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Prominent Innovation Prizes And Reward Programs

PROMINENT INNOVATION PRIZES AND REWARD PROGRAMS

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Introduction

The following document describes prominent examples of innovation prizes and reward programs that have been implemented with the primary purpose of stimulating innovation. While the distinction is not black and white, this list includes ex ante prizes that specify in advance a desired outcome and a reward for obtaining it in order to incentivize innovation, and excludes ex post prizes that are, for example, primarily intended to honor achievement after the fact. Prizes are listed chronologically from earliest to latest as determined by the year in which the prize was initially offered.

1714 - Longitude Prize

In 1714, the British government offered the Longitude Prize for a method of accurately determining a ship's longitude. Prizes of 10, 15, and 20 thousand British pounds were offered for solutions of varying degrees of accuracy. John Harrison was awarded the top prize in 1773, and his system revolutionized navigation and maritime trade. Commentators have noted that methods for verifying a winner of the Longitude Prize were poorly specified, resulting in arguably unreasonable demands of proof that postponed Harrison's eventual payment by years. On the other hand, by leaving open eligible methods for solving the problem, the prize succeeded in promoting a surprising solution. Harrison's method utilized a chronometer, when most expected the winning method to involve improved star charts.

1721 - French Royal Academy Prize Questions

In 1721, the French Royal Academy of Sciences began offering regular scientific and mathematical "prize questions" and offering a Grand Prix medal for the best solution. While no cash prizes were awarded, the medals were potentially career-making honors and stimulated considerable research on the selected questions. Prize-winners included Maclaurin for his work in kinetics and Coulomb for work on magnetic compasses.

1775 - Alkali Prize

In 1775, King Louis XVI offered a prize of 2,400 livres to anyone who found a commercially viable artificial process for the production of alkali. Naturally occurring alkali was used in paper, soap, and glass production, but discovery of an artificial process in 1791 by Nicolas Leblanc enabled much greater production and launched the French chemical industry. Unfortunately for Leblanc, the French Revolution destroyed his alkali factory and prevented the King from giving Leblanc his award. Leblanc committed suicide in 1806, and it was not until 1855 that his heirs received the prize payment from the French government.

1795 - Napoleon's Food Preservation Prize

In 1795, Napoleon's Society for the Encouragement of Industry offered a 12,000 franc prize for a method of food preservation to help feed Napoleon's army. Nicolas Appert devised a solution using champagne bottles in 1809 and was awarded the prize in 1810 on the condition that he publish his methods. The discovery marked the beginning of the canning industry.

1820 - Montyon Prizes

In 1820, the French Royal Academy of Sciences began offering large monetary awards after a private donor established the Montyon Fund for prizes in medicine. The Montyon prizes were designated for solutions to pre-specified medical challenges, with reward amounts intended to be "proportional to the service" of the innovator. The Academy struggled with applicants' failure to disclose negative results, while some suggested that the Academy itself was corrupt as there was little transparency in awarding the prizes and un-awarded funds reverted to the Academy's coffers. Nonetheless, an unprecedented 283,000 francs in prizes were awarded between 1825 and 1842. In 1860, a young Louis Pasteur was awarded a Montyon prize for his work in physiology, and the winnings subsidized much of his subsequent groundbreaking research. In the mid-1800's, private contributions to the French Royal Academy lead to the establishment of dozens of additional monetary prizes. These included the Jecker Prize, established in 1851 "to accelerate the progress of organic chemistry" and the Breant Prize in 1858 offering 100,000 francs for a cure for cholera. Charles Friedel was among the winners of the Jecker Prize for his now famous Friedel-Crafts reaction. The main Breant Prize was never awarded, though it propelled more research on infectious diseases that was rewarded with subsidiary prizes. Pierre and Marie Curie received multiple prizes from the Academy between 1895 and 1906. The French Royal Academy gradually transitioned from offering prizes to grants in the late 19th and early 20th centuries.

1823 - Turbine Prize

In 1823 the French Society for the Encouragement of Industry offered a prize of 6,000 francs for the development of a large-scale commercial hydraulic turbine. The prize was won in 1827 by then 25 year-old Benoit Fourneyron. His turbine was placed in the public domain and was immediately implemented across Europe and helped to power the burgeoning New England textile industry.

1895 - Chicago Times-Herald Prize for Motors

In 1895, the Chicago Times-Herald offered a \$5000 Prize for Motors to be awarded for the development of "practicable, self propelling road carriages," as determined by a 54-mile race. The winner was J. Frank Duryea. Even more than the prize money, the publicity generated did much to promote investment in automotive innovation.

1900 - Deutsche Prize

In 1900, Henry Deutsch de la Meurthe offered the Deutsche Prize of 100,000 francs for the development of an airship that could be flown on an 11km course around the Eiffel Tower in under 30 minutes. Alberto Santos-Dumont became an international sensation after being awarded the prize in 1901, despite exceeding the time limit by 40 seconds. After Santos-Dumont's success, the Brazilian government matched the prize money he received.

1903 - Deutsch-Archdeacon Prize

In 1903, French Aero Club members Earnest Archdeacon and Henry Deutsch de la Meurthe offered a prize of 50,000 francs to the first pilot to fly a heavier-than-air vehicle in a 1km circular course. Henry Farman won the prize in 1907, and went on to become a commercial airplane manufacturer.

1908 - Scientific American Prize

In 1908, the magazine Scientific American offered a prize of \$2,500 to the first airplane in America to publicly fly for 1km. Glenn Curtiss won the prize the same year.

1909 - English Channel Crossing Prize

In 1909 the British Newspaper the Daily Mail offered the English Channel Crossing Prize of 1,000 pounds to the first pilot to fly an airplane 21 miles across the English Channel. Louis Bleriot won the prize the same year, and the French government supplemented his winnings with an additional 50,000 francs.

1909 - Rheims Airshow Prizes

Also in 1909, several prizes for speed, distance, and altitude were offered at the Rheims Airshow. Glenn Curtiss won two prizes for speed, including the Gordon Bennett Prize, and launched an airplane manufacturing business with his winnings.

1910 - Milan Committee Prize

In 1910, the Milan Committee offered a prize of 160,000 lire for the first pilot to fly a plane over the Alps between Switzerland and Italy. The prize was won the same year by Gorges Chavez, but his winning flight ended in a crash and the pilot died four days later.

1910 - Hearst Prize

Also in 1910, William Randolph Hearst Offered \$50,000 to the first pilot to fly across the U.S. in under 30 days. Though there were some attempts, the prize expired in 1911 without a winner.

1913 - Daily Mail Tans-Atlantic Prize

In 1913 the Daily Mail offered the Trans-Atlantic Prize of 10,000 pounds to the first pilot to fly across the Atlantic within 72 hours. John Alcock and Arthur Whitten Brown won the prize after World War I in 1919.

1919 - Orteig Prize

In 1919, Raymond Orteig offered the \$25,000 Orteig Prize for the first non-stop flight between New York and Paris. The prize offer expired in 1924 with no attempts before Orteig extended the deadline. By the time Charles Lindbergh won the prize in 1927 in his famous plane, the "Spirit of St. Louis," nine competitors had prepared to make the flight and three had already tried and failed. Lindberg's success sparked a boom in American interest in aviation, and inspired many subsequent prizes, including the Ansari X Prize 70 years later.

1931 - Soviet Committee for Invention

In 1931, the Soviet Union implemented a Committee for Invention offering payment for new inventions determined by a sliding percentage of the cost savings produced after three years of use. Non-monetary social privileges were also offered as rewards. The patent system was left in place, but application fees were high and patents were made less valuable by market controls. The amount of the rewards was increased in 1942 after innovation declined, but by most accounts the rewards remained too low to promote optimal levels of innovation. The system continued until the collapse of the Soviet Union in 1991.

1946 - U.S. Patent Compensation Board

In 1946, the U.S. Patent Compensation Board was established to provide an incentive for private innovations in atomic energy that were no longer eligible to be patented for security reasons. The Board considers the cost and usefulness of inventions in determining how much to reward inventors, but reward amounts have been criticized for being too low; Enrico Fermi received only \$300,000 for his patented process for the production of radioactive isotopes. The Compensation Board remains in place today, but largely fails to stimulate private sector innovations in atomic energy.

1948 - Wolfskehl Prize

At his death in 1948, Paul Wolfskehl left 100,000 German marks as a prize for the first valid proof of Fermat's Last Theorem. While there had been previous attempts to prove the 300 year-old theorem, the Wolfskehl Prize increased the problem's profile. Andrew Wiles won the prize in 1997.

1958 - NASA Space Act Awards

In 1958, NASA established the Inventions and Contributions Board with the authority to offer Space Act awards of up to \$100,000 for technological developments in aeronautics that contribute to NASA's goals. The program is still in place, and dozens of prizes have been awarded.

1959 - Feynman Prizes

In 1959, physicist Richard Feynman offered prizes of \$1,000 for the development of the first motor less than 1/64th of an inch on every side, and for the first written text at 1/25,000th scale. William McLellan and Thomas Newman won the prizes in 1960 and 1985, respectively.

1959 - Kremer Prizes

Also in 1959, Henry Kremer offered a prize of 5,000 pounds for the development of a human powered flying machine. Paul McCready won the prize in 1977, after which Kremer offered several additional prizes for further advances in human-powered flight.

1980 - Fredkin Prize

In 1980, computer scientist Edward Fredkin offered a \$100,000 prize for the first computer chess program to beat a reigning world chess champion. IBM's Deep Blue Chess team won the prize in 1996 when their machine defeated Gary Kasparov.

1990 - Loebner Prizes

In 1990, Hugh Loebner and the Cambridge Center for Behavioral Studies offered the \$100,000 Loebner Prize for the first computer to pass the "Turing Test" for artificial intelligence. The grand prize has not yet been won, but \$2,000 prizes are awarded annually for the most significant advances in computer natural-language processing and artificial intelligence.

1991 - FCC Pioneer Preferences

In 1991, the U.S. Federal Communications Commission (FCC) established the Pioneer Preference Program, offering a reward of preferential licensing (worth many millions of dollars) for the development of new spectrum-using communications services and technologies. Five companies received the reward before the program ended in 1997, and a sixth, Qualcomm, was granted the award for its development of digital wireless technology after a legal appeal.

1992 - Super Efficient Refrigerator Program

In 1992, 24 American utility companies created the Super Efficient Refrigerator Program (SERP) that offered a prize of up to \$30 million for the development of a commercially viable CFC-free refrigerator that surpassed federal efficiency standards by at least 25%. Actual prize payment was to be awarded based on the number of units sold. While Whirlpool won the competition in 1994, exceeding the program's efficiency requirements, falling energy costs and delayed implementation of federal efficiency standards led to lower than expected sales and a lower prize payment.

1994 - Rockefeller Prize

In 1994, the Rockefeller Foundation offered a prize of \$1 million for developing a low-cost highly accurate diagnostic test for gonorrhea or chlamydia that could be easily administered in the developing world. The prize expired in 1999 without a winner, and has been critiqued for being too small, too inflexible, and offered for too short a period of time.

1995 - Ansari X Prize

In 1995, the Ansari family sponsored the first X Prize. The X Prize was modeled after the Orteig Prize won by Lindbergh, and offered \$10 million for the first private team to build and launch a spacecraft capable of carrying three people to an altitude of 100km twice within two weeks. Mojave Aerospace Ventures won the prize in 2004 with a spacecraft designed by Burt Rutan. The prize garnered significant media attention, and significantly raised the public profile of commercial spaceflight.

1996 - Foresight Institute Feynman Prizes

In 1996, the Foresight Institute announced the \$250,000 Feynman Grand Prize to be awarded for two specified breakthroughs in nanotechnology. The Grand Prize has not yet been won, but in the meantime the Feynman Institute awards \$20,000 annually for the most significant advancements in nanotechnology.

1997 - Budweiser Challenge

In 1997, Budweiser announced a \$1 million prize, half of which would be donated to charity, for the first non-stop balloon flight around the globe. Bertrand Piccard and Brian Jones won the prize in 1999 for meeting what was called the "last great aviation challenge of the century."

1997 - Cheap Access to Space Prize

In 1997, the Space Frontier Foundation and the Foundation for International Non-governmental Development of Space (FINDS) announced the \$250,000 Cheap Access to Space (CATS) Prize for the first private team to launch a 2kg to an altitude of 200km. Two launches were made, but the prize expired in 2000 with no winner.

1999 - Cooperative Computing Awards

In 1999, the Electronic Frontier Foundation announced its Cooperative Computing Awards, offering a total of \$550,000 in prizes for the discovery of very large prime numbers. The intent of the Awards is to encourage computer networking for the solution of complex computational problems. Nayan Hajratwala won \$50,000 in 2000 for discovering a prime number with over 1 million digits with the help of tens of thousands of networked computer users. Prizes for 10 million digits, 100 million digits, and 1 billion digits have not yet been awarded.

2000 - Millennium Grand Challenge in Mathematics

In 2000, the Clay Mathematics Institute announced the Millennium Grand Challenge in Mathematics,

offering a combined \$7 million; \$1 million each for a proof or counterexample to any of seven classical conjectures in mathematics. The prize announcement received considerable public attention. Grigori Perelman was confirmed to have solved one of the seven conjectures in 2006, but he declined the award.

2000 - Goldcorp Challenge

Also in 2000, the gold mining company Goldcorp introduced the Goldcorp Challenge: the company released all of its geological data on an underperforming Canadian mine, and offered \$575,000 in prizes including a grand prize of \$105,000 for the most accurate predictions of where to dig to find the most gold. Over 1,400 people participated from 50 countries, with 80% of 110 identified digging sites yielding significant quantities of gold. A partnership of two Australian companies using computer fractal technology won the grand prize in 2001.

2001 - Innocentive

The now independent company InnoCentive was founded by Eli Lilly in 2001 as a registry for scientific innovation prizes. Companies post specific scientific needs, a prize amount, and a deadline. The innovator providing the best solution is awarded the prize. To date, over 80 prizes have been awarded.

2003 - DARPA Grand Challenges

In 2003, the Defense Advanced Research Projects Agency announced the first DARPA Grand Challenge: \$1 million for the first robotic vehicle to complete a course from California to Nevada in under 10 hours. Multiple teams competed for the prize in 2004, but none completed the course. A second Grand Challenge was held in 2005, with the Stanford Racing Team winning the \$2 million prize. A third Grand Challenge is scheduled for November 2007 on a 60 mile simulated urban course, with a total of \$3.5 million in prizes to be awarded.

2003 - Methuselah Mouse Prize

In 2003, the Methuselah Mouse Foundation announced a prize for the development of long-lived genetically engineered mice in order to promote longevity research. The foundation solicits private donations to increase the prize amount, which now stands at more than \$4 million.

2004 - Project Bioshield

In 2004, the U.S. enacted Project Bioshield, which includes a provision for automatic government payment to procure newly developed "qualified countermeasures" against bioterrorism. By most accounts, the program has done a poor job of stimulating private R&D on bioterror countermeasures.

2004 - NASA Centennial Challenges

In 2004, NASA announced the first in a series of Centennial Challenges, initially offering prizes from \$50,000 to \$250,000 for private sector development of specific technologies to advance space exploration. To date, six Challenges have been announced, two have expired with no winner, and five additional Challenges are scheduled to be announced in 2007. Current Challenges include the \$2 million Lunar Lander Challenge.

2005 - Medical Innovation Prize Act

In 2005, former Congressman Bernie Sanders introduced a bill, the Medical Innovation Prize Act of 2005, that called for devoting .5% of U.S. GDP annually to be paid to the developers of new

pharmaceuticals in lieu of standard patent market exclusivity. New drugs would be open to generic competition as soon as they received FDA approval, with prize payments from over a ten year period serving as an alternative incentive for private innovation. The Act called for prize payments to be linked to the incremental medical benefit provided by a new product, meaning that the fund would be divided between the developers of new drugs on the basis of the relative medical utility of their products. The intent of the bill was "to provide incentives for the investment in research and development for new medicines" and to "enhance access to new medicines."

2005 - Grainger Challenges

In 2005, the National Academy of Engineering announced the first in a planned series of Grainger Challenges, offering a \$1 million first prize and \$200 and \$100 thousand second and third prizes for the development of economical filtration devices for the removal of arsenic from well water in developing countries. Over 70 entries were submitted, and Abul Hussan was announced the winner in 2007 for his SONO filter that has already been implemented to provide safe drinking water to 400,000 people.

2006 - Archon X Prize for Genomics

In 2006, the X Prize foundation announced the Archon X Prize for Genomics, offering \$10 million for reaching targets for high speed and low cost in full genome sequencing.

2006 - Netflix Prize

In 2006, Netflix offered a prize of \$1 million for a system to more accurately predict consumer preferences; specifically for a 10% improvement over Netflix's current accuracy in predicting whether a customer will like a movie given previous selections.

2006 - Ibrahim African Leadership Prize

In 2006, businessman Mo Ibrahim announced a \$5 million annual award for a former African head of state who has ceded power after significantly contributing to the welfare of his or her constituents. The prize is intended to reduce corruption as well as promote effective development strategies.

2007 - Virgin Earth Challenge

In 2007, Sir Richard Branson and former U.S. Vice President Al Gore announced the \$25 million Virgin Earth Challenge for "a commercially viable design which results in the removal of anthropogenic, atmospheric greenhouse gases so as to contribute materially to the stability of Earth's climate." In announcing the prize, Branson cited inspiration from previous innovation prizes, including the Longitude Prize, French prizes for alkali and canning, and 20th century prizes for automobiles and aviation.

2007 - Pneumococcal Vaccine Advance Market Commitment

Later in 2007, Canada, Italy, Norway, Russia, the United Kingdom, and the Bill & Melinda Gates Foundation announced a \$1.5 billion "Advanced Market Commitment" or AMC for pneumococcal vaccines. The AMC specifies requirements for new pneumococcal vaccines and pledges \$1.5 billion to heavily subsidize the purchase of eligible vaccines for use in developing countries, in effect offering a prize for the development and delivery of effective vaccines. Backers suggest the AMC will speed delivery of vaccine to developing countries by 10 years and save the lives of 5.4 million children by 2030.

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