# off

## Framework

### My value is morality for two reasons

1. The resolution’s use of the word “unjust” implies a moral question.
2. Morality allows us to perceive what is inherently good or bad. It’s the value upon which we can conceptualize all other values, thus it must be prioritized.

### My criterion is environmental justice

#### Environmental justice means ensuring the planet remains livable

Bolte et al. 11, [Bavarian Health and Food Safety Authority, Oberschleissheim, Germany,] 3-3-2011, "Environmental Justice: Social Disparities in Environmental Exposures and Health: Overview," Elsevier B.V., <https://www.sciencedirect.com/science/article/pii/B9780444522726006851> PM

Introduction There is growing evidence that the gap in environmental resources and health has recently been widening not only between north and south, but also within industrialized countries (e.g., USA and Europe). The great number of multidisciplinary studies in this field is just beginning to make it clear that health disparities are inextricably linked with inequalities in the social, physical, and manmade environmental conditions across economic strata. To reach a better understanding of ethnic and socioeconomic inequalities in health and well-being, one must examine the conceptual and practical aspects of environmental justice as a dimension of the social causes of environmental inequality. Environmental injustice becomes evident from the disproportionate exposure to environmental hazards that affect mainly economically disadvantaged populations and communities of ethnic minorities with low capability for adjustment, rendering them more vulnerable. Early efforts to address various forms of structurally embedded environmental racism and social injustice were started in the USA during the 1980s by environmental organizations, social movements, and primarily locally based (grassroots) groups. The community of environmental justice activists has grown quickly over the past three decades in several countries, popularizing its concept and goals. The movement has attracted increasing public awareness, supported by substantial research, and to some extent political acceptance. In addition, methodological considerations mainly in the area of epidemiology were one recent cause for the growing interest in social disparities in environmental exposures and health. Definition and Main Features of Environmental Justice Environmental justice, environmental equity, and environmental racism are different phrases that describe and explain central features of the environmental justice movement, focusing on the disparate impact of hazardous waste sites and other polluting facilities located in or near distressed neighborhoods with high concentrations of ethnic minorities and economically disadvantaged populations. Because the concepts and contexts associated with each of these labels are complex and multidimensional, the meaning of environmental justice and injustice has changed over time and can differ considerably. Following the core definition from the Environmental Protection Agency (EPA), environmental justice seeks the equitable treatment and involvement of people of all races, cultures, incomes, and educational levels in the development, implementation, and enforcement of environmental programs, laws, rules, and policies. Therefore, the concept of environmental justice as a term with a more political connotation implies justice on a distributive, procedural, and precautionary level. Distributive justice requires an equitable distribution of the costs of environmental risks and of the benefits of environmental values across the demographic and geographic scales. Considerable emphasis is placed on procedural justice defined as the extent to which political decisionmaking processes are applied fairly and people are empowered to control and influence the decisions that affect them (e.g., higher fines for dumping waste in white versus minority communities). The precautionary principle is based on the attitude that uncertainties in short- or longterm environmental impacts resulting from deteriorating conditions in the everyday environment where people live and work call for decision-making to keep public health from harm. 459 With recent distributional challenges of globalization, urbanization, and environmental degradation (e.g., ozone depletion, water security, declining biodiversity, and deforestation) as well as climate change, the environmental justice concept has moved toward a broader understanding, now including generational and international environmental justice. Generational environmental justice refers to the concept of sustainability (including global ecological integrity and global environmental justice) and the responsibility of current generations to ensure a healthy and safe environment for future generations. (‘‘We’re only borrowing the world from our children.’’) It implies avoiding environmental degradation, which brings injustice on future generations for the sake of short-term economic gains in the present. As more environmental resources become ever scarcer, the increasing burden in hazardous environmental conditions imposed by more affluent countries on developing countries touches on an important issue of international environmental justice. Therefore, the concept of environmental justice has been taken up by many countries.

## Contention 1 is Innovation

#### Outer Space as a private sector is growing significantly right now

Weinzierl 21, 2-12-2021, "The Commercial Space Age Is Here," Harvard Business Review, <https://hbr.org/2021/02/the-commercial-space-age-is-here> PM

There’s no shortage of hype surrounding the commercial space industry. But while tech leaders promise us moon bases and settlements on Mars, the space economy has thus far remained distinctly local — at least in a cosmic sense. Last year, however, we crossed an important threshold: For the first time in human history, humans accessed space via a vehicle built and owned not by any government, but by a private corporation with its sights set on affordable space settlement. It was the first significant step towards building an economy both in space and for space. The implications — for business, policy, and society at large — are hard to overstate. In 2019, [95%](https://brycetech.com/reports) of the estimated $366 billion in revenue earned in the space sector was from the space-for-earth economy: that is, goods or services produced in space for use on earth. The space-for-earth economy includes telecommunications and internet infrastructure, earth observation capabilities, national security satellites, and more. This economy is booming, and though [research shows](https://hbsp.harvard.edu/product/716037-PDF-ENG) that it faces the challenges of overcrowding and monopolization that tend to arise whenever companies compete for a scarce natural resource, [projections for its future](https://hbsp.harvard.edu/product/720027-PDF-ENG) are optimistic. Decreasing costs for launch and space hardware in general have enticed new entrants into this market, and companies in a variety of industries have already begun leveraging satellite technology and access to space to drive innovation and efficiency in their earthbound products and services. In contrast, the space-for-space economy — that is, goods and services produced in space for use in space, such as mining the Moon or asteroids for material with which to construct in-space habitats or supply refueling depots — has struggled to get off the ground. As far back as the 1970s, [research](https://ntrs.nasa.gov/citations/19780004167) commissioned by NASA predicted the rise of a space-based economy that would supply the demands of hundreds, thousands, even millions of humans living in space, dwarfing the space-for-earth economy (and, eventually, the entire terrestrial economy as well). The realization of such a vision would change how all of us do business, live our lives, and govern our societies — but to date, we’ve never even had more than [13 people](https://www.space.com/6503-population-space-historic-high-13.html) in space at one time, leaving that dream as little more than science fiction. Today, however, there is reason to think that we may finally be reaching the first stages of a true space-for-space economy. SpaceX’s [recent achievements](https://www.nasa.gov/press-release/nasa-s-spacex-crew-1-astronauts-headed-to-international-space-station/) (in cooperation with NASA), as well as upcoming efforts by [Boeing](https://www.nasa.gov/feature/boeing-s-starliner-makes-progress-ahead-of-flight-test-with-astronauts), [Blue Origin](https://www.blueorigin.com/news/nasa-selects-blue-origin-national-team-to-return-humans-to-the-moon), and [Virgin Galactic](https://spacenews.com/virgin-galactic-prepares-to-transition-to-operations) to put people in space sustainably and at scale, mark the opening of a new chapter of spaceflight led by private firms. These firms have both the intention and capability to bring private citizens to space as passengers, tourists, and — eventually — settlers, opening the door for businesses to start meeting the demand those people create over the next several decades with an array of space-for-space goods and services. Welcome to the (Commercial) Space Age In our [recent research](https://www.hbs.edu/faculty/Publication%20Files/jep.32.2.173_Space,%20the%20Final%20Economic%20Frontier_413bf24d-42e6-4cea-8cc5-a0d2f6fc6a70.pdf), we examined how the model of centralized, government-directed human space activity born in the 1960s has, over the last two decades, made way for a new model, in which public initiatives in space increasingly share the stage with private priorities. Centralized, government-led space programs will inevitably focus on space-for-earth activities that are in the public interest, such as national security, basic science, and national pride. This is only natural, as expenditures for these programs must be justified by demonstrating benefits for citizens — and the citizens these governments represent are (nearly) all on earth. In contrast to governments, the private sector is eager to put people in space to pursue their own personal interests, not the state’s — and then supply the demand they create. This is the vision driving SpaceX, which in its first twenty years has entirely upended the rocket launch industry, securing 60% of the global commercial launch market and building ever-larger spacecraft designed to ferry passengers not just to the International Space Station (ISS), but also to its own promised [settlement on Mars](https://www.spacex.com/media/making_life_multiplanetary_transcript_2017.pdf). Today, the space-for-space market is limited to supplying the people who are already in space: that is, the handful of astronauts employed by NASA and other government programs. While SpaceX has grand visions of supporting large numbers of private space travelers, their current space-for-space activities have all been in response to demand from government customers (i.e., NASA). But as decreasing launch costs enable companies like SpaceX to leverage economies of scale and put more people into space, growing private sector demand (that is, tourists and settlers, rather than government employees) could turn these proof-of-concept initiatives into a sustainable, large-scale industry. This model — of selling to NASA with the hopes of eventually creating and expanding into a larger private market — is exemplified by SpaceX, but the company is by no means the only player taking this approach. For instance, while SpaceX is focused on space-for-space transportation, another key component of this burgeoning industry will be manufacturing. [Made In Space, Inc.](https://madeinspace.us/capabilities-and-technology/archinaut/) has been at the forefront of manufacturing “in space, for space” since 2014, when it 3D-printed a wrench onboard the ISS. Today, the company is exploring other products, such as high-quality fiber-optic cable, that terrestrial customers may be willing to pay to have manufactured in zero-gravity. But the company also recently received a [$74 million contract](https://www.nasa.gov/press-release/nasa-funds-demo-of-3d-printed-spacecraft-parts-made-assembled-in-orbit) to 3D-print large metal beams in space for use on NASA spacecraft, and future private sector spacecraft will certainly have similar manufacturing needs which Made In Space hopes to be well-positioned to fulfill. Just as SpaceX has begun by supplying NASA but hopes to eventually serve a much larger, private-sector market, Made In Space’s current work with NASA could be the first step along a path towards supporting a variety of private-sector manufacturing applications for which the costs of manufacturing on earth and transporting into space would be prohibitive. Another major area of space-for-space investment is in building and operating space infrastructure such as habitats, laboratories, and factories. Axiom Space, a current leader in this field, recently [announced](https://www.theverge.com/2021/1/26/22250327/space-tourists-axiom-private-crew-iss-price) that it would be flying the “first fully private commercial mission to space” in 2022 onboard SpaceX’s Crew Dragon Capsule. Axiom was also [awarded](https://spacenews.com/nasa-selects-axiom-space-to-build-commercial-space-station-module/) a contract for exclusive access to a module of the ISS, facilitating its plans to develop modules for commercial activity on the station (and eventually, beyond it). This infrastructure is likely to spur investment in a wide array of complementary services to supply the demand of the people living and working within it. For example, in February 2020, Maxar Technologies was awarded a [$142 million contract](https://www.builtincolorado.com/2020/02/03/maxar-technologies-142m-nasa-contract) from NASA to develop a robotic construction tool that would be assembled in space for use on low-Earth orbit spacecraft. Private sector spacecraft or settlements will no doubt have need for a variety of similar construction and repair tools.

#### The US commercial space industry is booming – private space companies are driving innovation

**Lindzon 21** [(Jared Lindzon, A FREELANCE JOURNALIST AND PUBLIC SPEAKER BORN, RAISED AND BASED IN TORONTO, CANADA. LINDZON'S WRITING FOCUSES ON THE FUTURE OF WORK AND TALENT AS IT RELATES TO TECHNOLOGICAL INNOVATION) "How Jeff Bezos and Elon Musk are ushering in a new era of space startups," Fast Company, 2/23/21, https://www.fastcompany.com/90606811/jeff-bezos-blue-origin-elon-musk-spaces-space] TDI

In early February, Jeff Bezos, the founder of Amazon and one of the planet’s wealthiest entrepreneurs, dropped the bombshell announcement that he would be stepping down as CEO to free up more time for his other passions. Though Bezos listed a few targets for his creativity and energy—The Washington Post and philanthropy through the Bezos Earth Fund and Bezos Day One Fund—one of the highest-potential areas is his renewed commitment and focus on his suborbital spaceflight project, Blue Origin. Before space became a frontier for innovation and development for privately held companies, opportunities were limited to nation states and the private defense contractors who supported them. In recent years, however, billionaires such as Bezos, Elon Musk, and Richard Branson have lowered the barrier to entry. Since the launch of its first rocket, Falcon 1, in September of 2008, Musk’s commercial space transportation company SpaceX has gradually but significantly reduced the cost and complexity of innovation beyond the Earth’s atmosphere. With Bezos’s announcement, many in the space sector are excited by the prospect of those barriers being lowered even further, creating a new wave of innovation in its wake. “What I want to achieve with Blue Origin is to build the heavy-lifting infrastructure that allows for the kind of dynamic, entrepreneurial explosion of thousands of companies in space that I have witnessed over the last 21 years on the internet,” Bezos said during the Vanity Fair New Establishment Summit in 2016. During the event, Bezos explained how the creation of Amazon was only possible thanks to the billions of dollars spent on critical infrastructure—such as the postal service, electronic payment systems, and the internet itself—in the decades prior. “On the internet today, two kids in their dorm room can reinvent an industry, because the heavy-lifting infrastructure is in place for that,” he continued. “Two kids in their dorm room can’t do anything interesting in space. . . . I’m using my Amazon winnings to do a new piece of heavy-lifting infrastructure, which is low-cost access to space.” In the less than 20 years since the launch of SpaceX’s first rocket, space has gone from a domain reserved for nation states and the world’s wealthiest individuals to everyday innovators and entrepreneurs. Today, building a space startup isn’t rocket science. THE NEXT FRONTIER FOR ENTREPRENEURSHIP According to the latest Space Investment Quarterly report published by Space Capital, the fourth quarter of 2020 saw a record $5.7 billion invested into 80 space-related companies, bringing the year’s total capital investments in space innovation to more than $25 billion. Overall, more than $177 billion of equity investments have been made in 1,343 individual companies in the space economy over the past 10 years. “It’s kind of crazy how quickly things have picked up; 10 years ago when SpaceX launched their first customer they removed the barriers to entry, and we’ve seen all this innovation and capital flood in,” says Chad Anderson, the managing partner of Space Capital. “We’re on an exponential curve here. Every week that goes by we’re picking up the pace.”

#### Innovation brought about by space helps to mitigate climate change

**ESA 20,** (European Space Agency ) 7-16-2020, "Space technology helps mitigate climate change", Esa, https://www.esa.int/Applications/Telecommunications\_Integrated\_Applications/Technology\_Transfer/Space\_technology\_helps\_mitigate\_climate\_change PM

Space technologies have led to a number of inventions that benefit the environment and save energy. Satellite-based systems are reducing vehicles’ carbon dioxide emissions, remote-sensing technology is making wind turbines more efficient, and information from weather satellites is helping solar cells to produce more energy. These are just some examples of how spin-offs from space technology and satellite services can make a difference. Over the years, ESA’s Technology Transfer Programme and its Business Incubation Centres have fostered and supported many innovative technologies and business ideas that contribute to new services and products to mitigate climate change. To maximise the amount of electricity from new wind turbines, the French company Leosphere developed a small instrument to measure wind speed and direction from the ground up to heights of 200 metres. The ‘lidar’ technology is similar to that which ESA will use on its Aeolus satellite to provide global observations of wind profiles from space. ESA’s expertise from this mission was important for Leosphere and was used to improve their instrument during the company’s start-up phase at ESA’s Business Incubation Centre (BIC) in Noordwijk, the Netherlands. More instruments based on the same technology have followed and these are now being used in more than 100 countries. By using data from weather satellites, ‘SolarSAT’ from Italian company Flyby can accurately predict the power output of photovoltaic power plants. This information is used to design improved systems and quickly identify faults in operating photovoltaic plants – faults that can reduce energy production by more than 10% a year. This system has already been installed on several photovoltaic systems in Italy. Miniaturised ceramic gas sensor technology, developed originally for measuring oxygen levels around spacecraft reentry vehicles, is now being used in systems that accurately control heater combustion, one of the major sources of pollutants. “It can reduce exhaust gases that are harmful for the environment and ensure that heating systems work at an optimum level. It also reduces fuel consumption by 10–15%,” explained Rainer Baumann from TU Dresden. Supported by ESA’s Technology Transfer Programme and its partner MST, this technology is now used by the German company ESCUBE in systems controlling industrial heaters. Conventional satnav systems help people to find their way. Now, several innovators have come up with interesting developments that use the same information to reduce fuel consumption and pollution by cars. Repeated rapid acceleration and abrupt braking increases the fuel consumption of even the greenest car. Alex Ackerman and Yossef Shiri have developed the intelligent GreenDrive system that combines information on the type of car, its location and the road conditions to advise the driver on the most economical driving style to use: when to accelerate, when to brake and when to keep the speed constant. On average, this can result in a 15–25% fuel saving. Another system proposed by Prof. Gerhard Güttler for the European Satellite Navigation Competition is Galileo-Ecodrive. This uses data on a road’s geodetic height profile provided by satnav systems to optimise the operation of auxiliary devices such as electricity generators, air conditioning, power steering, the deep freezers used on trucks for perishable goods and the moveable parts of a cement mixer –devices that consume up to 20% of the fuel. This could amount to savings of up to 2 billion litres a year across Europe, avoiding the emission of 5 million tonnes of carbon dioxide.

# Case

### AT Debris

#### No impact to space debris

Lee A. Paradise 15, writer for Science Clarified encyclopedia. July 29 2015 "Does the accumulation of "space debris" in Earth's orbit pose a significant threat to humans, in space and on the ground?" www.scienceclarified.com/dispute/Vol-1/Does-the-accumulation-of-space-debris-in-Earth-s-orbit-pose-a-significant-threat-to-humans-in-space-and-on-the-ground.html

Considering the small size of objects like satellites or the shuttle placed against an environment as vast as space, the risk of severe collisions is minimal. Even when an object in space is hit by space debris, the damage is typically negligible even considering the high rate of speed at which the debris travels. Thanks to precautions such as debris shielding, the damage caused by space debris has been kept to a minimum. Before it was brought back to Earth via remote control, the MIR space station received numerous impacts from space debris. None of this minor damage presented any significant problems to the operation of the station or its various missions. The International Space Station (ISS) is designed to withstand direct hits from space debris as large as 0.4 in (1 cm) in size.¶ Most scientists believe that the number of satellites actually destroyed or severely damaged by space debris is extremely low. The Russian Kosmos 1275 is possibly one of these rare instances. The chance of the Hubble Space Telescope suffering the same fate as the Russian satellite is approximately 1% according to Phillis Engelbert and Diane L. Dupuis, authors of The Handy Space Answer Book . Considering the number of satellites and other man-made objects launched into space in the last 40 years, the serious risk posed to satellites is astronomically low.¶ In fact, monitoring systems such as the Space Surveillanc e Network (SSN) maintain constant track of space debris and Near Earth Orbits. Thanks to ground-based radar and computer extrapolation, this provides an early warning system to determine if even the possibility of a collision with space debris is imminent. With this information, the Space Shuttle can easily maneuver out of the way. The Space Science Branch at the Johnson Space Center predicts the chance of such a collision occurring to be about 1 in 100,000, which is certainly not a significant enough risk to cause panic. Soon the ISS will also have the capability to maneuver in this way as well.

### AT Mining

#### Asteroid mining is totally infeasible

Amanda Jane Hughes 18. Post-Doctoral Researcher of Astrophysics, Liverpool John Moores University. “Mining Asteroids Could Unlock Untold Wealth – Here’s How To Get Started.” The Conversation. 5/2/2018, http://theconversation.com/mining-asteroids-could-unlock-untold-wealth-heres-how-to-get-started-95675

According to Professor Martin Elvis, an astrophysicist at Harvard University, an asteroid **worth mining** needs to have a market value of **$1 billion**. In order to satisfy this requirement, the asteroid must be more than 1km in diameter, contain more than 10 parts per million of platinum and have a velocity relative to the speed of the Earth of less than 4.5 kilometres per second. There are more than 17,000 near-Earth asteroids, but how many of them fit the bill? Professor Elvis made a theoretical estimation based on probabilities and assumptions. For instance, of all the meteorites that have fallen to Earth, approximately 4% were metallic. So we can assume that 4% of near-Earth asteroids are also metallic. Taking **into account this** and **other probabilities**, we are left with **only 10 asteroids** that are – **theoretically** – **economically worthwhile** and **practically feasible to mine**. As the targets have **not yet been directly identified**, the task now is to find these **needles in the haystack**. The initial design phase for a prospecting satellite is underway, and the Asteroid Mining Corporation is aiming to launch it by 2020. This would go into low-Earth orbit and would survey the skies for near-Earth asteroids, gathering spectral data and determining their composition in order to identify specific targets. As part of my report I will identify the range and resolution of the spectrograph needed to determine composition. I will also work out a preliminary telescope design. The next objective would be to launch a probe, collect samples for detailed chemical analysis and photograph the surface of the target to identify a potential landing place. The eventual aim would be to land a mining craft on the surface of the target and extract precious metals in situ. Many different techniques have been proposed. However, this would be an **incredibly ambitious feat of engineering** that **cannot be underestimated**, with **many** **unanswered questions** and **unknown timescales** at **this early stage**. There are **not just technical challenges** to overcome. There is currently concern over the **legal ramifications** of this burgeoning industry, given the **lack of laws** and **regulations** to govern the international nature of space exploration. The United Nations oversees the Outer Space Treaty, signed by 106 countries. This provides a framework for the governance of space-based activities, but it does not provide the detailed legislation needed. There are concerns that the situation could become the **new Wild West**, with a lack of laws leading to **disputes** over **who has the rights** to mine a particular asteroid. There is **no mechanism** currently in place to **adjudicate such claims**, and the **legal landscape is complex**.