

Some Business-Related Ethical Issues in Engineering

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Engineering has always been related to business, but now more than ever. Engineers are increasingly involved in startup companies in which they make business decisions as well as engineering decisions. Even in large firms, highly integrated product development cycles bring engineers into closer contact with marketing and other business people than in years past. Engineers must now think about ethical issues that were once the province of business managers. In addition, the rapid growth of biotechnology and e-commerce has created a new ethical landscape in which engineers must operate.

The aim here is to examine a few of the issues that bring business ethics into the engineer's life: professionalism in management, quality and safety, intellectual property, and international business ethics.

Professionalism in Business and Engineering

Engineering has been regarded a profession in the West since the nineteenth century. The major engineering societies issue codes of professional ethics and certify many engineers. The professional duties of a business manager are less clear, and there is no certification. It is debated whether management is a profession at all. Thus when an engineer wades into business, the ethical waters become more murky.

Not all duties of a business person are professional ones. It is important to clarify what a profession is and what kind of obligations it imposes.

What Is a Profession?

Professionals can be defined by three characteristics: they are experts, they use their expertise responsibly, and they mark themselves as professionals. The last characteristic is key. Professionals are not only good at what they do, but collectively identify themselves as such. A professional "professes" his or her membership in a distinguished group. The word originally referred to membership in a religious order.

If there were no medical profession, a person who is ill would have to investigate personally anyone who might provide treatment. Because there is a profession, one can assume that any certified physician will have at least a minimal degree of competency. The investigative task is turned over to certification boards, medical schools, etc. From this perspective, a significant goal of professionalism is efficiency, because it reduces the effort needed to identify responsible experts.

Professional status normally develops around occupations in which it is hard to know that a person

is incompetent until it is too late. If incompetence is immediately apparent, one can dismiss the employee before much damage is done. Engineering clearly calls for professionalism, because serious defects in an engineer's work may not become evident until years after the work is completed.

Professional Duties

Professional obligations are usually summed up in a professional code of ethics. The task of a code of ethics is not to derive obligations from first principles, but *to spell out what the public expects from the profession*. A profession is defined primarily by its reputation, because it exists precisely to create a reputation.

There is no standard code of ethics for business, although some corporations put codes on their web sites. Nonetheless many business people are arguably called to professionalism because they are entrusted with other people's money, sometimes a life's savings. A manager's incompetence may not become evident until the money is squandered.

This idea is not new. Frederick Taylor tried to establish a management profession in the United States a century ago, using the example of engineering, his own profession. He argued that business management has its own domain of expertise and encouraged the development of a science to support it. His influence is reflected in the early appearance of business schools in the United States, beginning with the Wharton School at the University of Pennsylvania.

The duty of business managers, however, has historically been construed very narrowly. It is to maximize the wealth of the owners, normally stockholders, by any legal means. This principle is enshrined in corporate law, partly on the ground that it clarifies the legal responsibility of directors and managers and protects them from gratuitous lawsuits. Yet even this principle must be tempered by common sense. Under current law, stockholders can technically sue a board of directors for not moving a plant offshore and destroying a community's economic base, if that move would increase profit. In practice, courts normally do not try to second-guess business judgment, and they award damages only when directors are involved in fraud or clear conflict of interest. In addition, most business people have no stomach for the practice of maximizing profit by any and all legal means.

In the 1980's, however, a number of prominent CEO's developed a reputation for having just this kind of stomach. Rampant downsizing and plant closings aroused public disgust and stimulated a re-examination of business ethics. Someone invented the word "stakeholder" (a take-off on "stockholder") to refer to the broader collection of constituencies a business should be concerned about, including employees, customers, and the surrounding community. It was never clear, however, how duties to owners were to be balanced against duties to other stakeholders.

Kenneth Goodpaster (1991) proposed a solution to this dilemma. He suggested that managers and directors are beholden only to the owners, but with a key proviso: they must assume responsibility for *both* the financial interests *and* the business-related ethical obligations of the owners. If they are to represent the owners, they must represent the owners in their full capacity as business

people. The business-related obligations of the owners become professional obligations of their fiduciaries. Some states have written this principle into corporate law. Pennsylvania's plant closing law, for example, states that a corporation may, if it chooses, adopt a charter that assigns ethical duties to the board of directors. The directors of such a firm cannot be sued for refusing to close a plant for the sake of greater profit abroad, if the closing would harm the community.

Quality and Safety

An issue of great concern to engineers is how to balance quality and safety against cost. Engineers want to design a high-quality product, but business managers want to keep the cost down. This raises business, legal and ethical issues. The business issues center around what firms *must* do to compete in the marketplace. The legal and ethical issues concern what they *should* do.

The Business View

The task of business managers is to make sure the firm survives and prospers in a competitive environment. If the firm goes broke, they will get the blame.

The business environment has become steadily more competitive. World trade and deregulation of markets create stiffer competition for many firms. The phenomenal quality and efficiency of Japanese manufacturing in the 1980's set new standards. "Lean manufacturing" is a precondition of survival in many industries. Lot sizes, setup times, and inventory levels have become orders of magnitude smaller than they were 15 years ago. To be competitive, a firm must generate new products as quickly and responsively as possible. Some of these factors, such as small lot sizes and inventory levels, enhance quality and safety. But others, such as international competition, rapid product development and general cost cutting, can force compromises.

Ideally, customers know at the time of purchase how much quality and safety they are buying. They can decide for themselves how much they want to pay for them, and the market works. However, the very characteristic of engineering that calls for professionalism can undermine market mechanisms: the defects may not appear until long after the purchase.

The customary remedy for this market failure is to establish laws and professional standards. Government-issued trademarks allow a product brand to establish a reputation for quality or shoddiness. Because this process is too slow and risky for safety, statutory law and government regulations establish safety standards. The threat of a product liability suit (discussed below) also provides a strong incentive for safety. Quality and safety in large projects can be regulated by professional standards, as set forth in handbooks and established by common practice. The threat of lawsuit may operate here as well. Without these mechanisms, a firm concerned about quality and safety would be regularly undersold. They are particularly crucial when a government agency is required by law to accept the lowest bid.

We all have a hand in creating the environment in which we ask business managers to operate. Engineers who are dissatisfied with the environment can petition their professional associations

and legislators to change it.

The Legal View

Engineers who are asked to cut corners should first understand the company's legal obligations to its customers. According to common law, a product must be fit for the purpose for which it is sold. If a new ballpoint pen does not write, the merchant must refund the customer's money. This is known as failure of consideration. In the United States, the Uniform Commercial Code develops this into the idea of implied warranty. If an automobile is sold as scrap metal, it need not run. But if it is sold as an automobile, the buyer has a right to expect it to provide basic transportation. Except in special cases, implied warranty governs in spite of what the written warranty says. One exception is a used car that bears the notice, "As is," which means that for legal purposes it is scrap metal. If a company asks its engineers to design a product that will not serve its basic purpose, it violates the law by selling it.

The firm also has a legal obligation to provide a safe product. There are three main theories of product liability: a contractual theory, a due care theory, and the theory of strict liability. They are described more fully by Velasquez (1992). The *contractual theory* asserts that classical contract law is adequate for matters of product liability. The product should be safe because, if unsafe, it is unfit for its intended purpose. However, the seller is liable only for contractual damages and not for additional harm the buyer may suffer. If, however, the seller commits fraud (deliberate deception), it could be criminally liable.

The *due care theory*, popular in Europe, burdens the seller with exercising due diligence to make sure the product is safe. If it is not diligent, it could be liable for damages due to defects. The standard of care is defined by statute. This is in fact the origin of the International Standardization Organization (ISO) quality standards that are now used around the world.

The *strict liability theory* rules in the United States. It holds the seller liable for damages, no matter how carefully it designs and tests the product. Curiously, this rule is not enforced by statute but evolved out of U.S. case law. The pros and cons of strict liability are discussed by Brenkert (1997).

The doctrine of implied warranty does not apply to projects for which a firm signs a contract. Rather, the theories of contracts and negligence operate. Most contracts contain detailed specifications that the engineer must observe. They also generally specify that the job must be done in a "workmanlike manner," which requires that it meet generally accepted standards for similar work. If the firm asks engineers to perform work that is below the quality that the community has come to expect in similar projects, the firm risks being sued for breach of contract.

Safety issues are covered by the theory of negligence, which normally is a tort (a civil wrong) but can be a crime in some cases. A firm that builds an unsafe bridge or heart valve can be held liable for damages if it is negligent, meaning that it did not exercise due care. The standard of care is defined by generally accepted norms in the engineering profession. Professional associations often publish manuals that specify constraints, such as minimum tolerances, in order to ensure safety.

The law therefore relies heavily on the professional status of engineering.

The Engineer's Duty

Legal considerations alone may not address the engineer's dilemma. They may leave it unclear what the engineer should do when the firm acts illegally, or when the firm's behavior is within the law but odious on other grounds.

It is useful here to recall the distinction of professional obligations from other obligations. In the area of quality and safety, an engineer's professional obligation is fairly well defined. It is to live up to the expectations the profession has created. The public expects a building, for example, to be totally safe from collapse except in the case of extraordinary disaster. A firm's bid must cover the cost of this kind of safety. The U.S. public expects a product to be absolutely safe in normal use. This is reflected in the strict liability theory. The European public expects the product to meet specifications. This expectation varies across cultures. Volvos are built like tanks because Scandinavian culture emphasizes protective and systemic safety (as reflected by elaborate social welfare systems), whereas Ferraris emphasize maneuverability because Italians prefer to be safe by taking individual action (as reflected by dysfunctional social systems).

In some cases, however, professional ethics do not settle the matter. Expectations may be unclear or insufficiently demanding. An instance of the former is the O-ring failure in the Challenger project (Boisjoly et al, 1989). It is hard to say what are the expectations of the public, or even of astronauts, for the safety of space exploration. In such cases one must fall back on more general theories of normative ethics.

A utilitarian analysis is sometimes helpful. Suppose that only one firm is licensed to sell a certain drug that cures a debilitating illness. It has a choice between making the drug safe and expensive, or risky and cheap. Only a few people can afford the expensive drug. The cheap drug cures far more people but makes a few worse off. Selling the cheap drug therefore maximizes utility. In most cases, of course, utilities are much harder to compare, or fairness issues complicate the picture.

A generalization test can also be useful. A small chemical company undersells its competitors by releasing untreated pollutants into the air. One small factory has little effect on the atmosphere. But if all chemical companies were so lax, we would all suffocate. The act of pollution fails the generalization test.

There may be no one theory that explains all ethical phenomena (the same is true of physical science, after all). But more often the problem in practice is lack of factual information. The engineer must decide whether to speak up on the basis of incomplete data that suggest danger but do not prove it. This requires an existential decision that, almost by definition, cannot be given full rational justification at the time. The Challenger scenario required this sort of decision.

Whistle-Blowing

If an engineer decides that current practice is unethical, there are at least three basic responses: (a) "blow the whistle," either internally or publicly, (b) resign, or (c) keep quiet and do what the company wants.

There is a considerable literature on whistleblowing because it touches on a fundamental issue of employment: what, if anything, is the employee's duty to the firm? What exactly is employment, and how do an employee's obligations differ from those of someone working on contract? Two good case studies in this area are the Goodrich aircraft brake scandal (Vandivier, 1972) and the Challenger disaster mentioned earlier. Two popular articles are those by Bok (1980) and Duska (1997). Although prudential issues must be distinguished from ethical ones, this literature makes clear that the would-be whistleblower must think carefully before acting. Whistleblowers often pay a substantial price, and their effectiveness is uneven.

The employee who would resign to avoid unethical conduct must also consider the duties of employees. Arguably, employment is indistinguishable from any other sort of work-for-hire unless it implies some degree of commitment, albeit both employers and employees often renege on their commitments. One can ask whether a company should immediately fire an employee who behaves unethically, or whether it should try to correct the behavior and give the employee a second chance. One can also ask the same question of the employee.

Intellectual Property

Because engineers are essentially designers, they create little else than intellectual property. It is important that they understand the concept and the issues surrounding it. In addition, the rapid development of biological and information technology has forced a rethinking of intellectual property law and ethics.

What Is Intellectual Property?

In the narrow legal sense, intellectual property is a patented invention, a trade secret, or copyrighted material.

A *patent* grants an inventor exclusive rights to an invention for 17 years in exchange for disclosing it to the public. One cannot patent (or copyright) a pure idea, such as a mathematical theorem. The invention must be some product or process that embodies an idea. United States law defines it to be a method, product, apparatus, composition of matter, design for articles of commerce, or in certain cases a plant. The disclosure must be specific enough to allow a person skilled in the art to recreate and use the invention.

To be patented, the invention must be useful, novel, and unobvious. It is "novel" if (a) it was not known or used in the United States prior to the patent application, (b) it was not patented or described in a publication anywhere in the world more than a year prior to the patent application.

The invention is “unobvious” if the idea was not obvious to a person skilled in the art at the time of the invention. One cannot patent a “way of doing business” or anything that occurs in nature.

A *trade secret* is a secret formula, pattern, or device that is used in a business and provides a commercial advantage. A trade secret can be bought, sold and licensed. It differs from a patented invention primarily in two ways. (a) A trade secret remains intellectual property forever (not just 17 years), or until the secret gets out. An example is the formula for Coca-Cola. (b) While the law prohibits others from *using* a patented idea, it only prohibits others from *stealing* a trade secret. It is perfectly legal for another company to conceive the idea independently and use it. Reverse engineering is not theft of a trade secret, because an idea deducible by reverse engineering is not really secret. It is illegal, however, to obtain and use a secret idea from its owner without permission. This is a tort known as misappropriation of intellectual property. It is also a crime by Federal and some state statutes.

A *copyright* limits the number of copies others can make of a document or work of art without permission. It lasts much longer than a patent. A copyright held by an individual, for example, lasts 50 years beyond his or her lifetime. Ideas as such cannot be copyrighted and can therefore be discussed freely. Only a particular expression of ideas can be copyrighted. Software (source code or machine code) can be copyrighted, and recent law recognizes patents as well.

Who Owns Intellectual Property?

A patent is always registered in the name of the inventor. The patent’s *owner*, however, may be another person or a corporation. An employer normally owns any invention or trade secret conceived by an inventor who is working “for hire.” This means basically that the employer is buying rights to whatever that person may produce in job-related work. Even an idea conceived in the garage at home belongs to the employer if it is related to the job. The 3-M employee who invented post-it notes for his church choir had to turn rights over to the company.

It is not always obvious who is working for hire. A full-time employee of a business or government agency almost always is, whereas a consultant may not be, depending on the specific arrangement. A Ph.D. student who is paid by a professor to develop a certain algorithm normally is not working for hire and therefore retains property rights to the algorithm, unless there is some specific agreement to the contrary. A professor who conducts research under a government grant is subject to the agreement under which the funds are granted. Traditionally a university faculty member retains rights to a scholarly article, but universities are free to modify this tradition in the employment contract and sometimes do.

Inventors working for hire have limited rights, but a few things can be done to improve the situation. The inventor should make sure the patent is granted in his or her name and is mentioned in articles and grant proposals. Employment contracts that provide financial incentives for inventions can be negotiated.

Is Software Intellectual Property?

The legal status of software is confusing because it went through several stages of development and involves both copyright and patent law. Currently it is generally accepted that software can be copyrighted, and that both algorithms and software can be patented under the category of methods or apparatus. A patent may be refused, however, for software that merely automates a procedure that was once done by hand, if that procedure can be viewed as a “way of doing business.”

A court battle between Apple and Microsoft established that Microsoft could copy the “look and feel” of the Apple desktop without violation of copyright. The argument was basically that Microsoft copied *methods* of entering commands, which are not protected by copyright. Lotus and Borland fought a similar battle over spreadsheet commands, with similar results. These rulings allowed the software industry to evolve toward standardized user interfaces. Software protection has broadened since then, but the rulings still seem to govern.

Can Life Be Patented?

The biotechnical revolution has brought much confusion to the intellectual property arena, but one principle seems to be observed consistently. One cannot have property rights to anything that occurs in nature. Apparent exceptions to this principle turn out not to be exceptions on closer examination.

One can, however, patent a genetically altered organism. This was clearly established in a 1980 U.S. Supreme Court Case, *Diamond v Chakrabarty*, which remains the ruling authority. Given the triviality of human tinkering relative to the natural wonder that is DNA, one might liken this to changing the hubcaps on a Mercedes and claiming credit for the entire automobile that results. Yet is unclear that many conventional inventions do not have this character.

The disclosure requirement for patents helps limit some of the excesses of biological patenting. In his much-discussed book *The Biotech Century*, Jeremy Rifkin reports (page 47) that Philip Leder received a patent on a genetically engineered mouse that contains cancer-causing genes and on any mouse that might ever be engineered to contain such genes. This is an overstatement. The patent covers only a mouse that is engineered with a procedure similar to that described in the patent disclosure. A person skilled in the art must be able to derive the procedure used from the one described.

The Neemix Case Study

This interesting case study introduces some of the ethical issues surrounding the patenting of life. The story began when W. R. Grace received a U.S. patent on an insecticide, neemix, derived from the seeds of the neem tree, which occurs naturally in India. Some Indians challenged the patent on the grounds that (a) neem seeds are natural and belong to everyone, and (b) neem extracts and their effects are traditional knowledge in Indian culture. Some of the issues might be untangled as follows.

Can one patent a substance that occurs naturally in neem seeds? No. In fact, Grace did not seek a patent on the seeds themselves or any component of them. They patented a more stable form of the traditional extract. One might argue that their modification was too trivial, and the result too similar to the traditional extract, to be novel. But this is an issue of fact and law, not ethics. The related ethical issues are stated in the next two paragraphs.

Should U.S. patent law award Grace a patent for a neem-based product even if it is not novel? Current law would in fact award Grace the patent in this case, provided neem extract was unknown in the United States, because the idea had not been patented or published in India. One might defend this policy on the ground that it grants the two countries symmetrical rights. Companies in each country can (and do) profit from intellectual property that originates in the

other. (Grace did not seek and in any event would not be granted a patent in India.) Indian companies, for example, regularly sell unlicensed copies of video tapes from the United States.

Current patent law therefore recognizes international boundaries. An alternative would be to regard the entire world as a single jurisdiction with uniform patent protection everywhere. A difficulty with this arrangement, however, is that Indians would be unable to patent their traditional knowledge anywhere (because it is not novel), but Americans would be able to copyright the content of their video tapes everywhere (because it is new). The developed countries gain an unfair advantage because of the nature of their products. This issue must be addressed in any multilateral agreement on intellectual property.

What if the product is novel? New products based on natural substances have traditionally been granted patents without controversy. But one may still raise the next question.

Should indigenous people receive royalties from companies that profit, directly or indirectly, from their traditional knowledge? Note first that this issue is different from the issue of whether Indian folk knowledge should be patented in the United States. If Indians deserve payment for their knowledge, this is the case whether a single company or many companies exploit it in another country. As for the issue of royalties, one can observe that a subculture *within* the United States has no rights to royalties from domestic companies that use its traditional knowledge, either directly without modification or indirectly in the form of a patented product. This is precisely because the knowledge is traditional rather than new. If one accepts this situation, then it is hard to argue that people abroad should have rights to royalties from U.S. companies that use their traditional knowledge. As a practical matter, it is hard to say exactly to whom royalties would be paid, particularly in view of the fact that past generations should get most of the credit.

There is a deeper argument, however, that goes to the heart of the intellectual property dispute. It asks what sorts of goods should be regarded as property in the first place.

The Moral Status of Intellectual Property

We tend to think of property rights as a recent advance in human history. In fact traditional conceptions of property tend to be more sophisticated than the modern one. Traditional societies usually recognize several kinds of property that are only partially interchangeable and whose disposition is closely regulated. One may be permitted to purchase a bride (“bride price”), but perhaps the payment can be made only in the form of cattle. There may be a form of money, but it buys only certain commodities, perhaps those traded with neighboring villages. Tools and certain other goods may fall under a system of “reciprocity,” meaning that one can take them when in need and provide them to others in their time of need, with no strict accounting.

Michael Walzer (1983) and others argue that more complex property systems are morally superior. In a society in which all property is interchangeable, one can use any form of economic power to acquire the assets of anyone who is less well off. One who has intelligence, artistic talent, or good looks ends up selling these assets to stay alive. This exacerbates the concentration of wealth and power. Modern societies sometimes recognize this problem, for example by trying to prohibit prostitution, partly in order to prevent exploitation of poor women. The efficiency of a single medium of exchange, however, drives Western-style economies toward assigning everything a price. One of the few reversals of this trend was the abolition of chattel slavery by European powers that established it three centuries earlier.

As technology-based manufacturing and distribution systems grew, businesses pressed for rights over intellectual property in order to provide an incentive to innovate. This is a recent development, as U.S. observance of intellectual property 150 years ago was much as it is in China today. Even here there is a recognition that pure ideas must be allowed to circulate without commercial restraint. But the rights of intellectual property owners have steadily increased.

A key issue is whether biotechnology signals a need to reverse this trend, much as in the case of slavery. Indians argue that traditional knowledge of healing and agriculture, like knowledge of mathematics, are part of our common human heritage and should not be subject to commercialization. In particular it should not be encumbered by patents, even in its refined or derivative forms. On the other hand, the patenting of variants could spur the development of affordable new remedies.

Full resolution of this dilemma requires a more general analysis of property systems and their moral status. In the meantime, one might tentatively suggest the following test: if genetic or other engineering creates a product whose *effects* go substantially beyond those of the traditional substance from which it is derived, grant the patent and commercialize the product. If the effects are substantially the same, grant no patent, but allow commercialization, at least until we figure out a better way to organize property. On this view, Grace's development of a more stable extract from neem seeds would not warrant a patent. The traditional effects of the seeds provide ample motivation to bring them to market. Developing a stable form is part of the cost of distribution. However, if Grace had converted neem extract into a new cure, the world would have benefited from providing Grace the incentive of patent protection.

International Business Ethics

In a global economy, engineering projects are often international. They bring together people from different traditions who have different values and do business in different ways.

Westerners sometimes have difficulty making the adjustment, because they are universalists. They deeply hold the conviction that all peoples should be basically the same (i.e., similar to them), although some may be further along the path of development than others. Whatever Westerners may believe, peoples are in fact very diverse. Cultures have developed fundamentally different and equally legitimate solutions to life's problems. The key to working in a multicultural setting is to acknowledge the possibility of radically different approaches to life.

This is obviously a large topic, and attention here is restricted to a few behavior patterns that are considered unethical or unprofessional by Western standards. Engineers working abroad (or at home!) may encounter cronyism, nepotism, kickbacks, and bribes. Westerners view them as corrupting, and they are in fact corrupting in a Western context. They may or may not be corrupting in other systems, which can likewise be corrupted, but in different ways. Another cultural pattern that Westerners may find disturbing is discrimination against women in business.

The discussion here refers vaguely to non-Western cultures, but every culture has its own way of doing business and getting the job done. Before beginning an international assignment, the engineer should study the host culture and if possible the language. Some resources indexed by country may be found at <http://ba.gsia.cmu.edu/jnh/culture>.

Kickbacks

A classic situation is that of a purchasing agent for a company or government. A representative of a potential supplier offers the agent a side payment in exchange for a contract. In the West this is unethical, and perhaps illegal in the case of government agents. In many countries it is business as usual.

Kickbacks are corrupting in the West because they imply a conflict of interest. The purchasing agent is supposed to represent the interests of his company. If the agent is taking payments, his or her own interests interfere. The proper procedure is to look at the bids, investigate the companies, and choose the best deal. This works because the system is based on rules and transparency. Bids, annual reports, accounting statements and the like are expected to reveal the facts about the supplier. If they do not, the supplier is guilty of fraud and can be taken to court. The business relationship is based primarily on a framework of rules that most people believe in and take seriously. (The government enforces the rules, but enforcement is impossible unless most people are already inclined to obey them.)

In a different kind of system, business relationships are personal. Rather than doing business with a company, one does business with a person, who happens to work for a certain company. The relationship is based on mutual trust, which may be built over a long period. When things go wrong, it is no use to call a lawyer. The agent must rely upon his personal relationship with another human being. Because a major part of the agent's task is to establish this relationship, there is no conflict of interest in doing so.

One way a supplier can demonstrate his commitment to the relationship is to put money on the line. If the supplier has paid for the relationship, he¹ is less likely to vanish when there is a problem. The agent who receives a kickback is therefore doing his job.

Written contracts are traditionally not part of this process, because the concept of a contract presupposes an overarching framework of rules and law that enforce the contract. Many people around the world do not believe in the legitimacy of any such framework, because they are not universalists as Westerners are. They regard a piece of paper as just that. Any kind of enforceability must be based on flesh and blood, on a relationship of mutual trust and commitment between human beings. Because most business people have accepted the Western practice of writing contracts, some interesting anomalies result. For example, in some countries (e.g., Egypt), it is customary to write kickbacks into the contract.

Cronyism

In much of the world, one routinely lets contracts to one's friends. The reason, again, is that business is based on trust relationships with individuals. They take different forms in different countries. In China one speaks of *guanxi* (the Putonghua word for "relationship"), which is a long-term association based on mutual obligation. In Mexico business relationships reflect bonds of friendship and affection. In Japan or Korea they are based on an old-boy network formed during college days.

The West refers to this as cronyism and complains of lack of transparency. To be sure, there is nothing transparent about it. A business person would be reluctant to ask a partner for too much

¹ The person in question is almost always male.

accounting information even if it were reliable, because to do so would insult the partner's honor. This relationship-based system can work quite well, however. It sustained great civilizations for thousands of years; Western capitalism has existed only 500 years. A business commitment based on a proper relationship is as solid as anything in this life (although the parties often ask each other to renegotiate). With this background, it is not hard to trace the cause of the Asian financial crisis: investors poured in funds based on (insufficient) public information, rather than cultivating the sort of trust relationship that for millennia undergirded investment in that part of the world. It still does in China and Taiwan, which largely escaped the crisis.

In much of the world, cronyism provides the social glue that makes business possible. Far from being immoral, it reflects a highly developed moral sensibility that is often missing in the West. It occurs in relationship-based cultures, in which people place high priority on solicitude for the welfare and feelings of their associates. Maintaining courtesy, respect, loyalty and honor is a fine art.

It must be acknowledged, however, that many countries have evolved an uncomfortable blend of Western and indigenous practices. It may be hard to evaluate such cases, and one must look at each one individually.

Nepotism

Nepotism is also standard practice in much of the world. A business person from the United States may be asked to hire relatives of the local boss. The proper response is to oblige if the relative will work in the host country, but not if he would work in the United States, which has different norms.

Hiring relatives, or relatives of friends, has advantages in many cultures. Some relatives may be incompetent, but in any case the boss knows their strengths and weaknesses better than those of other employees, and he can assign them duties accordingly. This is possible because employees are more likely to be managed directly by the boss than assigned to a fixed job description. Also in non-Western cultures, an older relative tends to carry great authority. This can enable the boss to obtain a level of effort and devotion that would not be forthcoming from more competent but unrelated employees.

The main reason for nepotism, however, is the primacy of the family, which is a foundation of many cultures. From this point of view, Western societies, with their broken and troubled families, are dysfunctional and inefficient.

Bribes

The definition of a bribe varies around the world. Many people regard a kickback as a "commission," not a bribe. A gift of a new BMW after the conclusion of a deal may be viewed as an expression of gratitude rather than a bribe, even if some degree of quid-pro-quo is implied. Bribes, however defined, may be legal or illegal. In China, the punishment for bribery can be death by firing squad. Illegal bribery may or may not be widely practiced. In Singapore, no one dares; in China, it is ubiquitous. The business person from abroad must know the local situation.

Bribes may or may not be corrupting for the culture in which they occur. In South Korea, payments in white envelopes are a regular feature of dealings with government officials. In many cases they help to cement a continuing relationship. These relationships are important, because

government officials learn which companies are acting properly by cultivating personal ties with their executives. The bribe signals that the executive is serious and will behave himself to avoid upsetting a relationship in which he has invested. Bribes therefore need not be corrupting, although it should be noted that it is loss of face to be exposed in bribery. Koreans seem to realize that bribery could easily get out of hand and become corrupting (just as legalism can get out of hand in a rule-based culture, as it has in the United States).

Bribery is usually corrupting when it occurs in rule-based Western countries or does not contribute to relationships that are essential to making the system work. It is corrupting in Japan, for example, because it undermines loyalty to the group, the foundation of Japanese society. It is largely corrupting in China, because it shortcuts *guanxi* and incapacitates the central government. Petty bribery allows the Indian government to operate, because government salaries are too meager to live on; larger bribes and misappropriation of funds are dysfunctional. The moral status of bribery in Indonesia and Malaysia is less clear. It is widespread in Russia and parts of eastern Europe, where it is an unmitigated evil. It is far from unknown here at home. A few years ago, no less a figure than the Chief Justice of the Pennsylvania Supreme Court was impeached and removed from office for taking bribes.

Corruption tends to be most prevalent in cultures that have been disrupted by war or colonialism, as for example in some African countries, where bribes are often excessive and harmful to business. Bribery is similarly a legacy of past injustice and violence in Latin American countries, where people regard it as a serious social problem, even those who engage in it.

American business people should be aware of the U.S. Foreign Corrupt Practices Act, which makes it illegal for them to bribe officials of foreign governments. The law does not prohibit bribery of private business people, nor payment of extorted money. It also permits "facilitating payments," such as small side payments to Indian officials. The law is vague and unevenly enforced, and it is wise to consult company attorneys when in doubt.

In fact, when in a foreign country it is wise to avoid, whenever possible, any transactions that might be interpreted as bribes. Irrespective of U.S. law, they may be illegal in the host country. Locals may know how to do it without getting into trouble, but visitors do not. Bribery tends to be an art that amateurs should not attempt.

Discrimination against Women

Different cultures can have very different attitudes toward gender equality. A visitor from the United States tends to notice this right away, because it has been a high profile issue back home.

The case study "Foreign Assignment" (Dunfee and Robertson, 1997) describes a female bank employee in the United States who asked to be transferred to a branch in Mexico City. She encountered patronizing attitudes from male coworkers and, from clients, a lack of respect for her professional competence. Her dilemma was whether to acquiesce in this aspect of Hispanic culture or fight it. She chose the latter. As a result superiors gave her lukewarm evaluations and her career began to bog down.

Cultural patterns of this sort usually exist to serve a purpose in the larger system. The tradition of *machismo* can be traced to Moorish Spain. It is centered around the concept of manly honor. Like

so many cultural practices, it is a stress control mechanism. The underlying cause of stress is lack of control over one's fate. A young man growing up in Latin America once faced (and in some cases still faces) a life of danger and violence. To deal with this stress, he learned to take control of the situation. Rather than give in to fate, he took action, often violent action. Rather than surrender his wife and children to danger, he protected them by whatever means was necessary. *Machismo* made a virtue of necessity: by facing up to danger "like a man," the Latino experienced life as an occasion to display manly honor rather than to cower with fear. *Machismo* was a way of making a hard life bearable for men and women alike.

The patronizing attitude toward women therefore does not imply that women are inferior; only that they have a different role. They nurture the family while men shield it from danger. In fact, the flip side of *machismo* is *Marianisma* (after Mary, mother of Jesus), which views women as morally superior to men. What U.S. women experience as demeaning, traditional Latina women accept as a sign of respect.

In recent times this system has evolved, at least among the upper classes, to an emphasis on devotion to family. A man of honor puts his family first. One way that Mexicans judge whether a business partner is trustworthy is to find out if he is a good family man. In particular he should never let business take precedence over the family. A Mexican businessman will cancel a meeting or miss an appointment to take care of family matters. He may spend a long lunch hour with the family or take several days off to assist an older relative or attend a funeral. This presents a stark contrast with business in the United States, where companies often expect total commitment, as though families did not exist. U.S. business people might well envy the Mexican way when it comes to family.

The Western habit of viewing different cultures as simply more or less advanced is therefore inadequate. Different peoples have made different tradeoffs and arrived at different solutions to life. Every solution favors certain human virtues and develops some aspects of human potential while suppressing others. A Westerner who simply resists a culture that seems retrograde misses an opportunity to develop a side of his or her humanity that is neglected back home.

Further Reading

There are a number of texts and casebooks on business ethics in which some of the material is relevant to engineering. Two that stand out are those of Beauchamp and Bowie (1997) and Donaldson and Werhane (1996).

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