 26, started the partnership that would go on to become Berkshire Hathaway.

A true gentleman!

Do 30-somethings represent the “sweet spot”?

- Founders in their 30s may represent the prime time for entrepreneurship because they are looking for “what’s next” in their careers and are armed with the right set of skills and experiences to find it. **Up to date too!**
- Each founder will need to find the right combination of holding the “correct” combination of experience and education, with the right timing for the business venture.
- The most crucial factor is your **network**, who you know or who you can get to know.

THINK YOU ARE TOO OLD TO BE A SUCCESSFUL ENTREPRENEUR?

A quick look at a few examples of “older” entrepreneurs and their ages at the time they formed their companies:

- Ray Kroc purchased and dramatically expanded (from just a single restaurant) McDonald’s at age 53
- Jim Clark formed Shutterfly at the age of 55
- Mike Ramsay was 47 when he cofounded TiVo
- Ely Callaway formed Callaway Golf Company at the “spry” age of 63
- Harland Sanders was 63 when he opened the first Kentucky Fried Chicken restaurant in his chain

IMMIGRANTS AND ENTREPRENEURSHIP

Twenty percent of all venture-backed public companies were founded by one or more immigrants to the United States.

Forty percent of high-technology, venture-backed public companies were founded by one or more immigrants to the United States.

Source: Stuart Anderson of the National Foundation for American Policy and Michaela Platzer of Content First LLC and commissioned by the National Venture Capital Association as part of its Maximizing America's Growth for the Nation's Entrepreneurs and Technologists (MAGNET) USA initiative.

What are the skills an entrepreneur will need?

WHAT TRAITS ARE OFTEN FOUND IN SUCCESSFUL ENTREPRENEURS OR BUSINESS LEADERS?

Research has identified a number of personality traits of successful entrepreneurs from restlessness and independence to heightened self-confidence, innovative, and action orientations. Below is a list of other skills that have been identified in successful founders and leaders of startup businesses:

- Instills a vision (and reminds others when they forget)
- Goal-oriented to keep the business on track and on target
- Practical, focused on solving problems efficiently rather than being “right” !!
- Leads by example and isn’t afraid to answer the phones, make the coffee, or call customers
- Effective brainstormer who gathers information to develop the best solutions
- A good listener who really hears what others say !!
- Strategic thinker focused on making decisions for tomorrow

WHAT TRAITS ARE OFTEN FOUND IN SUCCESSFUL ENTREPRENEURS OR BUSINESS LEADERS? (CONTINUED)

- Decisive when the time for discussion has ended
- Acts with integrity to maintain the reputation of the organization !!
- Good communicator who knows when a mass message won't do or when information has to be provided
- Genuine curiosity about all aspects of the business and all people involved
- Risk-taker who knows that a startup won't succeed by choosing to always play it safe
- Stubborn when the business needs stability and support
- Resilient when negative news hits or criticism arises
- Responsible for the actions of the company who isn't afraid to admit fault when needed
- Objective view of the company and not afraid to actively examine the business from an outsider's perspective !!

You'll be responsible for tackling the role of each of the following:

- **Dreamer:** The dreamer helps to identify the initial problem and understand whether a business concept exists to solve this problem; the dreamer serves as a **motivator**, a coach, and a visionary.
- **Planner:** The planner is responsible for setting out **specific, tangible, and time-focused** goals for the organization.
- **Implementer:** The implementer will need to balance the need for flexibility with the demands of rigidity required to successfully meet **customer needs**; the implementation stage involves managing people to a high degree.

FIND YOUR ENTREPRENEURIAL PERSONALITY TYPE

Author Darrell Zahorsky identifies nine different personality types for entrepreneurs in his online column “Your Guide to Small Business Information.” Zahorsky identifies these key personality types and things to watch for in each personality type.

Are you . . .

- an “**Advisor**” like John Nordstrom, the founder of Nordstroms?
- an “**Analyst**” like Gordon Moore, the founder of Intel?
- an “**Artist**” like Scott Adams, the creator of Dilbert, or Walt Disney of The Walt Disney Company?
- a “**Fireball**” like Malcolm Forbes, the publisher of *Forbes Magazine*, or Herb Kelleher, the founder of Southwest Airlines?
- a “**Hero**” like Jack Welch of General Electric or Lee Iococca of Chrysler?
- a “**Healer**” like Ben Cohen, the cofounder of Ben & Jerry’s Ice Cream, or Larry Page and Sergey Brin of Google?
- an “**Improver**” like Ingvar Kamprad, founder of IKEA, or Anita Roddick, the founder of The Body Shop?
- a “**Superstar**” like Donald Trump of Trump Hotels & Casino Resorts or Larry Ellison of Oracle Corporation?
- a “**Visionary**” like Bill Gates of Microsoft or Steve Jobs of Apple Computers and Pixar Animation Studios?

You may find that you are parts of each of these personality types and will inevitably find that each of these personality types will serve you well for particular situations you may face in the days of running your business. For more information or to read more, visit <http://sbinformation.about.com/cs/development/a/personality.htm>.

- There is no single background that yields successful entrepreneurs.
- For a first-time entrepreneur, much will be learned on the fly. **YES!**

DOES PREVIOUS STARTUP SUCCESS MATTER?

If you were at a venture-funded company that went public, does that increase your chances that your next startup will go public? What about if your previous company didn't go public? Or what if you are a first time entrepreneur? Research suggests that experience does matter, but maybe not as much as you might think and certainly is no guarantee of success.

According to a study of nearly 10,000 entrepreneurs who had started venture-funded companies, repeat entrepreneurs were only moderately more likely to see their company go public the second time around. The chances of success (taking a company public) in their second venture-backed company were as follows:

- Entrepreneurs who had previously started a company that went public — 30%
- Entrepreneurs who failed to take their previous venture-backed company public — 20%
- First-time entrepreneurs — 18%

Source: Paul Gompers, Harvard University, National Bureau of Economic Research.

EXECUTING ON YOUR BUSINESS

What could happen

You've got a great technical idea but limited business skills.

Watch out for

Technical excellence won't be enough in a new business venture. Make sure that, as a new business founder, you are prepared to focus on a full gamut of areas, including sales, marketing, accounting, law, human resources, and market forces. If you are weak in any of these areas (and even if you aren't), build a team to offer that support and take advantage of seminars, programming, and other opportunities to improve and learn. You won't need to be an expert in everything but remember that, with a lean team, you may need to handle certain responsibilities such as human resources or sales in the early days.

TIP: A successful business requires a founder familiar with business skills and a team with business experience.

Some boring stuff---get help!

The Best Small Businesses Opportunities for 2018

<https://www.thebalance.com/best-small-businesses-opportunities-4111809>

By: Susan Ward

Written 23-DEC-2017

Susan Ward is a business writer and experienced business person; she and her partner run Cypress Technologies, an IT consulting business, providing services such as software and database development. She has also run her own business as a computer/software instructor.

2018 business opportunities

Technical and nontechnical

1. Virtual Reality
2. Skilled Trades
3. Software Engineering and Development
4. Children's Services
5. Home Renovations
6. Bike Sales, Service and Rentals
7. Senior Care Services
8. Body Decoration Services (Piercings and Tattoos)
9. Counseling and Therapy
10. Financial Advisor/Planner
11. Gourmet Coffee
12. Facilities Support Services
13. Markets on Wheels: Food Trucks

Virtual Reality Ideas

- **3D movies** - watching a movie in 360 degree VR
- **Real estate marketing** - imagine searching for a new home and being able to take an online VR walk through of an advertised house from the comfort of your desk chair
- **Gaming** - VR is revolutionizing the gaming industry, with new VR titles being released on an almost weekly basis
- **Team-building exercises** - shaking up team building events with a group VR experience
- **Social media VR interaction** - friends will be able to interact in a virtual online space
- **Training** - VR can inject a much higher degree of realism into training scenarios. Many businesses (such as UPS) are launching new delivery driver training programs using VR.
- **Meditation** - VR is ideal for customized meditation

Skilled Trades Ideas

- Welding
- Carpentry and general construction
- Plumbing, pipefitting and steamfitting
- **Electrical and electronic control systems**
- **Heating, ventilation, air conditioning, and refrigeration (HVAC)**
- Machinists and Metalworkers
- Masonry
- Steelworking

Software Engineering and Development

- **Contract employment** - many software engineers start out as salaried employees and eventually become self-employed contractors.
- **Cloud computing and ease of remote access** - makes software development an ideal home-based business.

Home Renovations

- As individuals, where the contractor performs most or all of the work themselves.
- As general contractors, who hire and supervise employees or subcontractor who perform the work.
- As specialists in a particular area, such as bathroom or kitchen renovations, or niches such as restoring historic structures, **improving energy efficiency, or solar installations.**

Bike Sales, Service and Rentals

E-bikes have become very popular. E-bikes can be pedaled without electric power or use electric power to assist, and sales are expected to hit close to 50 million units by 2018. Regular pedal bikes can be converted to E-bikes with a kit that allows replacement of the front or back wheel hub with one containing a small electric motor and adding a battery and cabling.

Note: these are the personal opinions of Susan Ward

Checking her site in 2023: Hasn't changed that much.....