Cost–Benefit Analysis

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One tool often used in engineering analysis, especially when trying to determine whether a project makes sense, is cost–benefit analysis. Fundamentally, this type of analysis is just an application of utilitarianism. In cost–benefit analysis, the costs of a project are assessed, as are the benefits. Only those projects with the highest ratio of benefits to costs will be implemented. This principle is similar to the utilitarian goal of maximizing the overall good.

As with utilitarianism, there are pitfalls in the use of cost–benefit analysis. While it is often easy to predict the costs for most projects, the benefits that are derived from them are often harder to predict and to assign a dollar value. Once dollar amounts for the costs and benefits are determined, calculating a mathematical ratio may seem very objective and therefore may appear to be the best way to make a decision. However, this ratio can't take into account many of the more subjective aspects of a decision. For example, from a pure cost–benefit discussion, it might seem that the building of a dam is an excellent idea. But this analysis won't include other issues such as whether the benefits outweigh the loss of a scenic wilderness area or the loss of an endangered species with no current economic value. Finally, it is also important to determine whether those who stand to reap the benefits are also those who will pay the costs. It is unfair to place all of the costs on one group while another reaps the benefits.

- It should be noted that although cost–benefit analysis shares many similarities with utilitarianism, cost–benefit analysis isn't really an ethical analysis tool. The goal of an ethical analysis is to determine what the ethical path is. The goal of a cost–benefit analysis is to determine the feasibility of a project based on costs.
- When looking at an ethical problem, the first step should be to determine what the right course of action is and then factor in the financial costs in choosing between ethical alternatives.

Duty ethics and right ethics

A major proponent of duty ethics was Immanuel Kant (1724–1804), who held that moral duties are fundamental. Ethical actions are those actions that could be written down on a list of duties: be honest, don't cause suffering to other people, be fair to others, etc. These actions are our duties because they express respect for persons, express an unqualified regard for autonomous moral agents, and are universal principles [Schinzinger and Martin, 2000].

Rights ethics was largely formulated by John Locke (1632–1704), whose statement that humans have the right to life, liberty, and property was paraphrased in the Declaration of Independence of the soon-to-be United States of America in 1776. Rights ethics holds that people have fundamental rights that other people have a duty to respect.

Duty ethics and rights ethics are really just two different sides of the same coin. Both of these theories achieve the same end: Individual persons must be respected, and actions are ethical that maintain this respect for the individual. In duty ethics, people have duties, an important one of which is to protect the rights of others. And in rights ethics, people have fundamental rights that others have duties to protect.

As with utilitarianism, there are problems with the duty and rights ethics theories that must be considered. First the basic rights of one person (or group) may conflict with the basic rights of another group. How do we decide whose rights have priority?

Using our previous example of the building of a dam, people have the right to use their property. If their land happens to be in the way of a proposed dam, then rights ethics would hold that this property right is paramount and is sufficient to stop the dam project. A single property holder's objection would require that the project be terminated. However, there is a need for others living in nearby communities to have a reliable water supply and to be safe from continual flooding.

Whose rights are paramount here? Rights and duty ethics don't resolve this conflict very well; hence, the utilitarian approach of trying to determine the most good is more useful in this case.

Virtue Ethics

Virtue ethics is interested in determining what kind of people we should be. Virtue is often defined as moral and goodness. In virtue ethics, actions are considered right if they support good character traits and wrong if they support bad character traits. Virtue ethics focuses on words such as responsibility, honesty, competence and loyalty. Other virtues might include trustworthiness, fairness, caring, citizenship and respect.

Vices could include dishonesty, disloyalty, irresponsibility, or incompetence.

Personal morality can not be separated from professional morality. If a behavior is virtuous in the individuals personal life, the behavior is virtuous in his/her professional life as well.

How can virtue ethics be applied to business and engineering situations?

We can use virtue ethics in our engineering career by answering questions such as:

Is this action honest?

Will this action demonstrate loyalty to my community/ or my employer?

Have I acted in a responsible fashion?

The answer to these questions makes the proper course of action obvious.

We should be careful in applying virtue ethics. Problems can arise with words that seem to be virtue but can actually lead to vices.

Example: the concept of ‘honor’ is a code of dignity, integrity and pride. But the aspects related to pride can often have negative consequences . There are numerous examples in history of wars that have been fought and atrocities committed in order to preserve the honor of an individual or a nation. Individuals have often committed crimes as a way of preserving their honor.