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Deep-Sea Innovation and Exploration: A controversial idea.
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The human mind has been driven by curiosity since the beginning of time. The idea of exploring new ideas and ultimately discovering new things has been intertwined into human society as we know it. One of human society's biggest curiosities are the depths of the oceans. Despite the millions of species and thousands of discoveries made today, only 5% of the ocean has been discovered. The other 95% lays beneath continents, still waiting to be discovered and researched by the many scientists, engineers and intrigued citizens of the science world. However, not all of the world may agree on exploring and implementing innovation into the marine world. Marine biologists fear that the impact of mining and drilling in the ocean floor will negatively impact the possible existing species of marine life by destroying their extremely delicate habitats. Oil drilling companies, on the other hand, find the exploration of the deep sea essential to economic growth through the discovery of valuable minerals. Nonetheless, how do both perspectives impact the future of ocean innovation as a society?

From the perspective of the economy, the idea of deep-sea innovation is a rewarding advancement for companies and sea-mining industries. The floor bed of the deep sea is home to 3 main types of rock, polymetallic nodules, seafloor massive sulphides and cobalt-rich crusts. The different rocks have rich samples of copper, manganese, zinc and multiple other valuable metals. From a business standpoint, the cost of these metals usually change rapidly and can be quite fraught. Still, minerals from the seafloor are essential in creating cutting-edge technology and developing sophisticated ideas and inventions. The search for rare earth minerals continues to grow as technology advances, and is already in high demand. Currently, China controls a large share of the rare earth metals of the world compared to other countries. Consequently, countries will follow in the footsteps of China to produce and profit off of these rare metals, and to begin mining elsewhere to find these valuable materials *(Woodward A. 2019).* This may prove worthy as to why more deep-sea innovations are needed, since, without marine engineering and technology, reaching deep areas of the sea would be unlikely. The time for sea-mining is now, and companies are not hesitant to try luck with minerals from the deep *(Ballard B, 2019)*

In spite of everything companies claim, scientists believe that the deep-sea exploration and innovations of the future will negatively impact the species of marine life that exist today. Deep-sea exploration can result in the removal of fragile habitats for many species of marine life. Many fragile ecosystems exist in darker and deeper waters; yet most companies and industries ignore this. Majority of the ecosystems that develop in deep waters have unique features and can be easily damaged by being exposed to heat or light. *(McVeigh K. 2019)*. Despite claims to only explore (and not damage) deeper waters, many ocean innovations such as offshore mining and fish farming greatly affect the species of marine fauna living underneath the waves. Fish farming and aquafarms are highly likely to spread and deposit waste, pesticides and other chemicals into areas full of developing ecosystems. Aquafarming also destroys habitats by overloading areas with too many fish *(PETA , 2019)* Like most man-made things, the majority of the innovations being developed have good intentions, yet ignore the long-lasting effects on the environment.

However, the positive side of sea exploration is backed up by the curiosities of many scientists and citizens worldwide. It is easy to assume that humans have discovered most of the ocean by looking at maps, however, oceans are far from completely uncovered. By furthering innovations and exploring deeper parts of the oceans, scientists can get a better understanding of what really lies beneath the

waves and how they function. The exploration and recording of this data would be better for everyone, and not just in economic terms but in opportunities for unexpected discoveries. Instead of going backwards and continuing to investigate the same areas of ocean, scientists should be designing advanced technology and preparing for heavy study and investigations into the wildlife and functions of the deep ocean *(Billard R, 2014).* The information discovered from exploration may also help to identify problems within the ecosystems of the deep sea, research the behaviour and life of animals down there, and to better understand how plants underneath the waves grow. Like the great discoveries of the universe above, the discoveries of the ocean underneath will heavily influence the next innovations and the next generations to come.

Of course, there is no way to say that all the time, money and effort put into exploration will result in anything new. Possibly, scientists may never discover signs of life or be able to identify deep-sea ecosystems. Many also believe that it would be useless to try and discover whether humans are able to survive in areas of the deep-sea since human life would be unable to actually handle the amount of pressure at the bottom of the ocean. Not only is it possible that deep-sea exploration may be a waste of tie, but it may also be a waste of money. The cost of ocean exploration is becoming exceedingly expensive as the time goes by. Even small surveys for ocean exploration could cost around $50 million *(15 Effects of Ocean Exploration: The Pros and Cons 2019*). Spending so much money on an indefinite outcome is looked upon as a waste and could be used for something more beneficial for current issues and problems that directly affect society.

As stated, there are quite a few understandable yet contradicting reasons for and against deep-sea exploration and innovation. Both the drive of curiosity and discovery greatly affect opinions and views on this topic. Deep-sea innovations may help scientists to fully understand the functions of wildlife below the sunlight zone, and help to discover rich deposits of rare minerals in the twilight zone. Of course, it can't be forgotten that humans aren't the only ones affected by exploration. For some, innovations and technology aren't as important as any marine life anywhere in the ocean. And for some, the whole idea of deep-sea exploration seems unplausible and useless. In light of the evidence and considering the information overall, deep-sea innovations and exploration should certainly go forward, to progress current research and ideas for the discoveries of tomorrow.

Dewwandi Wijekoon, 2020

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