by law, becomes the property of his employer he may nevertheless be entitled to a 'fair share' of any profits. To succeed in his claim, the employee must show that his employer has derived 'outstanding benefit' from patenting the invention. The size and nature of the employer's business would be taken into account when deciding if the benefit has been outstanding.

Risk

Aiming for high profits is OK, but at what risk? It is no good pursuing that last pound if subsequently the business is unable to carry on. That is, the very process of carrying on business exposes the risk of commercial, financial or legal damage. So what are the risks and how can they be bounded? These exposures can be categorised broadly as: technical, financial, commercial, legal, personnel and political with a final special category known as acts of God. The following are primary examples of each of these risk categories.

Technical risks

Technical risks include the following:

Product design

If the product is not yet off the drawing board then there is a risk that it may never get there. It may be too complex or rely on other technologies becoming available that fail to materialise. The design team may not stay together. If the ultimate product performance capability and specification are not frozen at the outset the design and development phase may become protracted and numerous tangents explored as the designers struggle in the absence of a concrete goal.

Producability

If the product has not been manufactured before, questions arise over producability, the impact of late engineering changes, the cost and time of facility start up, learning time, production efficiencies, rework levels and a host of other things.

Acceptance

If the product has not been supplied before, there are questions over customer acceptance and testing, and in some cases installation, commissioning, handover and possibly integration with other products.

Product support

No matter the amount of design testing and proving there may be issues for the buyer and seller once the product has been handed over and accepted. New products will have predicted characteristics regarding the ease and cost of maintenance and repair. Frequently actual experience bears little resemblence to the predictions. The liability for any significant such disparity is a concern for buyer and seller.

Product safety

Although from a legal perspective, the definition of 'safe' can be problematic, from a practical viewpoint, products must be designed from the outset to be safe. The period of legal liability and the financial consequences to the company for 'unsafe' products are extensive.

Future proofness

The best products are those that either have a design that has a naturally long design life or those that are susceptible to regular upgrades and other improvements. It is usually difficult to design in either 'future-proofness' or the capability for later upgrades.

As will be seen in later chapters some of these technical risks are matters to be dealt with in contractual dealings with customers and suppliers.

Financial risks

Money makes companies go around and without sound financial management there will be no company in which to do interesting engineering work. Risks include:

Investment funding

The company must find the funds for design, development and manufacturing, marketing, advertising and selling costs. If the funds do not exist they must be raised from investors, banks and other lenders. To raise the money, the company must convince its lenders (or corporate headquarters where appropriate) that it has a sound business plan based upon achievable product plans and realisable markets. Whilst the loans are being financed and repaid the company's ability to engage in other activities will be limited.

Cash flow

Once the business is up and running cash flow must be managed. It will continue to be a recurrent theme that cash-in must exceed cash-out.

Estimating

Estimating is an area that can be a ticking time bomb for many companies. Accurately estimating costs (whether overheads, product, standard or job costs) is crucial to success. Selling at prices based upon estimates that turn out to have been too low can spell disaster.

Customer

The customer can be a major financial threat if he does not pay on time. The cost of financing work in progress whilst awaiting customer funds and the (legal) cost of pursuing him for payment can be quite burdensome.

Inflation

The company will be affected by the general rise in the costs of labour, raw materials, purchased items and the acquisition of services.

Exchange rates

Exchange rates on foreign currencies are a major headache for many companies. Whether buying or selling, the uncertainty in the financial markets is a major business financial risk for any company buying or selling on a significant scale to or from overseas sources. The debate in the UK on whether Britain should join the EU common currency gives strong evidence of the concerns to commercial enterprises over the exchange rate risk.

Investments

The company's own financial investments will be exposed to the effect of money markets, stock-exchange confidence, international interest rates, etc.

Asset management

Depreciation of capital assets and the cost and timing of decisions to replace assets is a significant worry for many companies.

Tax

The management of tax is also crucial.

Commercial risks

Commercial risks are many and varied and include:

Marketplace

From entering an existing market where competitors abound, to creating a new market, and to simply maintaining market share in an existing market – all can be problematic.

Customers

Customers are a company's best friends, but they too can present problems. Dependency on a single or on a small number of major customers can produce problems (for example trading terms) if the customer(s) choose to exert their bargaining power. Customers have different cultures and different practices (for example on honouring debts). Customers may not place orders when expected. Their needs must be satisfied but from a commercial perspective their behaviour can be a source of real concern.

Competitors

The presence and performance of competitors is a persistent risk. Cost, time and effort must be expended on tracking the activities of competitors from their product developments, product life cycle times, product performance, prices, delivery performance, reputation to ownership and control.

Suppliers

Contemporary theory on supply chain management and partnership sourcing can minimise risk but it is more difficult than it sounds to align seller and buyer aspirations and objectives. Outsourcing allows sharpened focus on core activities but exposes the risk of external influence and control. Companies are still dependant on supplier contractual performance and on the security of supply, where suppliers are either few in number or geographically distant.

Prices

Pricing strategy can be a source of risk from the simple question of whether prices will cover costs and leave something for profit, to more complex situations where analysis must be done to establish if prices and demand are related.

Post delivery obligations

The post delivery situation is one that usually gives heartache to the commercial fraternity. Customer acceptance of the work of the contract, post delivery rejection rights, contractual obligations to fix defects, contractual warranties, and implied warranties all represent potential additional, unbudgeted costs as well as customer dissatisfaction and a threat to reputation.

Intellectual property rights

Intellectual property rights can be a source of potential risk. Not only must steps be taken to ensure that any exclusive rights in the intellectual property used in the design or which are brought to the contract are protected for the future, but the company must be aware of the risk of the product (its design, manufacture, marketing, sale or export) somehow, even accidentally, breaching the intellectual property rights of somebody whose permission has not been obtained.

Dealing with the commercial risks listed above requires a combination of business strategy and a rigorous approach to tackling the issues in contractual dealings.

Legal risks

It is difficult to draw a distinction between commercial risks and legal risks. Companies, which have a 'commercial' or 'contracts' department sometimes look to these functions to embrace legal issues (calling on expert legal advice only where necessary). Other companies that do not have these functions may have a legal department that works, for example, with the sales function in order to ensure that company sales orders are sound. One distinction that may be helpful is that commercial risks deal with the overt matters concerned with the sale of the company's products or purchase of items from suppliers and that legal risks deal with those underlying aspects that determine whether the company's trade follows proper legal and regulatory requirements. The distinction is not important, provided all the risks are understood. Risks include:

Breach of contract

The phrase 'breach of contract' means exactly that – a breaking of any part of the promises that are enshrined in the contract. As will be seen in later chapters, the remedies available to the injured party are varied, but for example, if the company fails to meet, or is late in meeting a customer's order it is exposed to the possibility of contract termination and the payment of financial damages, the scale of which might vastly outweigh the profit that had been anticipated for the contract. A failure to pay a supplier's bill in accordance with the purchase order also exposes the risk of legal action for breach.

Statutory failure

Even if the product meets all the customer's contractual requirements the company may be exposed to legal action for breach of a statutory obligation implied into the contract.

Deception and misrepresentation

If a customer has been persuaded to buy under false pretences then action may follow for deception or misrepresentation.

Injury or death

If an unsafe product causes injury or death then civil and possibly criminal legal action may follow.

Intellectual property infringement

Breach of someone else's intellectual property rights may bring about a variety of legal actions.

Breach of regulations

Breach of regulations on a variety of subjects, from health and safety to export restrictions, may bring about legal consequences.

In addition to the reputation and financial costs of any of the above it is possible in some cases for a court to issue an injunction preventing the company from continuing to trade. The above list gives examples where the company may offend in some way. It is equally possible for the company to suffer as a result of such behaviour by others. Incidentally, whilst some behaviour must be dealt with in the criminal courts the resolution of disputes over non-criminal, contractual arrangements is achieved in 99% of cases by negotiations between the affected parties, sometimes with legal advice, sometimes not. The small proportion of cases that cannot be resolved by negotiation result in formal action, which may include arbitration, alternative dispute resolution, as well as court action. All of these matters divert management attention, cost money and can seriously impede successful trading. The relatively low incidence of formal legal action does not mean that companies and their staff can afford to ignore this category of risk. To the extent that the engineer is closely involved in some aspects (for example, product safety and delivery schedules) it is important for him/her to be fully aware of the consequences of action and inaction.

Personnel risks

Without the people there is no company at all. People risks go to the heart of the matter. Risks include:

Management

The management system may be deficient in structure or lacking in authority. Managers may not possess the requisite skills or mix of skills. Leadership may be lacking and communication of purpose and policy may be weak. Even in these days of information and knowledge management staff may not get to know what they need to know when they need to know it in order to deliver maximum performance.

Staff relations

Business operation may be disrupted by industrial inaction in those industries where trade unionism still flourishes. Even in the absence of official representative bodies, bad relations will produce poor work.

Conditions

Working conditions can be a positive influence as well as a potential negative influence. Companies that provide a safe and comfortable working environment and other staff facilities such as nursery care, health care, restaurant and sports and social facilities traditionally enjoy better staff relations than those that do not. Such standards cannot be taken for granted even in the twenty first century. Concern that modern call-centres are the contemporary equivalent of nineteenth century sweatshop practices is a case in point.

Competition

Staff turnover may be high where there are many companies competing for the skills of the people in the relevant labour pool. Despite 'no poaching' terms (usually unenforceable) in business contracts and restriction on movement terms (also usually unenforceable) in personnel contracts, companies that suffer this problem face the costs of extra recruitment and nugatory expenditure on training and similar investments.

One key result of poor personnel management is that staff turnover is high and staff loyalty is low. A key risk consequence of this is that the company's commercially sensitive and valuable information may be compromised accidentally (through carelessness) or deliberately (through malice or for gain). This risk also arises where there is vigorous competition for skilled people where staff may (wrongly, in many instances) think that the knowledge gained with one employer may be in effect sold at a higher price to another employer.

Political risks

It is indisputable that politics has a major influence over business risk. It is politics that sets the economic and regulatory environment in which companies must operate. Risks include:

Doctrine

Although the traditional division of industrial interest that distinguished the major UK political parties is long past, governments of all persuasions still set the agenda in terms of those sectors which will enjoy support and those which will not.

Regulation

The approach to regulation and control is an important factor. The sweeping away of the old regulatory approach amidst the wave of privatisations in the last two decades of the twentieth century had a very significant impact on the cost and freedom to operate of many industries.

Environment

Environmental concerns have an increasing impact on the cost of business and the types of activity in which it is socially acceptable to be operating.

Economic policy

Policy on personal and corporate taxation, interest rates and other elements of economic policy are key factors.

Exchange rates

Without a doubt, government policy, for example over the entry of the UK into the EU common currency, has a very major effect on the costs and ease of importing and exporting.

Grants

Although EU regulations make it difficult for governments to provide grants to industry, where such are possible then regions where unemployment is high are likely to fare better than elsewhere.

In an increasingly global marketplace served by instantaneous, permanently available communications, these risks have an increasingly multi-national quality to them, with the policies of overseas governments having a significant effect on the way some business is conducted in the UK.

Acts of God

Acts of God are often referred to as '*force majeure*' in contractual language. Such events are those beyond the control of any mortal organisation or, in the case of a contract, beyond the reasonable control of either party to the contract. Any such event would represent a major business risk. This category includes storm, flood, lightning and earthquakes.

Later chapters will consider the question of the allocation of these risks between buyer and seller.

Contracts

Maximising profit, minimising risk and business development are all concerned with the carrying on of the business to the greater glory and profit of the shareholders. Nevertheless, this is achieved through the medium of winning contracts, on one end of which is the customer who is only concerned with acquiring the goods or services he needs at minimum cost and inconvenience.The important point is that under the contract the customer may be entitled to many things and all those involved in implementing a contract should be aware of those things and more importantly the extent and limitation of whatever the customer's rights are.The principle, however, is to know the customer's minimum and maximum entitlement. If in practice he is satisfied with his minimum entitlement then contract costs will have been minimised and profit maximised. On the other if he is dissatisfied with his maximum entitlement then it needs to be put to him, carefully and diplomatically, that if he wants more, he must pay more. Similarly the success of the business may depend upon the performance of the company's suppliers. Anywhere in the supply chain, the buyer/seller **transaction** is inevitably based, in simple terms, upon a conflict of interests – each of the buyer and seller appear to stand to gain at the expense of the other. Common sense dictates that the buyer/seller **relationship** must be managed so as to sideline that conflict, but the pursuit of profit for one's own organisation is facilitated by an understanding of the limit of obligations and the extent of protection afforded by both sales and purchase orders.