

Changing the World: Entrepreneurship:

How Innovation and Entrepreneurship Changes the World

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Chapter 1. Introduction to Innovation and Entrepreneurship: What is Entrepreneurship and who are the Entrepreneurs?

Most of you will come to this course with some understanding of what entrepreneurship is, who entrepreneurs are, and what those entrepreneurs do. We develop those understandings because of the things we read and see in the media and the people we meet in our lives. As with so many things, our personal experience is often a small window into the field and may or may not reflect the larger picture that could be developed with more extensive experience.

In order to create that larger picture, we need to draw upon both a larger set of experiences (primary research) and upon the research and study done by others (secondary research) who have taken a systematic look at the field. This research has also shown that there are some widely held misconceptions (often termed “myths”) about entrepreneurs and entrepreneurship.

We will consider some example entrepreneurs. We will confront the myths, and we will try to develop a more accurate and evidence driven insight into entrepreneurship, innovation, and entrepreneurs.

Technological Entrepreneurship



Figure 1 Charlier Chaplin in Modern Times
public domain

Inventions and applications of new technologies often change the world in very profound ways. In 1934 Joseph Schumpeter, a Harvard University economist originally from Austria proposed his theory of **creative destruction**. This simply suggests that new products and technologies make old products and technologies obsolete and completely replace them. Later we will look at many examples of this.

Creative destruction has occurred throughout history and has both positive and negative effects. Consider the

invention of the practical steam engine in 1765 by James Watt. This drove the following industrial revolution and remade transportation systems -eventually creating the steam ship

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and the steam locomotive.¹ Like all inventors, Watt built on earlier, but less practical work by others like Newcomen and Savery. There was even a crude version of a steam engine created by the Greek scientist Hero of Alexandria in the first century CE.² Like all technologies, before and since, there were those who resented and resisted the new ways. The Luddites in England often attacked factories and destroyed equipment. Today we often refer to those who resist new technologies as “Luddites.” In 1936, Charlie Chaplin, made a film depicting the challenges of living in “Modern Times” that captured the angst of those who found technological change difficult.

In the last 50 years we have seen the most incredible transformations by technology since the invention of the steam engine. In the 1970s the first personal computers began to appear and that catapulted Bill Gates (Microsoft) and Steve Jobs (Apple) into the region of the wealthiest individuals and most valuable companies in the world. The internet sensation started quietly as a military generated technology to reliably transmit data from computer to computer. By the 1990s it was going mainstream and kicked off the “dot-com era” which was a boom and bust but left us with Amazon, Google, Facebook, Netflix, Wayfair, and many other new and valuable companies. Of course, many other efforts collapsed along the way. These are the survivors.

Next came a boom and surge in interest in Bitcoin, Ethereum, Tether, and others. There was a surge of venture capital investments in this area followed by an epidemic of criminal prosecutions and a drastic drop in venture investment. There continues to be interest in these technologies, but investors are now much warier.

As of 2024, the most recent excitement is around Artificial Intelligence (AI). The surge of investment in companies like OpenAI, Google, IBM, Microsoft, NVIDIA, Amazon, and other smaller companies seems to be sustaining even though there is a little bit of leveling off as investors try to determine how AI will change the world. Much like the Luddites of the 19th century, there are very reasonable people who are questioning whether AI will be more positive or more negative.

Not all entrepreneurship is driven by technology, but the effects of technology on entrepreneurship and innovation have been profound for the last century and continue to accelerate.

Legal and Ethical Issues

Entrepreneurship, like many other professions, has its share of those who bent the rules a bit too much. “Fake it till you make it!” highlights the persistence of some leaders to overcome obstacles. Sadly, it is far too easy to do this until it crosses the line into

¹ <http://www.history.com/topics/industrial-revolution>

² <http://www.livescience.com/44186-who-invented-the-steam-engine.html>

fraudulent behavior. Nearly any entrepreneur has their critics, but the best draw reasonable lines of ethical and legal behavior.

Sadly, we will also meet some “entrepreneurs” who flagrantly violated both legal and ethical standards. We will do a case on the collapse of FTX crypto exchange led by Samuel Bankman-Fried. We will also meet Elizabeth Holmes of Theranos who is currently sentenced to 11 years in prison.

The good news is that we will meet many more entrepreneurs who have managed to meet ethical and legal standards and have changed the world in profound ways.

Meeting a few Entrepreneurs

By taking a brief look at a few entrepreneurs, perhaps we can glean some insight into who they are, what motivates them, and how they operate. We will want to build on this insight throughout the text by looking at the research that defines entrepreneurial characteristics, but having some concrete stories will illuminate the dry statistics. The most important thing to begin with is that entrepreneurs are a pretty diverse group of individuals. We will see that they do share some common characteristics, but that these are not defined by race, age, gender, or many other characteristics that some may think of first.

For example: would you invest in the motley crew in Figure 2? Unless you happen to recognize the young Bill Gates in the lower left corner, you may think the group looks a bit inexperienced. Actually, they were. But they built Microsoft.



Figure 2 Microsoft Founders
(courtesy of Microsoft)



Figure 3 Apple Founders Steve Jobs and Steve “Woz” Wozniak
(courtesy of Apple Computer)

These two guys in Figure 3 started their collaboration in a basement. They were as different as anyone could imagine but were united by a vision for creating computers that would be personally owned. They were not the first to do this, but, apparently, they did it better than anyone else. Steve “Woz” Wozniak was the technical genius who built the Apple I computer and did the technical work to build the Apple II.

Steve Jobs was not as technically oriented but had a passion and persistence driving him to combine design principles with a personal vision for how he felt that people SHOULD interact with computers. That passion and persistence, perhaps coupled with his lack of deep technical knowledge, led him to push his vision on the engineers—even when the engineers found it difficult to fulfill his vision. In the end they split because Woz felt that personal computers should be open systems in which users could tinker with hardware and software to make the computer do what they wished. Steve Jobs viewed the computer as more of an appliance for people who wanted to use the computer but had no desire to tinker with it. His vision created Apple computer with its brilliant designs but with closed hardware and operating systems. From that vision, combined with research that he largely adapted from the Xerox Palo Alto Research Center (PARC), he created the Macintosh computer and then the iPod, iPad, and iPhone. To this day they are tightly controlled hardware and software systems that only allow you to do the things that Steve Jobs thought you should do. Given the success of Apple, he must have been very good at figuring that out.

Consider these snapshots of entrepreneurs:

Bill Gates

Gates was a computer software whiz from Seattle who dropped out of Harvard to start his own software business.

When IBM decided to get into the personal computer business, they designed the first IBM PC hardware, but needed an operating system for the PC. An operating system already existed; it was called CPM. Writers argue about whether it was because IBM was too cheap to license CPM or simply because negotiations broke down for other reasons, but the result was that IBM looked around to find someone to write clone of CPM. They contracted with Gates and his fledgling company, Microsoft. To develop that operating system they built on an existing operating system that they purchased to create MS-DOS which IBM branded as PC-DOS. In what many consider one of the greatest business blunders of the time, IBM left the underlying rights to the operating system with Microsoft. Thus Microsoft was able to work with others who wanted to clone the IBM PC and those others MS-DOS. The rest is history (after long expensive lawsuits that is!)



Figure 4 Bill Gates
(Agency Brazil-Creative Commons
License)

Bill Gates and Warren Buffet originated “**The Giving Pledge**”,³ later joined many others, in which these wealthy entrepreneurs pledged to give most of their acquired wealth to charity.

Mother Theresa

She was born as Agnes Gonxha Bojaxhiu, and is an Albanian who was born in Macedonia. Her father was an entrepreneur in construction and trading. She became a social entrepreneur in India as the Founder of the Order of the Missionaries of Charity

Jim O’Keefe, who worked for GE, Image systems, and served as the second ILINC President, visited her during his GE period. O’Keefe called the GE CEO, Jack Welch, to tell him how she had created an incredible charitable enterprise with amazing entrepreneurial skill. “As the ranks of her congregation swelled and donations poured in from around India and across the globe, the scope of Mother Teresa's charitable activities expanded exponentially. Over the course of the 1950s and 1960s, she established a leper colony, an orphanage, a nursing home, a family clinic and a string of mobile health clinics.” “By the time of her death in 1997, the Missionaries of Charity numbered over 4,000 -- in addition to thousands more lay volunteers -- with 610 foundations in 123 countries on all seven continents.”⁴ Mother Teresa is an excellent example of a Social Entrepreneur whose focus is primarily upon solving a social problem rather than making a financial profit. We shall see that other social entrepreneurs, like Muhammad Yunus or Harish Hande, operate for-profit enterprises that are designed to solve important social problems. Social Entrepreneurship can be either non-profit or for-profit.



Figure 5 Mother Teresa
(Photo: © 1986 Túrelia (via Wikimedia-Commons), 1986 / Lizenz: [Creative Commons CC-BY-SA-2.0 de](#))

³ <https://givingpledge.org/>

⁴ <http://www.biography.com/people/motherteresa-9504160>

Rajia Abdelaziz and Ray Hamilton

Ray and Rajia met in their engineering classes at UMass Lowell and began working together on projects. After hearing of the Difference Maker Program at UML, they decided to enter. In 2016, Ray and Rajia won the Difference Maker's Idea Challenge as the Most Innovative Solution. It carried a \$4500 prize to help the startup. In the summer of 2017, they were invited to join the 2017 Mass Challenge international startup accelerator, which helps emerging businesses refine their products and business models - 1,700 companies applied, and only 128 were accepted into the start-up program.



Figure 6: Rajia Abdelaziz and Ray Hamilton
-founders of invisawear

The idea came from Rajia's personal experiences as a young woman navigating her way in an urban area. They tell the story on the company website⁵:

One night after an event with Ray, Rajia was walking back to her car when a car full of guys rolled down the window and started yelling inappropriate comments, the car stopped and one of the guys started to get out. Luckily, Rajia was able to run and get in her car, unharmed. Though she was now safe, Rajia felt completely helpless. Although her phone was right in her purse, she didn't have that split second to find her phone and call the police or her friends who were still inside, at the event, less than a block away.

Rajia (invisawear's CEO) and Ray (invisawear's CTO) first started working on invisawear while in college. After exploring safety devices that provide S.O.S solutions, Rajia and Ray felt defeated. The current options were too big and bulky, or displayed a "panic button" feeling. They wanted a stylish, discreet S.O.S device, ideal for everyday wear. Thus, invisawear was born! -

Rajia was also the President of the campus chapter of the Society of Women Engineers and was disappointed in the attendance at evening meetings. Students told her that they did not like to have to walk across the bridge in town between the dorm area and the engineering buildings at night. She suggested carrying pepper spray, but then some of them showed her how easy it was to take it away and turn it back on her. There had to be a better way.

In February 2018, they launched a 30-day IndieGogo crowd funding campaign and met their \$20,000 goal in a week –eventually raising \$36,432. They nearly doubled their original goal!

They earned more than \$15,000 in prizes, They raised \$100,000 in their first round of funding. They were also one of three companies that received the first loans from a new, \$1 million fund operated by the Lowell Development and Financial Corporation.

⁵ <https://www.invisawear.com/>

By mid 2018 they were selling their first products at \$129 per device. After their product became nationally known when it saved the life of a woman who had crashed her car into a ravine, they were covered by ABC, Forbes, and many other national news media interviewed them. In 2020, they created a partnership with ADT security.⁶ In 2023 they acquired their rival: Flare.⁷

They have been very successful from modest beginnings. Their story is “to be continued.” Further information may be found in an ongoing case study⁸ of [invisaWear](#).

John Pulichino ‘67

John Pulichino graduated from Lowell Technological Institute, the pre-cursor to UMass Lowell in 1967 with his degree in industrial management. After graduation he entered Northeastern University to obtain a master’s degree in engineering management. John became the director of industrial management at the Polaroid Corporation during the 1970s.



Figure 7 John Pulichino and Joy Tong
Photo -UML

The Polaroid Camera was a huge success and the company grew rapidly. Unfortunately, the Polaroid Company is also a dramatic example of Joseph Schumpeter’s principle of “Creative Destruction” -as the new technology of digital cameras quickly made the Polaroid camera obsolete and put Polaroid out of business. John became the CEO of American Tourister until that company was sold. He founded Innovation Luggage in 1993 but was bankrupt by 2001.

Joy Tong had founded Group Three International Limited in 1984. He joined her company and became CEO, and she took the role of Creative Director. They also married. In 2003, he executed a brilliant business and branding move by getting a licensing agreement between Group III and Wenger, maker of the 100-year-old Genuine Swiss Army Knife brand. Together John and Joy have built a company that, since 2003, has done more than \$400 million in sales. With offices in Florida, Taiwan and China, Group III now distributes more than 60 products through Target Stores alone. They sold the company to a private equity group, but remained involved with its operations. He recently sold the firm to private equity group, but in 2015 they bought the company back from the private equity group.

They have donated about \$5 million to UML for scholarships and the Pulichino-Tong Building which houses the Manning School of Business.

⁶ <https://newsroom.adt.com/corporate-news/invisawear-and-adt-collaborate-next-generation-wearable-safety>

⁷ <https://www.bizjournals.com/boston/inno/stories/news/2023/03/20/smart-bracelet-safety-startup-flare-acquired.html>

⁸ <http://www.jackmwilson.net/Entrepreneurship/Cases/Case-Invisawear.pdf>

Elon Musk

Elon Musk was born to a wealthy South African family in 1971¹⁰. Apparently, he showed an early inclination to squabbling with others. After he was beaten up in a fight at school his father described his assailant as *"The boy had just lost his father to suicide and Elon had called him stupid. Elon had a tendency to call people stupid. How could I possibly blame that child?"*¹¹ He was then moved to a private school.

At 18 he moved to Canada, became a citizen, and entered Queens University. After a couple of years, he transferred to the University of Pennsylvania and graduated with dual degrees in Physics and Economics.



Figure 9 -Elon Musk -Alain Jocard/Getty Images

In 1995 he founded a company with his brother and sold it to Compaq for \$307 million. Then he founded X.com, a direct bank. After merging with another company to create PayPal, and the result was sold to eBay for \$1.5 billion. He took \$100 million from that sale and founded SpaceX in 2002. In 2004, he invested in Tesla which had been founded in 2003 by Martin Eberhard and Marc Tarpenning. As the largest shareholder he quickly asserted control and was named the CEO in 2008. Tesla went on to do what most felt was impossible: it offered an electric automobile and went into direct competition with companies like GM, Ford, and Toyota. It became the most valuable automobile company in the world. Tesla took advantage of government subsidies, demographic trends, technology advances, and economic forces to facilitate that meteoric rise.

He was a prolific entrepreneur founding Solar City (later Tesla Energy), Open AI, The Boring Company, and Neuralink. In 2022 he acquired Twitter for \$44 billion after a legal battle in which he tried to get out of the deal due to the exorbitant price.

In later years he has taken many controversial political stances that some feel have hurt his businesses. The Elon Musk story is a work in progress and if the past is a guide to the future, one might expect a lot more controversy.

¹⁰ https://en.wikipedia.org/wiki/Elon_Musk

¹¹ Bhaimiya, Sawdah; Business Insider "Elon Musk denies berating his son after an attack at school put Elon Musk in hospital"; December 5, 2023

Robert “Rob” Manning ‘84

Rob is the Chairman and CEO of MFS Securities. He is credited with saving a company that nearly expired! “For the rare comeback story among money managers, look to MFS Investment Management, one of the oldest names in the mutual fund business but also one of the most battered after the Internet bubble popped in 2000.” –Institutional Investor noted that “*CEO Manning described his approach as the opposite of the star system used by some rivals. Employees are expected to work closely together and sacrifice their egos as necessary; even fund managers with terrific performance records will face bonus cuts if they do not treat other employees respectfully, he said.*”



Figure 10

Robert “Rob” Manning ‘84 with Jack M. Wilson, Judi Wilson, and Donna Manning (photo-UML)

Rob and Donna (Nursing ‘84) have donated double digit millions of dollars to their alma mater UMass Lowell and to the other UMass campuses.

Manijeh Nazari Goldberg

Manijeh has three degrees from UMass Lowell: a BS in Engineering, an MS Computer Science, and a PhD in Biomedical Engineering. She also has an MIT MBA. Working with Professor Robert Langer, she created a company called Privo Technologies. It got off to a good start as an MIT 100 K Business Plan Award winner. They proposed to do Nano delivery of insulin by chewing gum by encapsulating the insulin with specially designed nano-molecules.



Figure 11

Manijeh Nazari Goldberg with MIT Professor Robert Langer and her team. (photo -M. Goldberg)

Since that time, they have pivoted the target to delivering nano-encapsulated cancer drugs through oral administration. They found that the market for insulin delivery was much too crowded and expensive to enter. They have been quite successful in getting grants from the NIH and the NSF as well as SBIR (small business innovation research) grants. Nevertheless, they are in a very tough area of raising money to commercialize. It often takes a billion dollars to bring a drug to market. Nevertheless, they have raised many millions and continue on the tract to success.

Case Study: <https://www.jackmwilson.com/Entrepreneurship/Cases/Case-Privo.pdf>

Elizabeth Holmes

Elizabeth Holmes was majoring in Chemical Engineering at Stanford University, but she dropped out in 2003 at the age of 19 to found Theranos. Her idea was to create a medical laboratory on a chip. The chip could do hundreds of tests, quickly and inexpensively on one drop of blood. The company was enormously successful at raising money and gathering partners.

In 2015 Forbes estimated her worth at \$4.7 Billion. She was the world's youngest female self-made billionaire.¹² She pioneered offering tests directly to consumers. Theranos was privately owned and she held about 50% of the company. The investors included Draper Fisher Jurvetson, ATA Ventures, Tako Ventures, Continental Properties Inc., and Larry Ellison, CEO of Oracle. She recruited outstanding business and political advisors included two former US Secretaries of State, Henry Kissinger and George Schultz. She raised a total funding more than \$70 million.

Apparently, she was “faking it until she made it.” Her claims of the utility of the tests and many other issues proved to be false. In 2022 she was sentenced to 11 years in prison along with Sunny Balwani, her cofounder and romantic interest.

Read more in the case: <https://www.jackmwilson.com/Entrepreneurship/Cases/Case-Theranos-ElizabethHolmes.pdf>

Blood money

The rise and fall of Elizabeth Holmes, Silicon Valley's startup queen

The saga of Theranos highlights the danger of glorifying novice entrepreneurs



Figure 12-Elizabeth Holmes

Harish Hande '98 '00

Harish Hande graduated from UML in 1998 with an MS in renewable energy engineering. He received his UML PhD in 2000 in mechanical engineering (energy). He co-founded Solar Electric Light Co. (SELCO) India in 1995.

As SELCO's managing director, he has pioneered access to solar electricity for more than half a million people in India, where more than half the population does not have electricity, through customized home lighting systems and innovative financing.



Figure 13 Harish Hande '98 '00
Photo © World Economic Forum

¹² <https://www.forbes.com/sites/matthewherper/2016/06/01/from-4-5-billion-to-nothing-forbes-revises-estimated-net-worth-of-theranos-founder-elizabeth-holmes/#1ea42ef33633>

Hande received the 2011 Magsaysay Award, widely considered Asia's equivalent of the Nobel Prize. He was selected as one of 21 Young Leaders for India's 21st Century by Business Today, and as Social Entrepreneur of the Year for 2007 by the Schwab Foundation for Social Entrepreneurship and the Nand and Jeep Khemkha Foundation. He is another who took the "for-profit" approach to social entrepreneurship.

Read more in the Case: <https://www.jackmwilson.com/Entrepreneurship/Cases/Case-SolarElectricLight-HarishHand.pdf>

Curtis Priem

Jensen Huang, Chris Malachowsky, and Curtis Priem¹³, Founded Nvidia in 1993, to develop 3D graphics systems for the gaming and multimedia markets.

They went through many tough years and nearly went bankrupt several times, before they hit their stride creating the RIVA chips and then the GeForce256 in 1999. Microsoft advanced Nvidia \$200 million to supply the chips for the Xbox.



Figure 14 Curtis Priem (2nd from left) and Jack Wilson (4th from left) at an RPI Alumni event in 2024.

Nvidia had a great run as the gaming video system of choice for use in personal computers. It spread beyond that focused us as graphic became a more and more important aspect of computer displays. And then the Artificial Intelligence mania hit after 2020 and the Nvidia chips became the go to chips driving the many AI systems.

By June 2024 Nvidia became the most valuable company in the world as it was riding the Artificial Intelligence (AI) wave of enthusiasm. It only lasted one day, with a market capitalization of over \$3.3 trillion, but it vaulted Nvidia into the lofty regions of market capitalization where it remains today.



Figure 15 Curtis Priem at RPI with Quantum Computer

Curtis left Nvidia in 2003 and turned his attention to philanthropy with a particular focus on his alma mater, Rensselaer Polytechnic Institute.¹⁴ He funded the creation of the Curtis R. Priem Experimental Media and Performing Arts Center (EMPAC) with a spectacular

¹³ <https://www.forbes.com/sites/phoebeliu/2023/11/26/this-nvidia-cofounder-could-have-been-worth-70-billion-instead-he-lives-off-the-grid/>

¹⁴ <https://fortune.com/2024/04/05/nvidia-forgotten-co-founder-curtis-priem/>

building on a hill overlooking the Hudson River. He also funded the very first university owned Quantum Computer which was built in partnership with IBM. He created the Priem Family Foundation to help with his charitable endeavors. Often, he donates anonymously, but one can estimate his donations thus far at several hundred million dollars.

Larry Ellison,

Ellison, the Founder of Oracle, was a dropout of both the University of Illinois and the University of Chicago. He worked at various computing companies in California and then founded Software Development Laboratories which eventually became Relational software, and then finally became Oracle. He is an avid sailor who participates in the most grueling and competitive races around the world.



Figure 16 Larry Ellison
(Photo Creative Commons Attribution 2.0 Generic license.)

He signed the Giving Pledge along with Bill Gates, Warren Buffet and others. The giving pledge was a promise to donate most of their acquired wealth to charity in some form.^{15, 16}

Sir Richard Charles Nicholas Branson

He was born July 18, 1950 in London, England. Branson is the seventh richest citizen of the United Kingdom, with an estimated net worth of \$4.9 billion (U.S.)¹⁷

He was a severe Dyslexic. (as is the author-JMW!) On his last day at school, his headmaster, Robert Drayson, told him he would either end up in prison or become a millionaire.

As Richard Branson himself put it: "At school I was dyslexic and a dunce."¹⁸,

He founded:

- Virgin Records
- Virgin Megastore
- Virgin Atlantic Airline
- Virgin Trains,
- Virgin Galactic



Figure 17 Richard Branson
Photo Richard Burdett (. CC BY 3.0,

¹⁵ <https://givingpledge.org/>

¹⁶ http://en.wikipedia.org/wiki/Richard_Branson

¹⁷ <http://www.forbes.com/profile/richard-branson/>

¹⁸ The Times, London, 11 September 1998, pg. 19

He helped form and fund “The Elders” with Nelson Mandela and others who were devoted to helping to solve world problems.

Teresa Mbagaya

She is an entrepreneur in Zimbabwe. She was born in Kenya and studied in England and the United States. A Graduate of Cambridge and Yale, she worked at Google on Education Services and Emerging Market Outreach teams.¹⁹

In 2013, she left Google and joined Econet Wireless in Africa. Econet Zero targets 5 million Econet Broadband subscribers offering them free access to 50+ education websites including Coursera, EdX, Wikipedia, Codecademy and others.

She launched EcoSchool Academy²⁰ to serve 9 million subscribers with an interactive mobile learning environment which provides 50 short courses covering a range of topics.²¹

Econet Education has reduced the costs for Medical Students in Zimbabwe, providing tablets on which they can access their text books at significant savings.²²

For those interested in hearing more about this project considering visiting the Case Study on the JackMWilson.net website:

Case: <http://www.jackmwilson.net/Entrepreneurship/Cases/Case-EcoSchool-Africa.pdf>



Figure 18
Photo by Teresa Mbagaya via
twitter.

¹⁹ <http://www.forbes.com/sites/mfonobongnsehe/2015/02/05/30-most-promising-young-entrepreneurs-in-africa-2015/2/>

²⁰ <https://www.ecoschool.co.zw/>

²¹ <http://www.techzim.co.zw/2014/10/everything-need-know-econets-ecoschool/>

²² <http://www.aworldatschool.org/news/entry/eco-school-pilot-scheme-slashes-cost-of-learning-in-zimbabwe>

Mark Zuckerberg

Zuckerberg is another one of those Harvard dropouts. He created FaceMash at Harvard and then left school to build Facebook. He was always a computer geek as well as a Gamer. Some would say he was socially inept, but others would disagree. He also signed the Giving Pledge, and has already given \$100 million to Newark Schools.

A movie purporting to chronicle the rise of Facebook, "The Social Network" was released in 2010. The movie was based upon Ben Mezrich's book "*The Accidental Billionaires*." When many people, including Zuckerberg, objected to the accuracy of the book and movie, Mezrich replied that the book was:

"big juicy fun" rather than "reportage" and the screen writer admitted that "I don't want my fidelity to be the truth; I want it to be storytelling...." what is the big deal about accuracy purely for accuracy's sake, and can we not have the true be the enemy of the good? It is ironic that social media is now widely perceived as the purveyor of "fake news" and "clickbait."



Figure 19

Mark Zuckerberg -Flickr: This file is licensed under the Creative Commons Attribution 2.0 Generic license.

Andrew Carnegie

Lest you think that entrepreneurship or philanthropy is something new, consider the case of Andrew Carnegie. He was born in Scotland but moved to Pittsburgh, PA in his youth. He began working for what became the Pennsylvania Railroad -selling bonds which were of dubious value. He founded the Carnegie Steel Corporation which eventually became the US Steel Corporation.

Astoundingly for that era, he made his wife sign a pre-nuptial agreement in which she acknowledged that he intended to give away his fortune rather than keep it in the family. This is an important insight into his intentions and character, since later legend tried to assert that he was shamed into giving away his fortune because of the violence that occurred in a strike at his steel plant. The existence of the prenuptial agreement makes those later assertions look quite unlikely. Moreover, he was away on a long trip in Europe leaving the management of the company to others when the violence occurred.

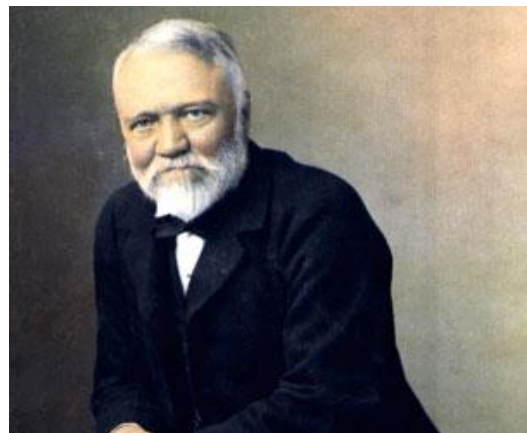


Figure 20 Andrew Carnegie

He used his fortune to create the Carnegie Libraries in towns and cities all across the country. He founded the Carnegie Museum and the Carnegie Institute of Technology which later merged with the Mellon Institute to become the Carnegie Mellon University. An eminently practical man, legend has it that he insisted that the first University building be built with very high ceilings. In case the University failed it could be repurposed into a factory building. The university succeeded and the high ceiling building was perfect for the large-scale engineering research and teaching programs for which it became known. He worried that university teachers did not have retirement programs so he created the Teachers Insurance and Annuity Association (now TIAA-CREF) to provide retirement programs. He worked for world peace, creating the Carnegie Endowment for International Peace.

Muhammad Yunus

Born in Bangladesh, he attended Chittagong College and Dhaka College and then received his PhD in Economics from Vanderbilt University. He was a Professor of Economics in Bangladesh. An entrepreneur, he founded a profitable packaging company.

He is credited with creating the system of microcredit and microfinance and was awarded the Nobel Peace Prize for that work. He founded Grameen Bank to make these programs viable, sustainable, and scalable. In the late 1980s, Grameen started to diversify by attending to underutilized fishing ponds and irrigation pumps like deep tube wells. As these projects grew and diversified, the fisheries project became Grameen Motsho ("Grameen Fisheries Foundation") and the irrigation project became Grameen Krishi ("Grameen Agriculture Foundation"). In time, the Grameen initiative grew into a multi-faceted group of profitable and non-profit ventures, including major projects like Grameen Trust and Grameen Fund, which runs equity projects like Grameen Software Limited, Grameen CyberNet Limited, and Grameen Knitwear Limited, as well as Grameen Telecom, which has a stake in Grameenphone (GP), the biggest private phone company in Bangladesh. From its start in March 1997 to 2007, GP's Village Phone (Polli Phone) project had brought cell-phone ownership to 260,000 rural poor in over 50,000 villages.²³



Figure 21 Muhammad Yunus
By World Economic Forum - Flickr:
Muhammad Yunus - World Economic
Forum Annual Meeting 2012, CC BY-SA
2.0, <https://commons.wikimedia.org>

The success of the Grameen microfinance model inspired similar efforts in about 100 developing countries and even in developed countries including the United States. Many microcredit projects retain Grameen's emphasis of lending to women.

²³ https://en.wikipedia.org/wiki/Muhammad_Yunus

He focused on women entrepreneurs in particular. More than 94% of Grameen loans have gone to women, who suffer disproportionately from poverty and who are more likely than men to devote their earnings to their families. Since this example of social entrepreneurship is also a network of for-profit companies, he has taken his share of criticism as well as praise. Because the micro-loans are quite risky, he charges a very high interest rate in order to recoup his capital, make his companies sustainable, and reinvest in more loans to women. Not everyone agrees with his business model.

He is an example of *social entrepreneurship* which is operated as a for-profit enterprise to solve social problems. The profits are re-invested to help additional clients.

Case Study: <https://www.jackmwilson.com/Entrepreneurship/Cases/Case-MuhammadYunas.pdf>

Samuel Bankman-Fried - FTX Crypto

Samuel Bankman-Fried (SBF) graduated from the Massachusetts Institute of Technology in 2014. He majored in physics and a minor in math. (JMW-Disclosure: I also graduated with a major in physics and a minor in mathematics. Otherwise, we have nothing in common!)

His parents are both professors at Stanford Law School: Barbara Fried and Joseph Bankman. After graduation SBF worked at Jane Street Capital, a proprietary trading firm. While there he met Caroline Ellison, also an MIT grad, who later ran the Alameda trading company for him. They are also reported as being romantically involved. He co-founded Alameda Research, a quantitative trading firm, after leaving Jane Street.



Figure 22 Samuel Bankman-Fried Arrested

SBF then co-founded FTX, a cryptocurrency derivatives exchange, with Gary Wang in April 2019. FTX collapsed spectacularly in 2022.

Wang and Ellison pled guilty to various counts of fraud and are expected to testify against SBF who was arrested in the Bahamas and charged with a number of crimes including fraud and illegal campaign donations. As of the beginning of 2023, the various court cases were in the preliminary stages.

Case Study: <https://www.jackmwilson.com/Entrepreneurship/Cases/Case-MuhammadYunas.pdf>

Mary Kay Ash

Mary Kay Ash was born in Texas. She was quite successful in sales, but became angry when men were promoted over her. In 1963 she created a business plan for Mary Kay Cosmetics. From that plan she founded Mary Kay Cosmetics with her two sons. Her business model was built around pyramid models of sales representatives who recruited other sales representative who recruited more sales representatives in an ever-increasing pyramid.

She came up with the idea of giving her top sales people a Pink Cadillac and more than 100,000 Pink Cadillacs have been given out Mary Kay Cosmetics grew into the 6th largest direct sales program with revenues of \$3.7 billion in 2015

What motivated Mary Kay from the beginning was that she wanted to help women to advance by helping them to help others. This is certainly a for-profit enterprise, but it also advances social enterprise goals.



Figure 23 Mary Kay Ash
https://en.wikipedia.org/wiki/File:Mary_Kay_Ash.jpg

Steve Jobs

“Don’t let the noise of other’s opinions drown out your own inner voice. And most importantly, have the courage to follow your heart and intuition. They somehow already know what you truly want to become. Everything else is secondary.” – Steve Jobs

The late Steve Jobs is one of the best-known entrepreneurs for his founding of Apple with Steve “Woz” Wozniak in 1976 to sell the Apple I and then II computers. They were hugely successful and were followed up by the Macintosh.

Jobs was fired from his job as CEO of Apple in 1986 and went on to found another computer company, NeXT, as well as Pixar. It is not unusual for a founder to be fired, and is also common for the fired founder to go on and found other companies.

In 1997, Apple invited Jobs back as CEO in order to revitalize a lethargic company. Returns like this are far less common, but it turned out to be one of the most brilliant business moves in history. He led Apple to create the iPod, iPhone, iPad, iTunes, and other products and built Apple into the most valuable company in the world as of 2018.



Figure 24 Steve Jobs
Photo by Mat Yohe
https://commons.wikimedia.org/wiki/File:Steve_Jobs_Headshot_2010-CROP.jpg

Mark and Elisia Saab

Mark and Elisia Saab Mark Saab graduate in Plastic Engineering from UMass Lowell in 1981. He was a specialist in polymers. After some time working in industry, he began to consider launching his own company. In 1988, Mark Saab '81 had a vision for a product that no one in the market was making: an ultra-thin walled medical tubing. Saab believed he could produce it and was confident the market would be there. And his wife Elisia believed in him. In 1989 they launched Advanced Polymers. Sacrificing nights and weekends, while working two day jobs, she helped Mark turn his vision into one of the most respected companies in its field. After a couple of decades of success, he merged the company with the MedTech Group in New Jersey. Saab suggests that the merger "provides substantial growth opportunities for the combined company,"



Figure 25 Elisia and Mark Saab
(photo J Wilson)

Mark and Elisia are donors of over \$ 1 million to UML Scholarships.

Jack Ma

Jack Ma (Ma Yun)²⁴ born in 1964 in Hangzhou, Zhejiang Province, China. He became the richest man in China and in the top 20 of the world. Surprisingly, he failed the university entrance exam three times, but eventually graduated from Hangzhou Normal University in English in 1988. In 1999, Jack Ma founded the website Alibaba.com²⁵, a business-to-business portal to connect Chinese manufacturers with overseas buyers.



Figure 26 Jack Ma -Alibaba

Alibaba provides consumer-to-consumer, business-to-consumer and business-to-business sales services via web portals. It also provides electronic payment services, a shopping search engine and data-centric cloud computing services. In 2012, two of Alibaba's portals handled 1.1 trillion yuan (\$170 billion) in sales. Its market value was measured as US\$231 billion at its historic initial public offering (IPO) on September 19, 2014.²⁶ Under pressure from Chinese political leadership, Ma left Alibaba in 2022.

Case: <http://www.jackmwilson.net/Cases/Case-Alibaba.pdf>

²⁴ http://en.wikipedia.org/wiki/Jack_Ma

²⁵ <http://en.wikipedia.org/wiki/Baidu>

²⁶ <http://www.economist.com/news/leaders/21573981-chinas-e-commerce-giant-could-generate-enormous-wealthprovided-countrys-rulers-leave-it>

Jim Dandeneau '80 (Photo by Jim Dandeneau)

Jim Dandeneau is the CEO & Owner of Putnam Plastics. He graduated from UMass Lowell in 1980 in Plastics Engineering. He was a hockey player as a student.

Jim founded Putnam Plastics in 1984 and serves as President and CEO. Under Jim's guidance, Putnam Plastics has established itself as the leading source for complex extrusions and co-extrusions for the medical device industry. He and his wife Deb are Co-owners of the Connecticut National Golf Course. They are donors of over a \$ 1 million to UML scholarships.



Figure 27 Jim Dandeneau

Gururaj "Desh" Deshpande

Desh was born in India and studied at the Indian Institute of Technology. He came to Canada to obtain his PhD at Queens University in Ontario and then went to work for Motorola.

He came to the US to work and, in 1990, he founded Cascade Communications (networking devices). He sold Cascade to Ascend Comm. for \$3.7 billion in 1997

Then he founded Sycamore Networks in 1998 which reached a value of \$18 B in 1999. He also founded Tejas Networks and A123 Systems

He founded the MIT Deshpande Center with \$20 million donation, and created the Deshpande Education Trust (DET). He also funded the Master of Social Entrepreneurship program (MSE), a two-year residential program affiliated with Karnatak University in Dharwad India

In 2010, he and his wife Jaishree founded the Merrimac Valley Sandbox at UML and they later changed the name to eForAll. He founded the Deshpande Symposium for Innovation & Entrepreneurship in Higher Education at UML which brings hundreds of university-based leaders to discuss the characteristics of the entrepreneurial university.²⁷



Figure 28

Left to right: Desh Deshpande, Jaishree, Jack Wilson, Judi Wilson Photo by Judi Wilson

²⁷ <http://www.deshpandesymposium.org/>

Charles Hoff '66

Charlie and Josephine Hoff are shown (right) with \$23 million donors Jack and Shelly Blais and the author. Hoff received a bachelor's degree in industrial management at UMass Lowell and a master's degree from Northeastern University. He has been a senior vice president of operations for Bausch & Lomb and held senior management positions with Wang Laboratories, Polaroid and Gillette.

**Figure 29**

Charlie and Josephine Hoff (right) with Jack M. Wilson and Jack and Shelly Blais (photo UML)

From 1983 to 1986, he was president, CEO and owner of ARL Analytical Instruments Co., which generated more than \$100 million in worldwide sales. He then became owner, chairman and CEO of Universal/Univis, Inc., a group of designer eyewear companies. He and Josephine have donated over \$5.5 million to scholarships at UMass Lowell.

Jack Blais

Jack and Shelly Blais – With Nobel Prize winner Craig Mello, Chancellor Lazare, and President Wilson. He is a private Investor in Precision Optics, and has founded 15 companies, –many of which he has since sold. He focused on optical and optical-interference technologies for military, medical and commercial applications. In 2001 Corning paid \$2.1 Billion to acquire NetOptix from him. He now serves as the founder and president of Blais Co. of Framingham, a holding company specializing in high-technology firms, and an active partner in Capital Risk Management Inc., a management consulting firm. He founded a bank in Florida. He is an active Philanthropist who keeps a low profile. He gave \$23 million to UMass Medical School for the Aaron Lazare Building and Blais Chair of Molecular Medicine for Nobel Prize winner Craig Mello. He also donated \$21 million to Dana Farber by buying the naming rights for the Patriots Training Facility and donating them to Dana Farber.

**Figure 30 Jack and Shelly Blais**

With Nobel Prize winner Craig Mello (center), Chancellor Lazare (right), and President Wilson (left)

John F. Kennedy

John F. Kennedy (UMass Lowell, BS, 1970 UMass Amherst, MBA, 1976) is the retired President and Chief Financial Officer of Nova Ventures Corporation the management company for Nova Analytics Corporation a manufacturer and marketer of analytical instruments and Nova Technologies Corporation a manufacturer and marketer of equipment and services to water collection networks. These are companies he was a co-founder of in 2003 and 2005, respectively with revenues in excess of \$170 million for 2007.



Figure 31
John Kennedy

He has over 30 years of financial and technology management experience. He was formerly Sr. Vice President Operations and Chief Financial Officer of RSA Security Inc, a NASDAQ security software company. He served as the Chief Financial Officer and Vice President, Finance of déCalog NV, an international investment management software company and as Chief Financial Officer of Natural MicroSystems Corporation, a NASDAQ telecommunications hardware and software company.

He is a member of the advisory boards for the Isenberg School of Management at UMass Amherst, the College of Sciences and the Center for High-rate Nanomanufacturing both at UMass Lowell. He is a donor for Scholarships to both UMass Amherst and UMass Lowell

Robin Lee (Li Yanhong)²⁸ and Eric Xu (Eric Xu Yong) -Baidu²⁹

Robin Lee- born Shanxi Province, China attended Peking University then SUNY Buffalo to study Computer Science, and now serves as CEO of Baidu. Eric Xu Young³⁰ –born in China, attended Peking University (BS and MS), PHD in Biology from Texas A&M and post-doctoral research at University of California Berkeley. He founded YIFANG Group Holdings Limited, a venture capital company, and several charitable organizations, and worked in two California start-ups before returning to China to found Baidu in 1999.

Baidu was incorporated on January 18, 2000 as a Chinese web services company headquartered at the Baidu Campus in Beijing's Haidian District. It offers many services, including a Chinese language-search engine for websites, audio files and images. Baidu offers 57 search and community services including Baidu Baike (an online, collaboratively-built encyclopedia) and a searchable, keyword-based discussion forum.

In March 2015, Baidu ranked 4th overall in the Alexa Internet rankings. During Q4 of 2010, it is estimated that there were 4.02 billion search queries in China of which Baidu had a market share of 56.6%. China's Internet-search revenue share in second quarter 2011 by Baidu is 76%. In December 2007, Baidu became the first Chinese company to be included in the NASDAQ-100 index. Baidu provides an index of over 740 million web pages, 80 million

²⁸ http://en.wikipedia.org/wiki/Robin_Li

²⁹ <http://en.wikipedia.org/wiki/Baidu>

³⁰ http://en.wikipedia.org/wiki/Eric_Xu

images, and 10 million multimedia files, and offers multimedia content including MP3 music, and movies.

Case: <http://www.jackmwilson.net/Cases/Case-Baidu.pdf>

Who ARE these people?

Think back for a moment about the entrepreneurs that you just read about. What did you notice? What do they have in common? How are they different?

Compare this group to the image that you previously had in your mind of an entrepreneur based upon your past experiences. What kinds of differences did you see? Which of your previous impressions were changed and which remained the same or were reinforced.

Consider your own ideas of what “wealth” and “profit” means to you. Did this mean the same thing to all of these entrepreneurs? If you had to guess, based upon what little you know of these individuals, do you think that they were all motivated by the same things?

Is there any way you could describe their motivations that might fit all of them?

Did they all want to

- Make money?
- Change the world?
- Make a difference?
- Do their own thing?
- Be their own boss?
- Be a widely recognized public figure?
- Take tremendous risks?

They are a very diverse group with diverse motives.

As you have also seen, there can be a temptation to ignore legal and ethical standards under the pressure of starting a new venture. While that can work for some time, you can also see that it ends badly for the entrepreneur and for society.

Now you can see that Entrepreneurs are a very diverse group. You can see that they are all motivated by a passion for changing something in the world. Some appear to be financially motivated, and others seem to be socially motivated. Some were both! Even the most socially motivated entrepreneurs sometimes took the non-profit route and sometimes took the for-profit path. In both cases, if there is no revenue coming in to support the mission then there is a failure: *“No margin – no mission.”*

24 Changing the World: Entrepreneurship – J. M. Wilson

Many graduates of UMass Lowell have gone on to be successful entrepreneurs in a variety of fields.

Entrepreneurship is often a global phenomenon. All of the entrepreneurs have done something innovative: Some were driven by technology. – Some created different ways of doing business –different business models. Some approached important social problems with innovative approaches. All faced and overcame obstacles as they followed their passion. They took, and are taking, calculated risks (not wild gambles) in an effort to change the world.