



U.S. Startup Company Formation and Venture Capital Funding Trends 2004 to 2017

Contents

1. Executive Summary
2. Economic Realities Facing Our Country
3. Entrepreneurial Inventors Are Crucial to Our Future
4. Systematic Weakening of the U.S. Patent System
5. Myth of the “Patent Troll” Has Been Devastating
6. Patents Are Critical to Inventors and Their Investors
7. Significant Shift in VC Investments – 2004 to 2017
8. Significant VC Declines in Strategic Technology and Life Science Sectors That Require Invention Protection
9. Significant VC Growth in Sectors That Do Not Require Invention Protection
10. Methodology for U.S. Startup Investment Study – 2004 to 2017
11. Steps for Restoring Strategic US Invention Incentives

Executive Summary

- For at least the last 15 years, accelerating with the Obama Administration, the U.S. patent system has been systematically marginalized for all but the largest corporations.
- Cutting edge startups and entrepreneurs – and their investors – have always been responsible for the real breakthrough inventions and technologies needed for economic growth, improved quality of life, increased productivity and national security.
- Despite superficial appearances that U.S. startups and their investors remain vibrant, a closer look reveals major declines in the technologies that drive systemic growth in the economy and advance U.S. competitiveness.
- Venture capital investment in the most advanced technologies has declined while investment in lower risk commercial activities has increased disproportionately
- Restoration of our patent system is essential if our country is to maintain its current prominence as the world leader in technology and applied science

Economic Realities Facing Our Country

- Certain technology areas, such as life sciences, communications networking, advanced manufacturing, materials science, semiconductors, medical devices and others disciplines are strategically critical to our country
 - They underpin foundations of economic growth, both in U.S. and globally
 - They improve the quality of life for U.S. citizens
 - Essential to national security
 - U.S. is in a worldwide race to remain dominant in the strategic use of science and technology
- Continuous formation of startups pursuing strategic technologies is essential to technology leadership and dynamic economy
 - Startups have long accounted for most net job growth in U.S.
 - Startups are more effective at developing and implementing new ideas and concepts than are larger incumbents.
- Starting a new company requires entrepreneurs and investors with a high tolerance for risk and fertile conditions for invention
 - Competing with large incumbents is risky and many startups fail
 - Breakthrough technologies with long development cycles require vast amounts of investment and promise of satisfactory returns years in the future to justify risk
 - For truly strategic technologies, patent protection against copying by incumbents and others is essential.

Entrepreneurial Inventors Are Crucial to Our Future

- Innovation by large corporations is not the same as the invention that typically happens at venture-funded startups working in more flexible environments
 - American technology giants have been innovative in the design, manufacture and marketing of an impressive array of useful and life-saving products.
 - Large corporations are not as good at pursuing breakthrough ideas that push the limits of creativity and that challenge their own market position.
 - Many reasons for this related to the management needs of large companies and the momentum of prior successes
- 200+ years of experience shows that many of the most important breakthrough technologies were made by individual inventors, disruptive entrepreneurs, startup companies and their investors. To name a few iconic examples:
 - Ray Dolby and Dolby Laboratories
 - Chester Carlson and Xerox Corporation
 - Irwin Jacobs, Andrew Viterbi and the other founders of Qualcomm
 - Andy Grove, Gordon Moore and the founders of Intel
 - Bob Swanson, Herb Boyer and Genentech
 - Bill Gates, Paul Allen and the other founders of Microsoft

Systematic Weakening of the U.S. Patent System

- Patent protection for inventors and startups has been gradually eroded for more than fifteen years
 - U.S. Supreme Court has systematically reduced the value and importance of patents in numerous respects.
 - Most problematic was the decision in EBay v. Merc Exchange in which the Court made it extremely difficult to obtain an injunction, thus eliminating exclusive right for inventors.
 - Other such decisions have had devastating impact on inventors trying to assert patent rights. E.g., KSR (obviousness), Lexmark (exhaustion), Prometheus (patentability), TC Heartland (venue), Octane Fitness (lawyer fees).
- U.S. Government policies have favored infringers over inventors and patent owners
 - DOJ and FTC sided with infringers in connection with standard setting and other activities.
 - SG amicus briefs to Supreme Court and Federal Circuit rarely argued in favor of patent owners.
 - FTC and DOJ took strong positions against patent owners in administrative proceedings and merger enforcement
- The Leahy-Smith America Invents Act and its implementation has had severe consequences for patent-intensive startups in strategic industries.
 - PTO rules implementing IPRs were blatantly designed to eliminate patents without regard to their merit.
 - IPR implementation has been a gross distortion of the intent of Congress.

Myth of the “Patent Troll” Has Been Devastating

- Hostility toward inventors and entrepreneurs seeking to enforce their patents has been fostered by myth of the “patent troll”
 - Term was invented at Intel to describe an inventor seeking to license his invention
 - Term was seized by large technology companies and retailers for political purposes
 - Addressing abuse of the patent litigation process did not require the systematic dismantling of a system of property rights that had served us well for 225 years
 - Term proved effective as a public relations tool to poison the environment for the thousands of inventors and startups that depend on patents for survival
- The results of this attack on the U.S. patent system has been devastating
 - Many large companies now simply ignore the patent rights of smaller companies using a strategy known as “efficient infringement”
 - Faced with the prohibitive cost of litigation, made vastly more expensive by the availability of post-grant challenges created by the AIA, many talented inventors have simply stopped creating
 - The access to capital for companies that depend on their patents has declined significantly, as can be seen in VC data over the past decade.
- As the U.S. patent system was being systematically marginalized, other countries have been emulating what the U.S. system was in years past

Patents Are Critical to Inventors and Their Investors

- Strategically significant technologies have long development cycles requiring years to complete
- Risks includes technology failure, obsolescence and time value of money
- Without reliable patent protection, incentives to invest are lost
- Once a revolutionary new idea is proven workable, larger enterprises can swoop in to perfect, scale and market the new technology. Allowing, or enabling, this through the patent system creates a devastating disincentive for future venture investors.
- Current environment offers no reasonable expectation that large entrenched players will respect a startup's intellectual property or pay for its use
- Predictable reaction of incumbents to market entrants and the lack of a functioning patent system has driven investment into companies that do not need patents

Significant Shift in VC Investments – 2004 to 2017

▪ Exemplary strategic sectors that have **declined as % of total VC funding**

- Core internet networking
- Wireless communications
- Internet software
- Operating system software
- Semiconductors
- Pharmaceuticals
- Drug Discovery
- Surgical Devices
- Medical Supplies

% of total VC funding in 2004: 20.95%

% of total VC funding in 2017: 3.22%

▪ Exemplary sectors that have **increased as % of total VC funding**

- Social network platforms
- Software apps
- Consumer apparel and accessories
- Food products
- Restaurants, hotels and leisure
- B2C companies in general
- Consumer finance
- Financial services in general

% of total VC funding in 2004: 11.4%

% of total VC funding in 2017: 36.3%

2 – U.S. Startup Investment Study Methodology

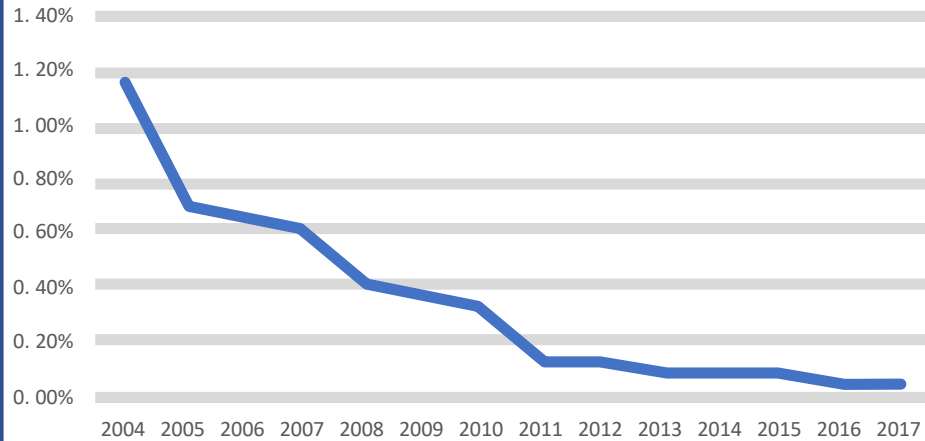
U.S. Startup Investment Study Methodology

- Objective: Compare U.S. venture capital investment trends in strategically important technology sectors that require patent protection against illustrative sectors that do not require patent protection
 - Data source: PitchBook data provided to National Venture Capital Association
 - Filter down to U.S. investments in designated economic sectors
 - PitchBook data reflects vast majority of all VC investments in the US
 - Study period: 2004 to 2017
- Data was normalized to eliminate effects of inflation and economic growth in study period
 - During the study period total number of companies funded annually increased 3.2 times and total amounts increased 3.9 times
 - The overall population and economy of the world has grown and some inflation has taken place
- Metrics used for this study:
 - % of companies funded in a given economic sector by year = companies in a specified sector funded in a given year divided by total number of companies funded in that year
 - % of dollars invested in a given economic sector by year = dollars invested in the specified sector in a given year divided by the total dollars invested in that year

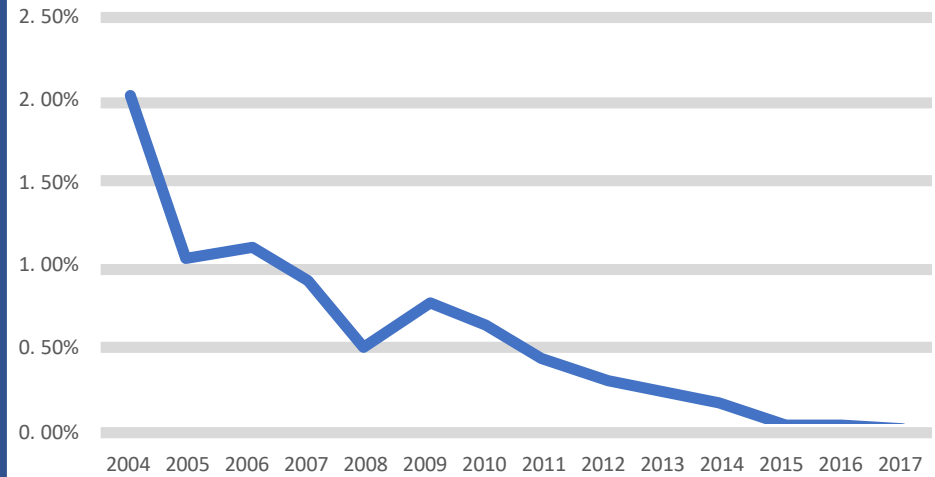
3 – Decline in Strategic Technology and Life Science Sectors That Require Invention Protections

VC Investment Decline In US Semiconductors

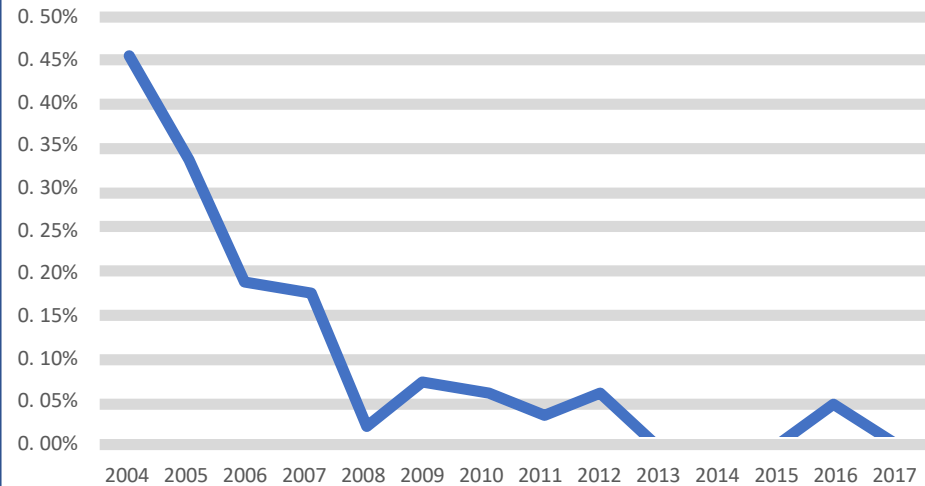
General Purpose Semiconductors % of Cos Funded



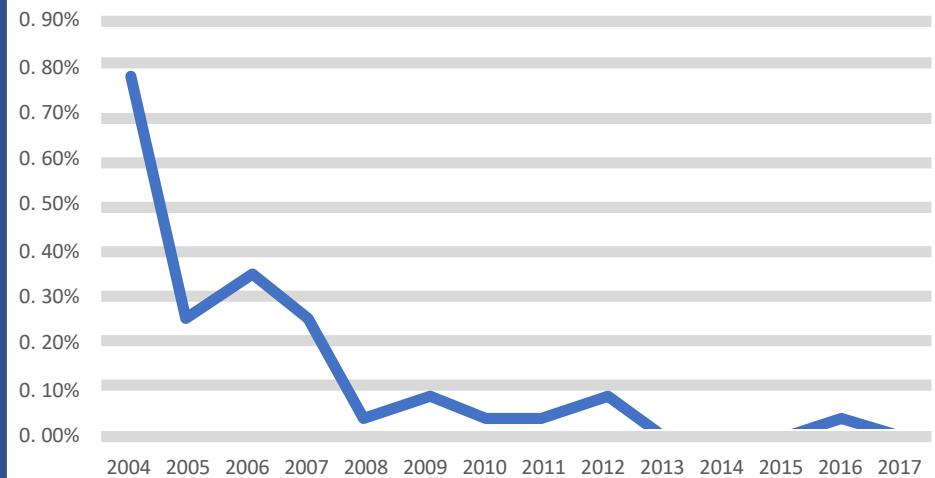
General Purpose Semiconductors % of \$ Invested



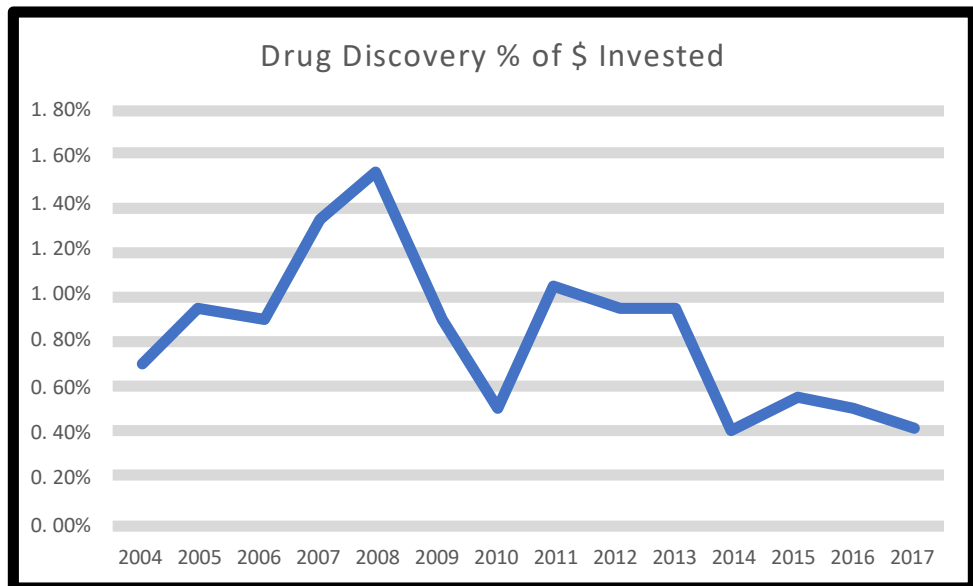
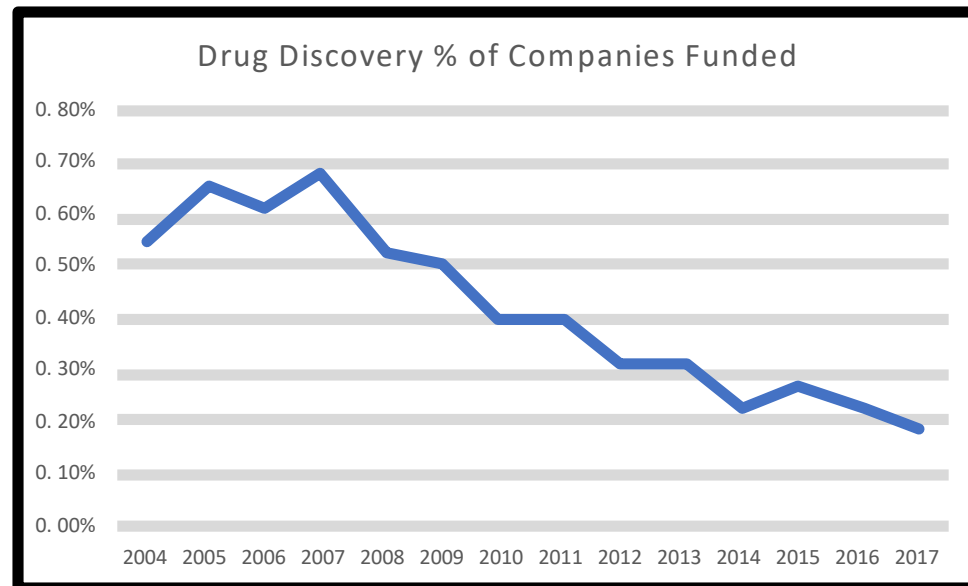
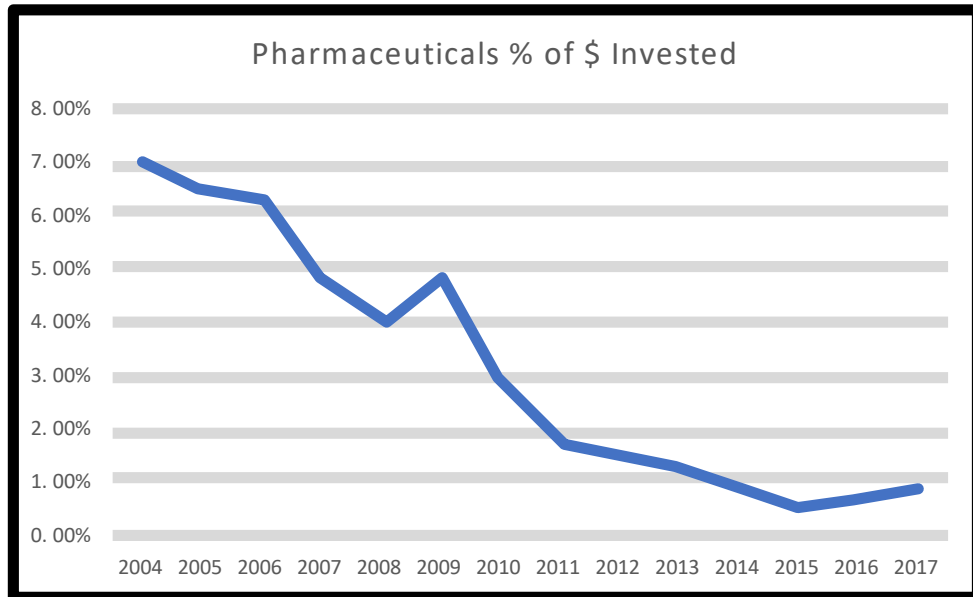
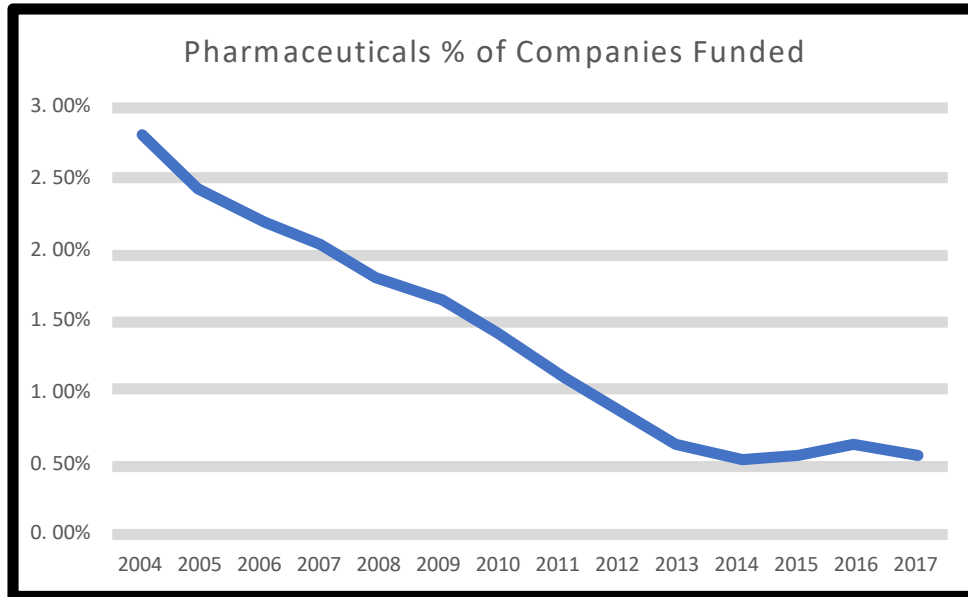
Production Semiconductors % of Cos Funded



Production Semiconductors % of \$ Invested

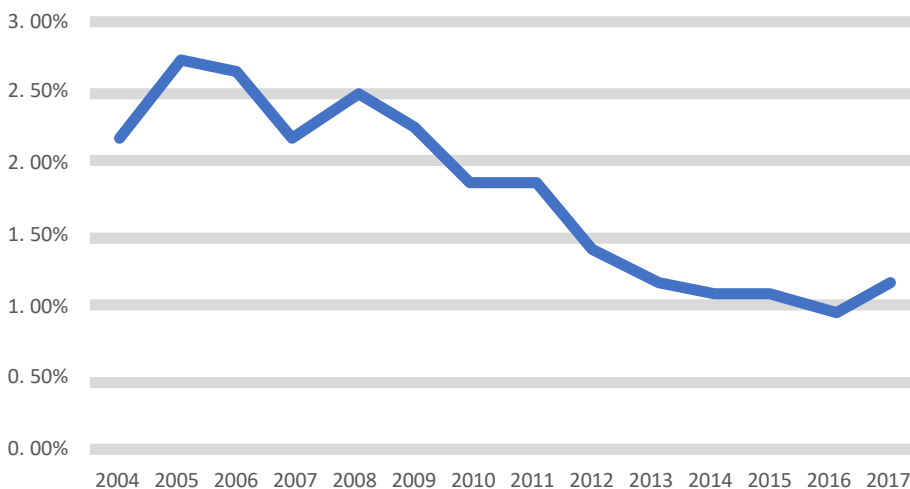


VC Investment Decline In U.S. Biotech & Drugs

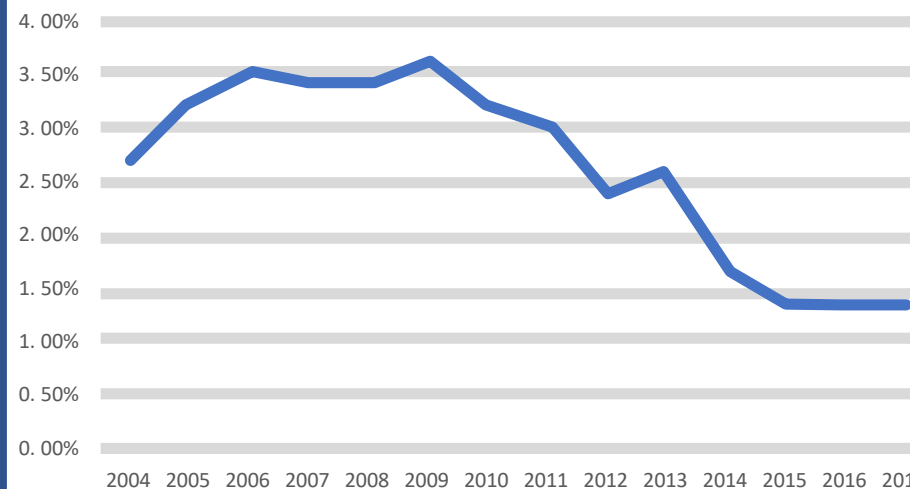


VC Investment Decline In U.S. Med Devices & Supplies

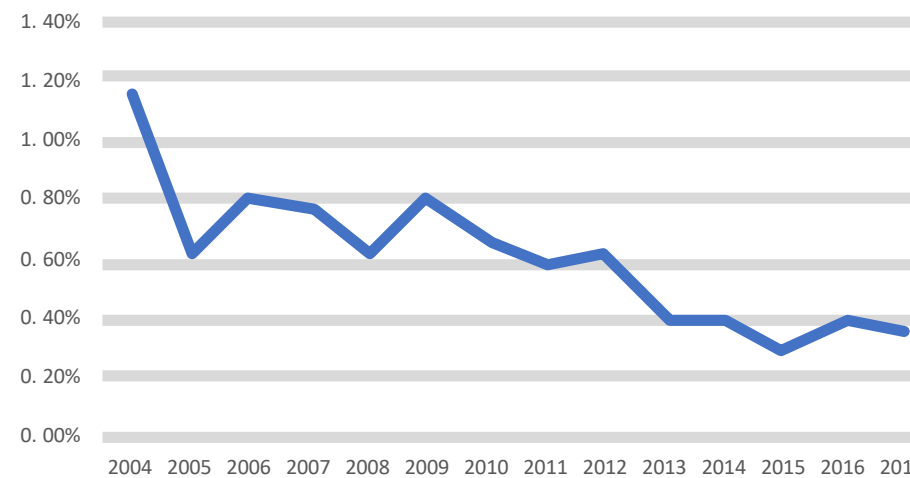
Surgical Device % of Companies Funded



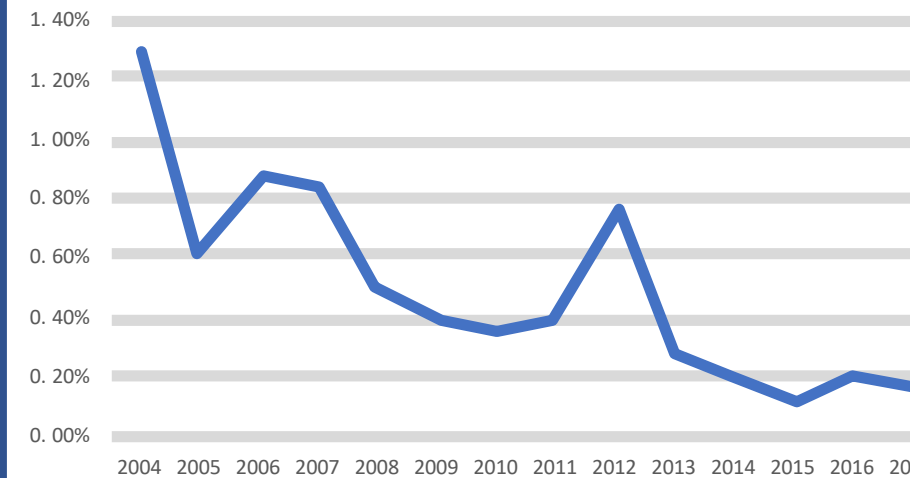
Surgical Device % of \$ Invested



Medical Supplies % of Companies Funded

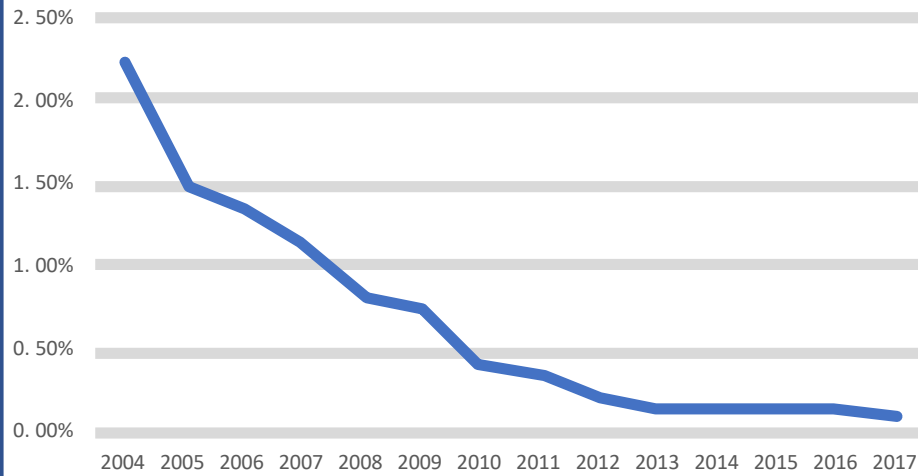


Medical Supplies % of \$ Invested

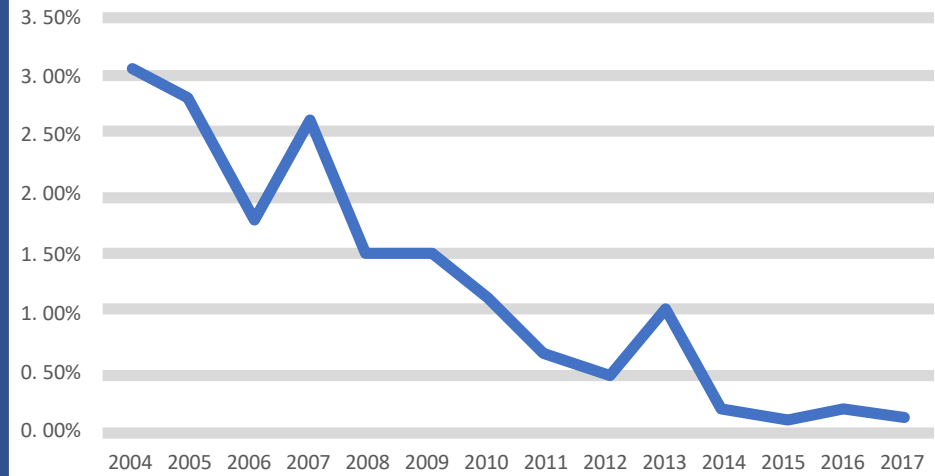


VC Investment Decline In U.S. Networking & Comms

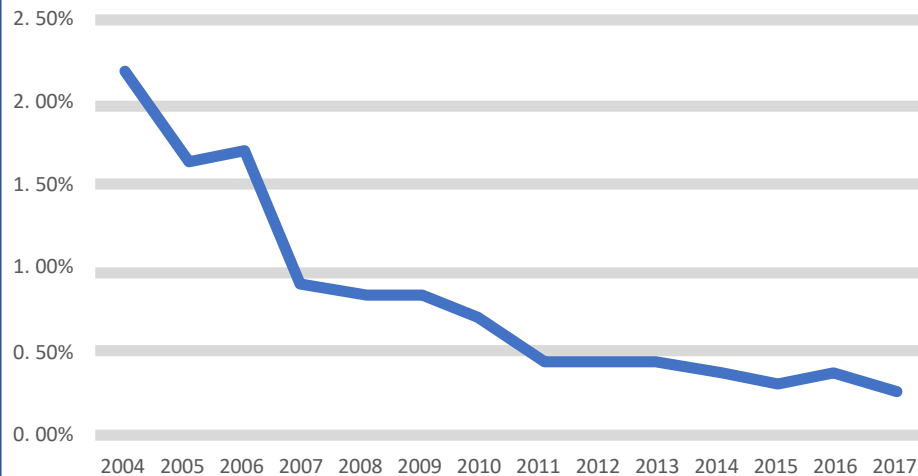
Networking Equipment % of Companies Funded



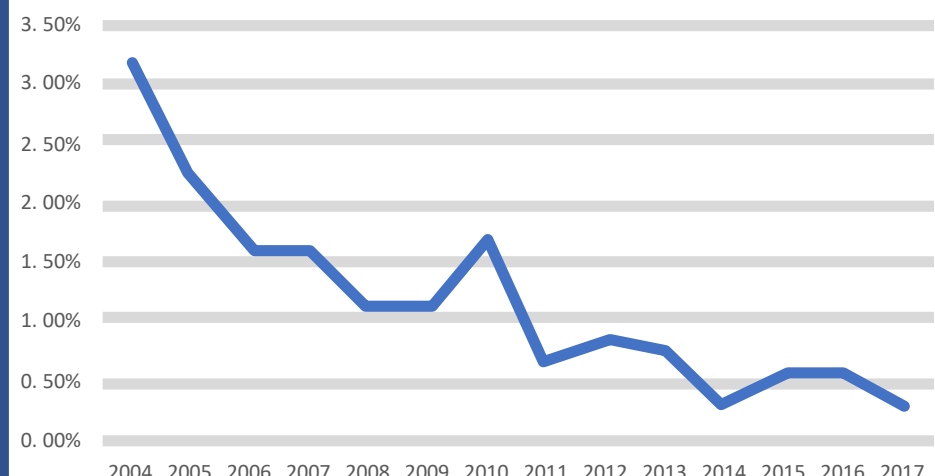
Networking Equipment % of \$ Invested



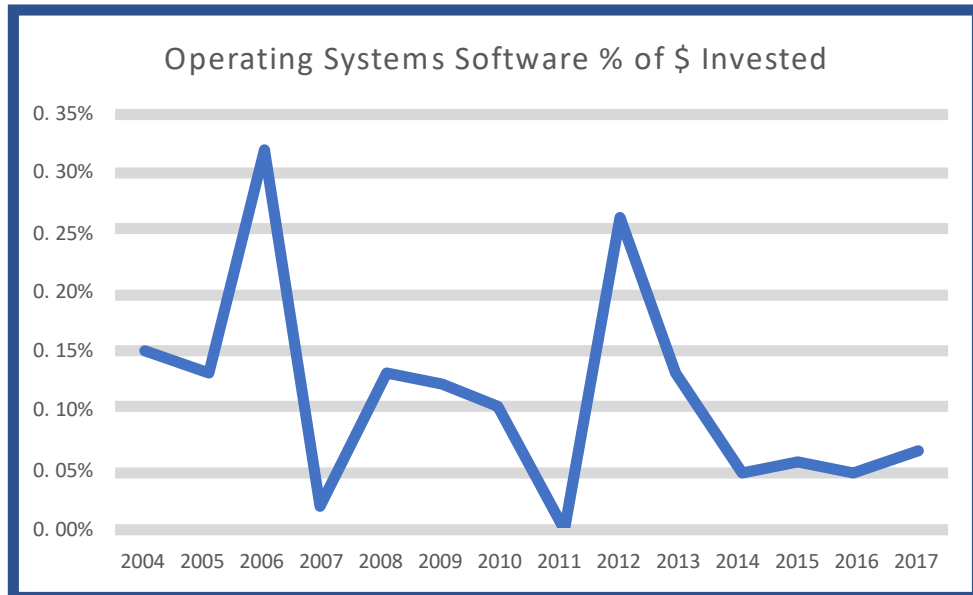
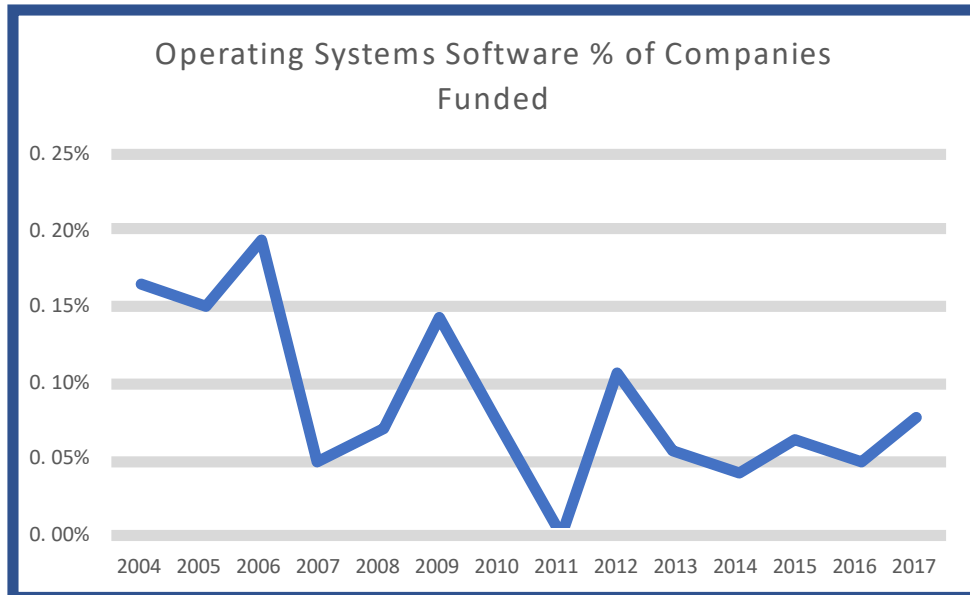
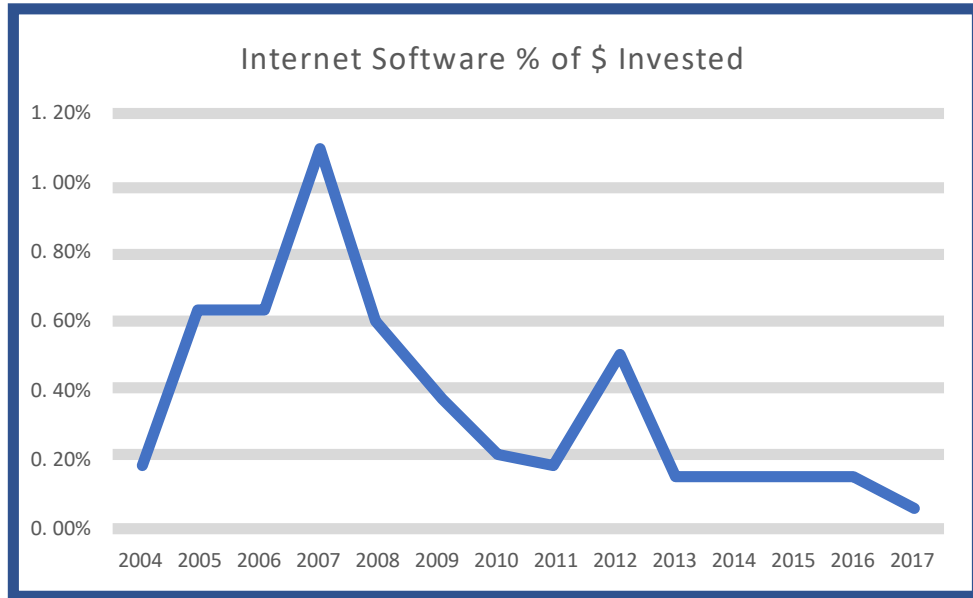
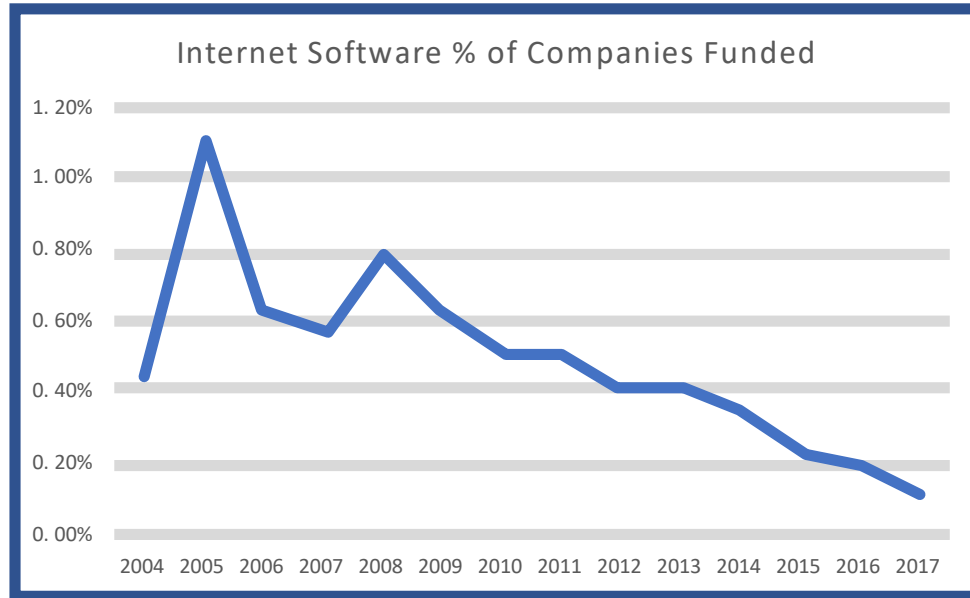
Wireless Communications Equip % of Cos Funded



Wireless Communications Equip % of \$ Invested

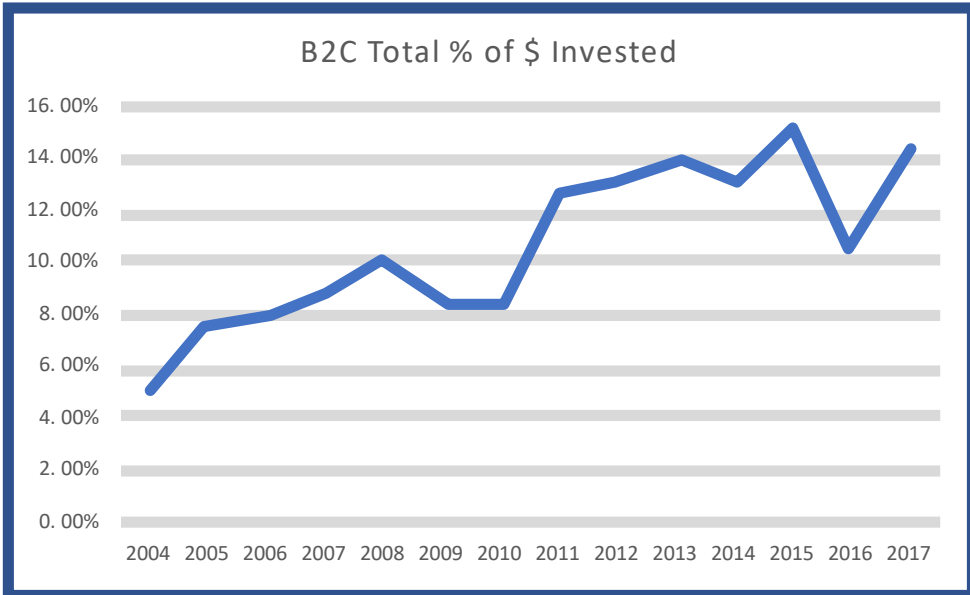
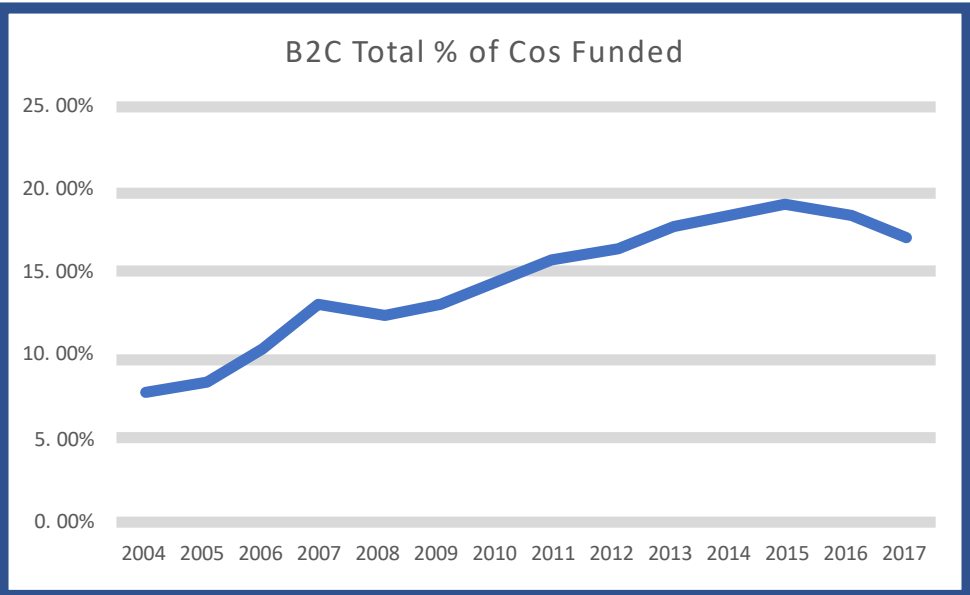
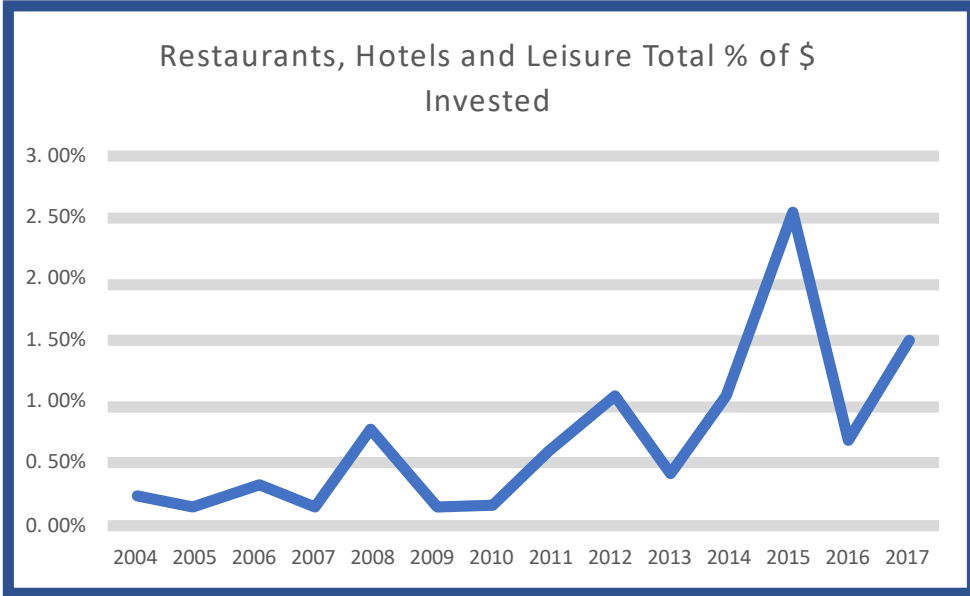
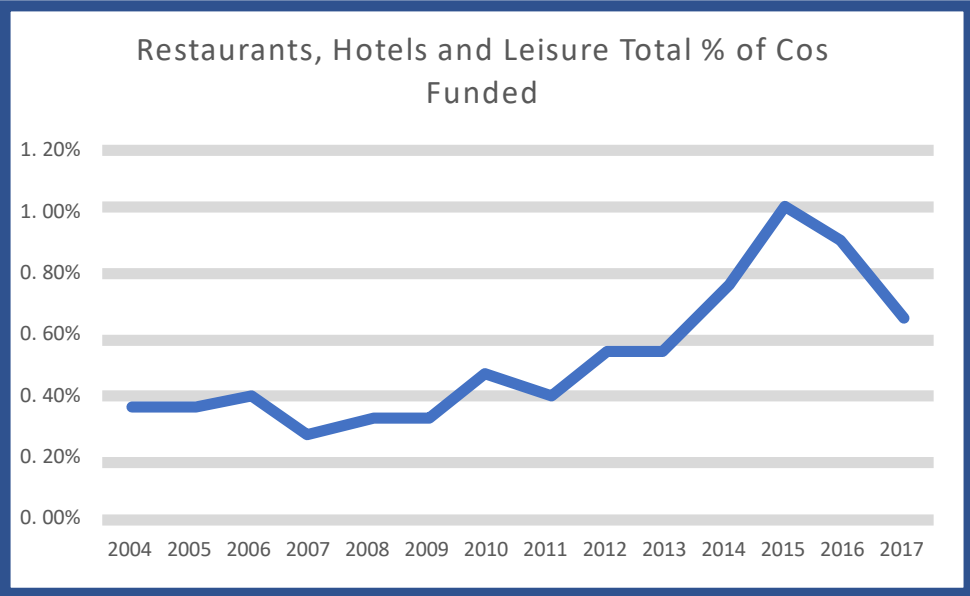


VC Investment Decline In U.S. Strategic Software



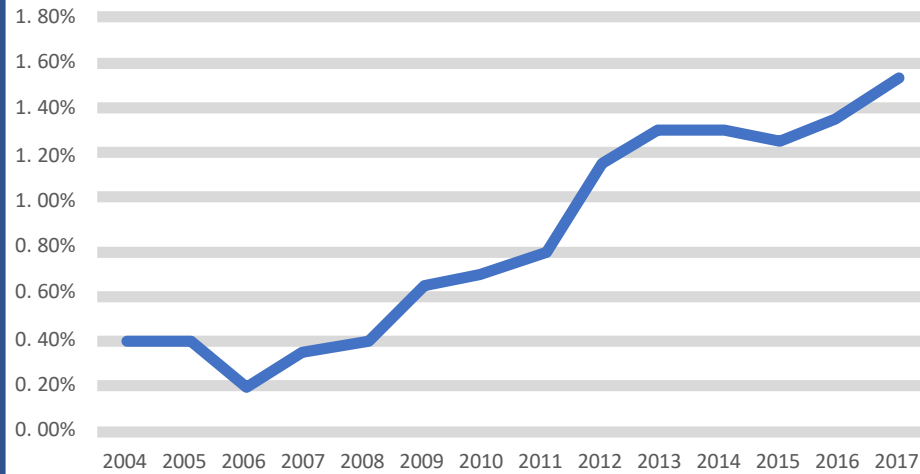
4 – Growth in Consumer and Consumption Sectors That Do Not Require Invention Protections

VC Investment Growth In Hospitality and B2C Consumer

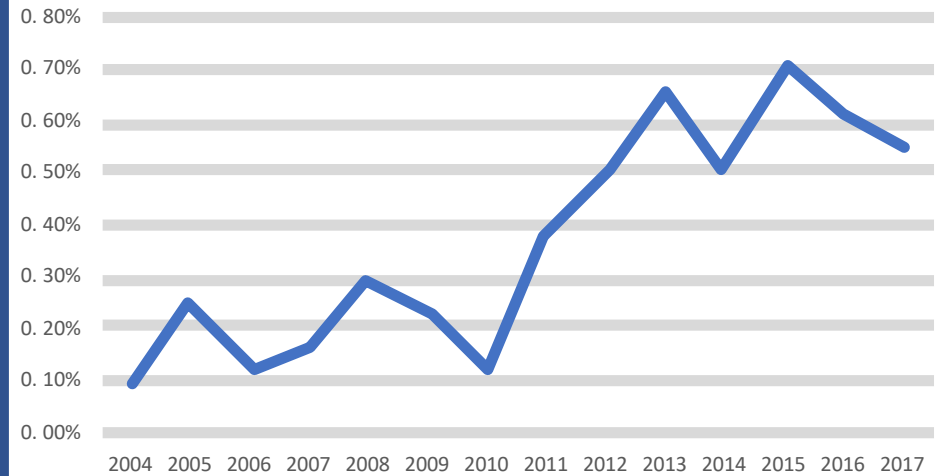


VC Investment Growth In Food and Apparel

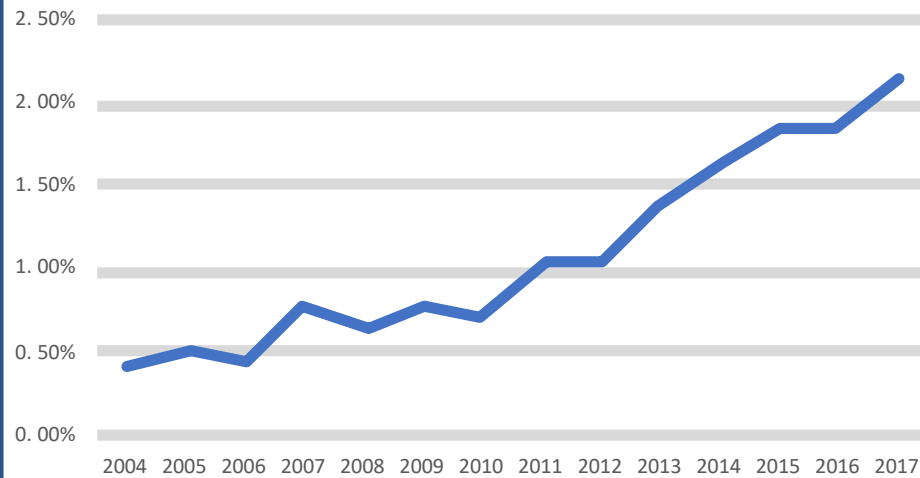
Apparel and Accessories Total % of Cos Funded



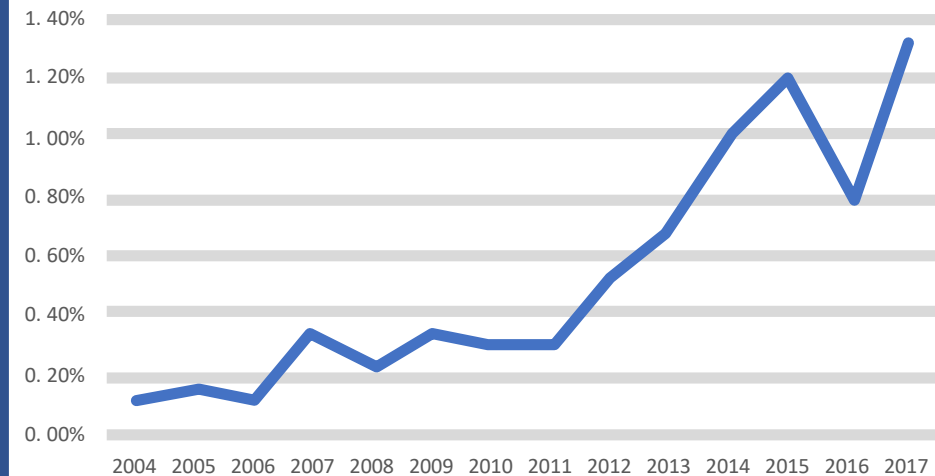
Apparel and Accessories Total % of \$ Invested



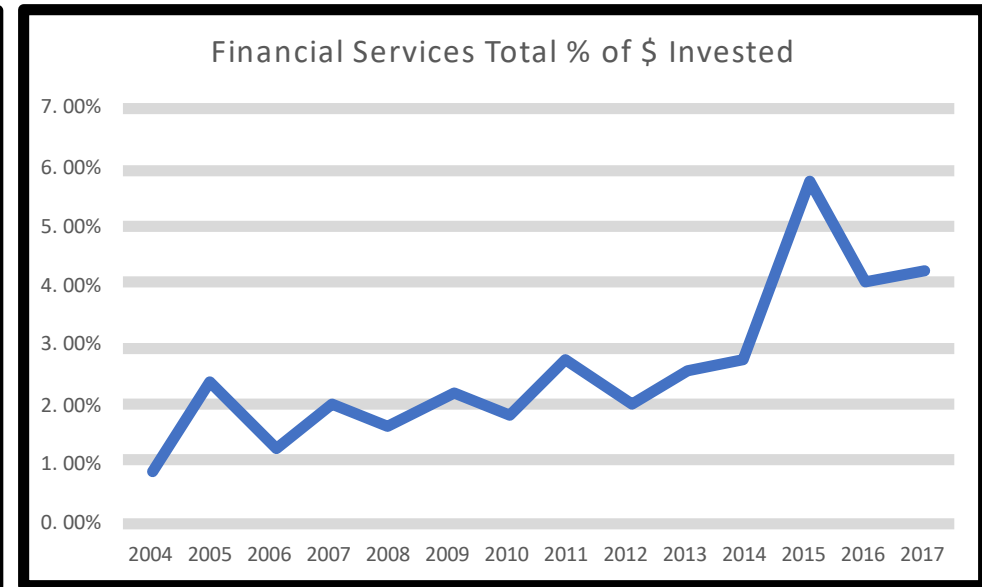
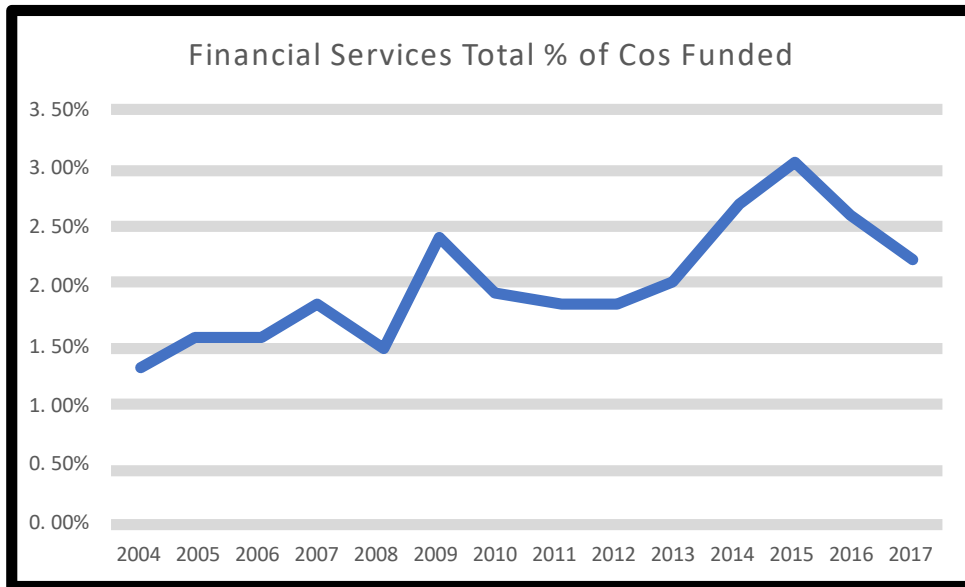
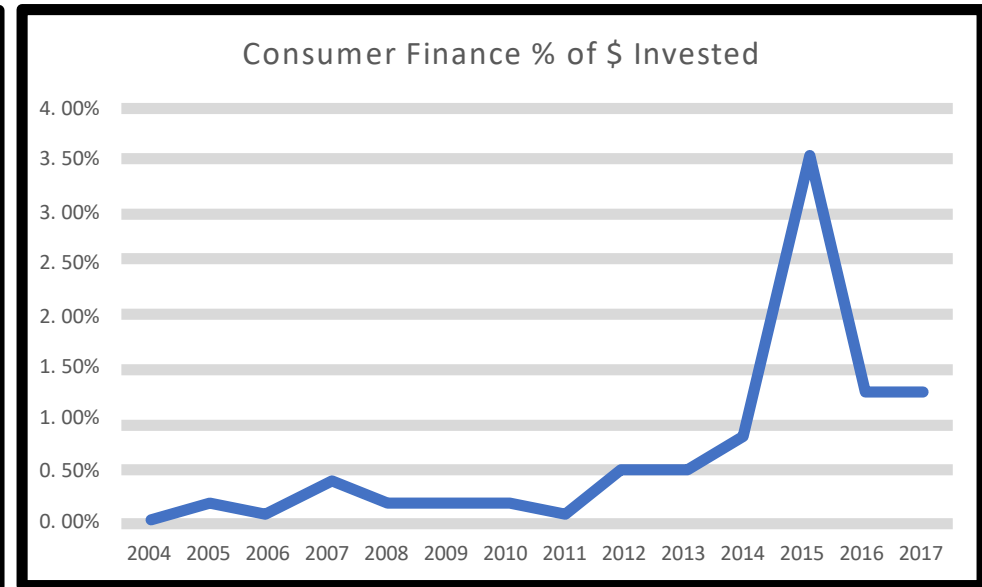
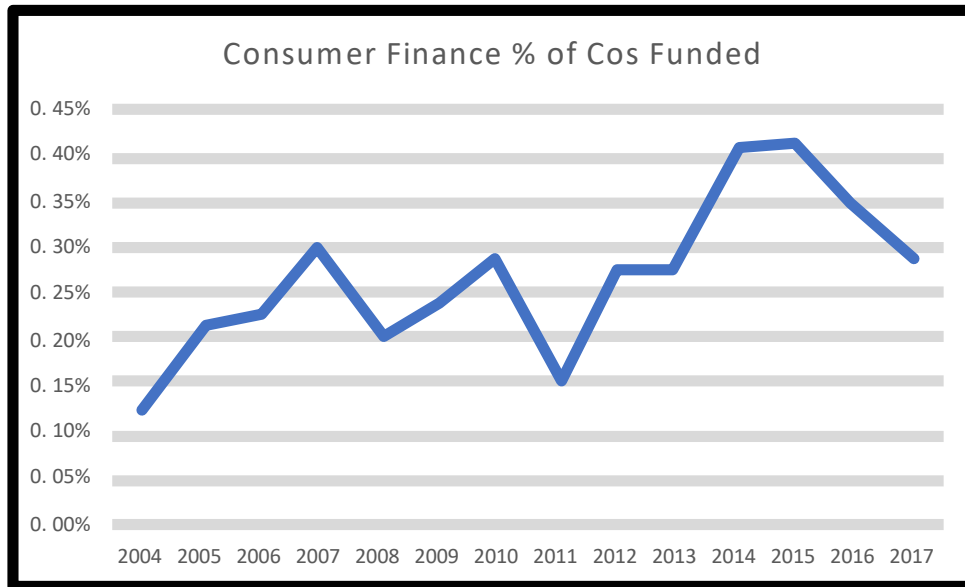
Food Products % of Cos Funded'



Food Products % of \$ Invested

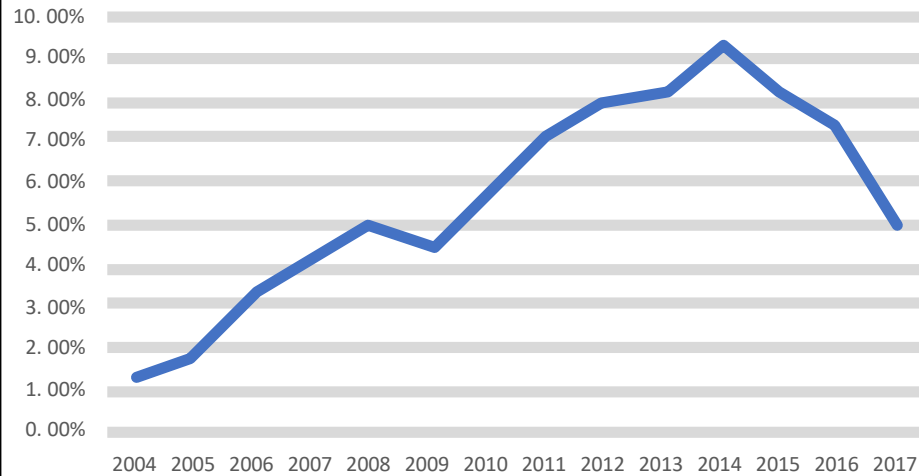


VC Investment Growth In US Finance

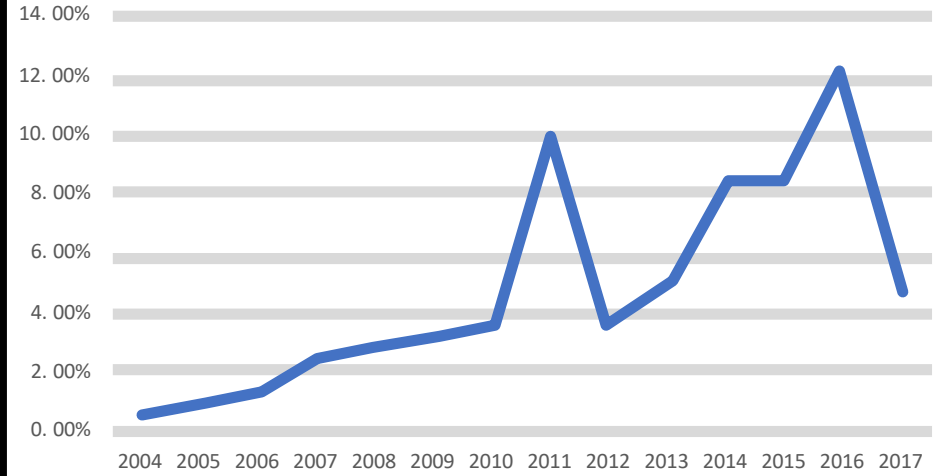


VC Investment Growth In U.S. Non-Strategic SW

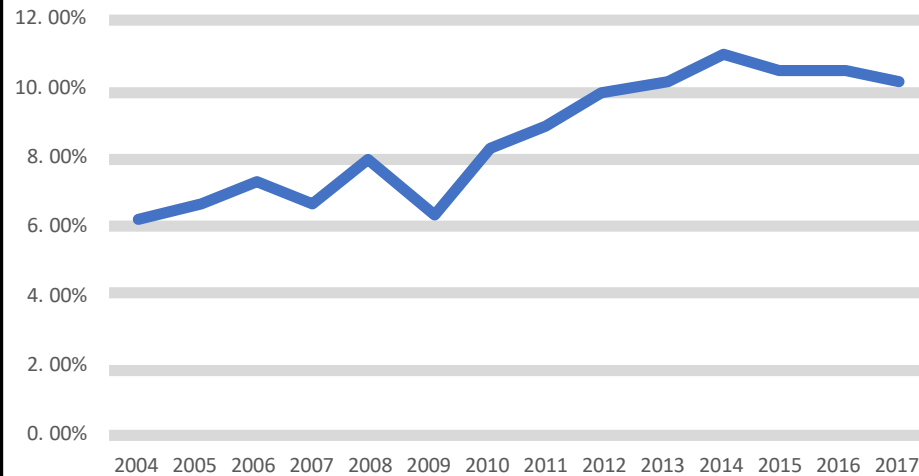
Social/Platform Software % of Cos Funded



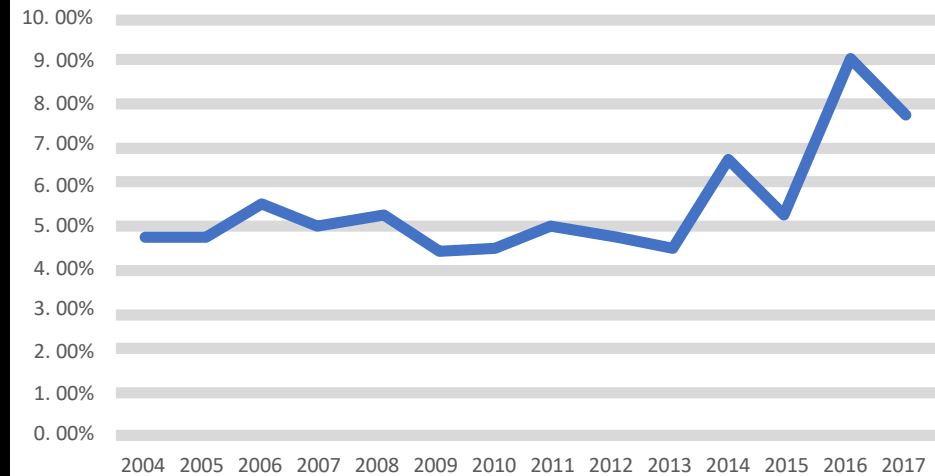
Social/Platform Software % of \$ Invested



App Software % of Cos Funded



App Software % of \$ Funded



Steps for Restoring Strategic Incentives

- Restoration of incentives for inventors, entrepreneurs and investors will take years
 - Congress and Supreme Court move slowly
 - Investor and entrepreneur communities will require convincing
 - PTO has capability to make immediate changes to examination policies and post-grant reviews
- USPTO Director has substantial discretion to control work flow and post-grant reviews
 - Discontinue use of BRI, per pending rule change
 - Allow reasonable opportunity to amend claims during IPR proceeding
 - Establish requirement for identification and estoppel of surrogates and privies
 - Apply estoppel rules to eliminate multiple challenges to patent claims
 - Restore rational rules for determining obviousness under Section 103
- USPTO Director has a respected voice at Supreme Court and Federal Circuit
 - Amicus briefs in patent and cases are needed to guide Supreme Court and Federal Circuit
 - Make better use of the “teaching – suggestion – motivation” test for application of Section 103
 - Monitor and help courts in the use of patent eligibility
- USPTO Director can also have significant impact on Congressional views of patents
 - Section 101 needs to be amended by Congress
 - Restoration of presumptive right to injunction is essential to a workable patent system
 - Royalty damages should reflect actual value of patents
 - Patent and copyright exhaustion needs to be fixed