42611 - Theory of science in engineering

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# Assignment 5
# Responsible Innovation and Inclusive Innovation

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# Assignment 5a: Responsible Innovation

## Contested innovation: Human Genetic Engineering

With the advancement of CRISPR/Cas9 technology, human genome engineering becomes more feasible. With the control of the human genome, disadvantageous traits can be replaced with advantageous ones. Human genome engineering has applications in eliminating many genetic-related diseases, but may also be used to select desirable traits in the non-health category, like hair color et cetera. The advancement and implementation of human genome engineering could improve the overall sustainable health goals, and also solve potential future genetic degradation problems. It is however not possible to select desirable traits in newborns, this is because the technology is not developed enough, but also partly due to being contested. The application of the technology can be considered playing god, which is an intrinsic ethical concern and the main reason for being contested. Although not the main reason for contention, there are also health and well-being related to human gene technology. As with any intervention of human biology, there are risks involved, as something could go wrong. There is also equality concerns related to human genetic engineering. In case not all people would have access to the technology, or access to some desirable traits et cetera. As the contention stems from religious reasons, increased responsibility in human genome engineering innovation is unlikely to improve the situation. But if we disregard the religious reasons for contention, we could alleviate concerns by escalating to more strict standards with the [1,"Declaration of Helsinki"] instead of for example the medical version of GxP: [2,GCP]. Establishing regulations for fair use and access to all could help eliminate the concern of inequality. With these examples, human genetic engineering could be made a more responsible innovation.

## Neglected areas: Global warming

Regardless of being aware of the negative consequences and impacts of our non-sustainable energy consumption and other climate deteriorating actions, we have yet to solve or even get close to approaching a projectory to meet our goals. Effects of our lacking effort in climate action goals are resulting in global warming, which potentially risks all life on the planet in the future. Although it can be argued that initiatives have been taken to improve the situation, it can also be argued that it is still nowhere sufficient enough. Responsible innovation can improve the climate action situation. Impact assessments like emission assessments and standardizing sustainable energy sources and transport methods. The situation can also be improved by ilegalizing the use of substances that are polluting like hydrofluorocarbons used in refrigerators and air conditioners. Hydrofluorocarbons are 3790 times more damaging to the climate than carbon dioxide over a 20-year period [3, ccacoalition hfcs]. Another example could be to increase government research funding on for example Power-To-X, Renewable Green energy or other projects that seek to improve the climate.

## Assignment 5b: Inclusive Innovation

Innovation should be made inclusive, such that the outcome of the innovation will provide a positive impact without neglecting to consider the possible negative impacts on others. The problem that the innovation seeks to solve, should solve the problem for all those who experience struggle with it, while also avoiding causing problems elsewhere.

Places with medium to high income often have a high living standard compared to low-income places. Although low-income places are capable and have plenty of innovation, it is not uncommon to spend an overwhelming amount of time working just satisfying basic needs like food, shelter, clean water etc. Higher-income places have more time to innovate, and with neglect towards lower-income places, the innovation usually targets the problems that are observed by oneself rather than everyone else. Because of the skewed innovation target and available time allocated toward innovation, a large amount of innovation is therefore targeting these higher-income places.

One of the challenges is that problems differ vastly from where in the world that is considered. Innovations seek to solve problems, but with the amount of complexity, development and equality disparity that exists in the world, it can be hard to solve a problem inclusively.

Another challenge of achieving inclusive innovation is to overcome an instinctive human behavior, that humans often limit altruism to the "tribe"/ closer circle. Most cannot or will not afford to think of anyone else than themselves and their closest, and in conjunction with capitalistic thinking, this leads to innovation that in simple terms have to "sell". With a goal of economic growth and self-preservation, who better to target than those with higher resources/income?

My study line is software technology, and with the fact that an overwhelmingly large part of the world does not have access to computers or the internet, it is very seldom that I observe or think of inclusive innovations. It is seldom to see or think of innovations in computer science as pro-poor, especially if we consider the very poor in third-world countries. The lives of people from low-income third-world countries are vastly different with vastly different problems than that of the more developed parts. Although very different, examples of inclusive computer science innovations that also include third-world countries do exist. An example of computer science innovation that can be considered inclusive, would be the SpaceX Star-link project that aims to provide high-speed, low-latency internet to rural locations across the globe [4, starlink].

Another example of inclusive innovations in computer science could be the many accessibility features like colorblind mode, screen magnifier, etc. Although accessibility features like those mentioned could be considered an innovation by themselves with the sole purpose to include an excluded group. People without a colorblind diagnosis would usually not use a colorblind feature but will solve the color related computer problem for all regardless of colorblindness or not.