Business Ethics for Engineers

John Hooker

May 2000

Business and Engineering

- Engineers are more involved in business management than ever.
  - Startup companies.
  - Integrated product development cycles.
  - Biotech and e-commerce raise new ethical issues.
- Engineers are increasingly exposed to issues of business ethics.

Today's Topics

- Professional Ethics
- Quality and Safety
- Intellectual Property
- International Business Ethics

Professional Ethics

Professional Ethics

- Professionals:
  - are experts;
  - use expertise responsibility;
  - belong to a professional order.
- Why professions?
  - Easier to identify competence.
  - Can identify incompetence before it is too late.
  - Engineering clearly needs professionalism.

Professional Ethics

- Professional obligations are narrower than ethical duties in general.
  - The whole point of a profession is to establish a reputation (and live up to it).
  - Professional conduct is what the reputation leads people to expect.
  - Determining professional obligation is more a matter of sociology than ethics.

Business as a Profession?

- "Professional" duties of business managers and directors have been narrowly construed.
  - Strictly a *fiduciary* duty to owners (investors, stockholders).
  - Fiduciary duty is strictly *financial* - make lots of money. Not allowed to think about ethics if it impedes profit.
  - This protects fiduciaries from frivolous lawsuits.

Duties of Managers

- Abuses of 1980's created a backlash.
  - Rampant plant closings to relocate offshore.
  - Downsizing out of control.
- "Stakeholder" theory developed.
  - A business has duties to employees, customers, community as well as owners.
  - But how are these duties reconciled?

Duties of Managers

- A broader conception of fiduciary duty.
  - Managers and directors represent owners with respect to their ethical duty as well as their financial interests.
  - Some states (e.g., Pennsylvania) recognize a corporate charter that allows directors to consider ethical issues.

Quality and Safety

Quality and Safety

- How to balance quality and safety against cost?
- How safe is safe?
- What to do when managers want to cut corners?

The Business View

- The new competitive environment
  - Lack of trade barriers stiffen global competition.
  - Japanese quality and efficiency set new standards in 1980's.
  - Lean manufacturing now a necessity.
    - Small lot sizes, setup times, inventory levels.
  - Rapid product development cycles.

The Business View

- If the firm can't compete, managers will get the blame.
- Quality and safety raise the price of the product.
  - Ideally, the consumer decides how to balance quality and safety against cost.
  - But quality and safety often cannot be evaluated until long after the purchase.

The Business View

- So there is market failure. The government and engineering profession must step in.
  - Trademarks.
  - Safety regulations.
  - Product liability suits.
  - Professional codes and standards.
- Engineers help shape the environment in which the manager must compete.

The Legal View

- What are a company's legal duties to customers?
- Three theories of product liability.
  - Contractual theory.
  - Due care theory (primarily Europe).
  - Strict liability (USA).
- Larger projects are governed by tort law.

Product Liability

- Contractual theory.
  - A product must be fit for the purpose for which it is sold (otherwise, failure of consideration).
    - Uniform Commercial Code develops this into concept of *implied warranty*.
    - Usually not overridden by express warranty, unless sold “as is.”
  - An unsafe product is unfit for its purpose.

Product Liability

- Seller is liable only for contractual damages, and not any other harm the buyer may suffer.
- There may be further penalties if fraud is involved.

Product Liability

- Due Care Theory (Europe)
  - Product manufacture must meet standards set by statute.
  - Seller is liable for harm caused by defects only if standards were not met.
  - Origin of ISO standards.

Product Liability

- Justification: purely contractual damages don't provide manufacturer enough incentive to be diligent.
- Justification: contractual theory assumes that parties are well informed, impossible for complex products.

Product Liability

- Strict liability (USA)
  - Manufacturer is liable for any damages caused by product defects.
  - This applies no matter how careful the manufacturer is.
  - Evolved out of U.S. case law, not statute.
  - Justification: regulations cannot keep up with innovative, high-tech industry.

Projects

- Quality of work governed by contract law.
  - Contract usually lists specifications.
  - It states that project will be completed in “workmanlike manner,” which is defined by professional practice and codes, public expectations.
  - Firms that ask engineers for substandard work can be sued for breach of contract.

Projects

- Safety governed by tort law.
  - A firm that builds an unsafe bridge or heart valve can be held liable for damages if it is negligent.
  - Negligence is lack of due care, as defined by professional codes and practices, and public expectations.
  - Negligence can be criminal if it involves reckless disregard for safety.

The Engineer's Duty

- An engineer's professional obligation is defined by the profession's reputation.
  - This is reflected in legal standards, professional codes and public expectations.
  - Varies across cultures (Volvo vs. Ferrari).
  - Example: 1999 earthquake in Turkey.

The Engineer's Duty

- Engineers are also bound by obligations that apply to human beings in general.
  - Should one practice engineering at all?
  - It is adequate merely to meet public expectations?
  - What happens when there are no clear standards or expectations (e.g., Challenger case)?

Whistle Blowing

- What is the engineer's duty when the firm behaves unethically?
- Options:
  - Blow the whistle, internally or publicly.
  - Resign.
  - Keep quiet and do what the company wants.

Whistle Blowing

- Some considerations:
  - Whistle-blowing (especially external) is typically traumatic for the employee and often ineffective.
  - Resignation may violate mutual obligations of employer and employee.
    - Look at the converse: should firm fire an unethical employee or try to correct him/her?
    - Perhaps an unethical firm has already violated its duties to employees.

Intellectual Property

Intellectual Property

- As designers, engineers do little but create intellectual property.
- Biotech and computing have complicated the issues.

Intellectual Property Law

- Legally, intellectual property is:
  - A patented invention.
  - A trade secret.
  - Copyrighted material.

Patents

- A patent grants the owner exclusive rights for 17 years in exchange for public disclosure of the invention.
  - One cannot patent a pure idea, such as a mathematical theorem.
  - One can patent a method, product, apparatus, composition of matter, design for article of commerce, certain kinds of plant.
  - An algorithm or computer code is a “method.”

Patents

- One cannot patent anything that occurs in nature.
- One cannot patent a “way of doing business.”
- The disclosure must be specific enough to allow a person skilled in the art to re-create and use the invention.

Patents

- The invention must be:
  - Useful
  - Novel
    - Not known or used in the USA prior to patent application.
    - Not patented or published outside the USA more than one year prior to application.
  - Unobvious
    - The idea was not obvious to one skilled in the art at the time of invention.

Trade Secrets

- A trade secret is a secret formula, pattern or device that is used in a business and provides a commercial advantage.
  - A trade secret lasts forever (not just 17 years) or until the secret gets out.
    - Coca-Cola formula.
  - While the law prohibits others from *using* a patented invention (without permission), it only prohibits others from *stealing* a trade secret.

Trade Secrets

- Stealing a trade secret is misappropriation of intellectual property, a crime.
- It is OK to create a trade secret independently and use it.
- Reverse engineering is not theft of a trade secret.

Copyrights

- A copyright limits the number of copies one can make of a document or work of art without permission.
  - Copyrights held by individuals last 50 years beyond owner's lifetime.
  - Ideas cannot be copyrighted.
  - Only particular expressions of ideas are subject to copyright.

Intellectual Property Ownership

- A patent is registered in the name of the inventor, but another person or corporation can own it.
- A person working “for hire” must turn over ownership to the employer.
  - “For hire” = the person hired is not being paid for a specific product but for any job-related output.

Intellectual Property Ownership

- A full-time employee works for hire.
  - Company has rights to any job-related ideas, even if developed at home in the garage.
  - 3-M employee who invented post-it notes for his church choir had to turn over rights to the company.
- Consultants may or may not work for hire.
  - Depends on specifics of contract.

Intellectual Property Ownership

- A Ph.D. student who is “hired” to write a particular algorithm does not work for hire.
  - The student has rights to the algorithm, unless there is an agreement to the contrary.
- A professor’s output under a government grant is governed by the conditions of the award.
- By tradition, a professor retains rights to scholarly books and articles.
  - But universities can and sometimes do modify these rights in the employment contract.

Intellectual Property Rights

- What can an inventor do about lack of rights? Not much.
  - Make sure patent is registered in inventor's name.
  - Mention patents in articles and grant proposals.
  - Negotiate an employment contract that rewards invention.
  - Buy the company.

Software

- Software ownership went through several stages that involved both patent and copyright law.
  - The key issue was whether an algorithm is a pure idea.

Software

- It is now recognized that an algorithm or software design can be patented as a method or process.
  - Machine code or source code can be copyrighted.
  - Software that implements a procedure once done by hand may not be patentable if it automates a “way of doing business.”

Software

- One cannot patent or copyright the “look and feel” of a user interface.
  - This allows for standardization across vendors.
  - Microsoft/Apple, Lotus/Borland.

Patenting Life

- One cannot patent an organism that occurs in nature.
- However, one can patent a genetically altered organism.
  - U.S. Supreme Court, Diamond v Chakrabarty, 1980.
  - One gets credit for the entire organism after tinkering with its DNA.

Patenting Life

- Disclosure requirement limits generality of patent.
  - Philip Leder patented genetically engineered mouse that contains cancer-causing genes, and any similar mouse.
  - “Similar mouse” must be engineered according to the technique disclosed in Leder’s patent application (Jeremy Rifkin notwithstanding).

Neemix Case Study

- W. R. Grace patented neemix, derived from seeds of neem tree, which grows naturally in India.
- Patent was challenged on two general grounds:
  - Neem seeds are natural and belong to everyone.
  - Neem extracts and their effects are traditional knowledge in Indian culture.

Neemix Case Study

- Can Grace patent a substance that occurs in neem seeds?
  - No. They cannot patent anything that occurs in nature.
  - Grace patented a more stable form of neem seed extract.

Neemix Case Study

- Can Grace patent a neem extract that is traditional knowledge in India?
  - Not in India. They didn't try.
  - They got a U.S. patent because
    - the extract had not been known or used in the USA prior to the patent application
    - The extract had not been patented, nor the idea published, in India a year or more prior to the patent application.

Neemix Case Study

- Suppose patents extended across international boundaries.
  - Neither U.S. nor Indian companies would be able to patent traditional Indian knowledge.
  - But U.S. companies would be entitled to video royalties in India.
  - First-world intellectual property would have the advantage.

Ownership of Genetic Material

- Is it right to view genetic material as intellectual property?
  - Traditional property systems recognize several types of property and limit exchange.
  - We do this in a limited way now: laws against prostitution; food stamps, frequent flyer benefits.

Ownership of Genetic Material

- Historically, economic systems have moved in a direction of total exchangeability.
  - Abolition of chattel slavery was a notable exception.
- Economists argue that restrictions on exchange simply lead to black markets.
  - For example, food stamps.
- However, electronic verification can limit exchangeability.
  - For example, frequent flyer miles.

Ownership of Genetic Material

  - Michael Walzer argues that limits on exchangeability promote justice.
- Perhaps it is again time to scale back property rights, as was done with slavery?
  - There is no problem of a black market.
  - But this removes part of the incentive to invest in genetic engineering.

Ownership of Genetic Material

- A compromise:
  - If genetic or other engineering creates a product with *new effects*, allow patent protection.
  - Otherwise allow commercialization without patent protection.
  - Thus Neemix would not receive patent protection.
  - In the meantime, work toward a more just system of property ownership.

International Business Ethics

International Business Ethics

- Engineering projects are frequently international.
  - Engineers find themselves working and doing business with people of different cultural backgrounds.

International Business Ethics

- While Westerners believe that everyone is or should be basically the same, cultures differ fundamentally.
  - The key to working in a multicultural setting is to acknowledge the possibility and legitimacy of radically different approaches to life.

International Business Ethics

- Will focus here on:
  - "Corruption"-- kickbacks, cronyism, nepotism, bribes.
    - These are corrupting in the West; may or may not be corrupting elsewhere.
    - Other systems can be corrupted, but in different ways.
  - Women in business.
    - Westerners notice the difference, because it is a high-profile issue back home.

Corruption

- Kickbacks
  - A purchasing agent may receive payments from a supplier in exchange for a contract.
  - This is corrupt in the West because it implies conflict of interest.
    - The purchaser is supposed to consider the company's interest, not his/her own.
    - Decisions are based on transparency: the bids, information about the bidders, etc.

Corruption

- In another system, one does business with a person, not a company.
  - Business is based on a long-term relationship that builds trust.
  - When there are problems, it is no use to call a lawyer. On must rely on the relationship.
  - It is therefore in the company's interest for the agent to build these relationships. There is no conflict of interest.

Corruption

- The kickback makes it clear that the seller is serious about the relationship. If he has invested in the relationship, he is unlikely to disappear when there are problems.

– In some parts of the world, kickbacks are written into the contract.
  - A curious result of imposing the foreign idea of a written contract.
  - A contract presupposes a universal framework of rules and justice, in which most cultures do not believe.

Corruption

- Cronyism
  - In most of the world, one lets contracts to one's friends.
    - *Guanxi* in China.
    - Bonds of affection and friendship in Latin America.
    - Old-boy networks in Japan and Korea.
  - It is anything but transparent.
    - It may be insulting to ask a business partner for accounting data, because it implies lack of trust.

Corruption

- In much of the world, cronyism provides the social glue that makes business possible.
  - Great civilizations thrived on this system for millennia.
  - The Asian financial crisis resulted largely from lack of cronyism, not the reverse. (China and Taiwan were largely unscathed.)
  - Cronyism reflects ethical sensibilities that are less developed in the West -- honor, loyalty to friends, sensitivity to needs of associates.

Corruption

- Nepotism
  - Your associates may ask you to employ their relatives.
    - This is often unethical in the West due to conflict of interest.
    - It is standard practice in much of the world.

Corruption

- In many cultures nepotism has advantages.
  - The boss is intimately aware of abilities and can assign duties accordingly.
    - Duties are determined more by direct supervision than written job descriptions.
  - The authority of an elder family member can induce relatives to produce more than others with greater talent.
- The main reason for nepotism is the primacy of the family.

Corruption

- Bribes
  - Definition varies.
    - Many view a kickback as a “commission,” not a bribe.
    - A thank-you gift may be viewed as gratitude rather than bribery, even if there is some quid-pro-quo.
  - Consequences vary.
    - In China, bribery can be punished with death by firing squad.
    - In Turkey, the police ask you to pay them a bribe.

Corruption

- Frequency varies.
  - In Singapore, no one dares.
  - In China, it is ubiquitous.
- Bribery may or may not be corrupting.
  - In South Korea, executives give white envelopes full of cash to government officials as a normal part of doing business.
    - The bribe assures the government official that the executive will abide by regulations to avoid losing a relationship in which he has invested.
    - Not necessarily corrupting, although exposure brings loss of face.

Corruption

- In Japan, bribery is corrupting because it undermines group loyalty.
- In China, it is corrupting because it shortcuts *guanxi* and weakens government power.
- In Malaysia and Indonesia, unclear.
- In Russia and eastern Europe, an unmitigated evil.
- In Africa, bribes so inflate the cost of doing business that the economy is crippled.
- In India, government officials could not subsist without side payments.

Corruption

- U.S. Foreign Corrupt Practices Act forbids bribery of government officials in other countries.
  - Does not forbid payments to business people.
  - Does not forbid paying extortion money or facilitating payments.
  - Forbids what is already illegal in most of the world.
  - Is only occasionally enforced.
- In any event, bribery is risky.

Women in Business

- The case study “Foreign Assignment” describes a female bank manager in the USA who requests a transfer to Mexico City.
  - She encounters patronizing attitudes from coworkers and lack of respect from clients.
  - She decides to resist rather than acquiesce.
  - She receives lukewarm evaluations, and her career becomes bogged down.

Women in Business

- To reject or try to change cultural traits implies a judgment.
  - Westerners are notorious for passing judgment, due to a strong tendency to universalize their own point of view.
  - It is best to understand behavior in its larger context first.

Women in Business

- In this case, *machismo* is at issue.
  - It emphasizes manly honor and has historical roots in Moorish Spain.
  - It is a stress control mechanism that gives men a sense of control over their fate.
    - Historically Latin American men faced a life of violence and danger.
    - By using any means to take charge, violence if necessary, men regained a sense of control over their lives.

Women in Business

- This made a virtue of necessity. One could face danger with courage and honor, like a man, rather than give in to fear.

– The flip side is *Marianisma.*

- Patronizing attitude toward women does not imply that they are inferior; only that they have a different role.
- They are morally superior and deserve protection.
- What U.S. women regard as demeaning, traditional *Latina* women accept as a sign of respect.

Women in Business

- In recent times, *machismo* in upper classes has become devotion to family.
  - A Mexican businessman puts his family first.
  - Mexicans judge a good family man as a man of honor and therefore trustworthy in business.
  - This contrasts with U.S. business, which often demands total commitment, as though families did not exist.
  - U.S. business people might envy this aspect of *machismo*.

Women in Business

- The Western habit of viewing cultures as simply more or less advanced is inadequate.
  - Different cultures solve life's problems in different ways and make different tradeoffs.
  - A culture develops some aspects of human potential while suppressing others.
  - One benefit of working in another culture is the opportunity to bring out a side of one's character that would be inappropriate at home.