Firms are islands of central planning in seas of markets.
If central planning is so bad and markets are so great, why do firms exist?

**The Vertical Production Chain**
The steps from raw materials to final products are called the vertical production chain.
If a firm participates in more than one step in the vertical production chain, it is said to be vertically integrated.
When a firm starts producing its own inputs it is said to be engaging in *upstream* or *backward* integration.
When a firm starts marketing or further refining its products it is said to be engaging in *forward* or *downstream* integration.

**Obtaining Intermediate Inputs: The Make or Buy Decision**
Firms manufacture output using some intermediate inputs. These intermediate inputs may be iron ore or auto parts, unexposed film or printed photographs, sand or computer components. In each case, the firm must decide whether to make its own intermediate inputs (from still more primitive inputs) or to purchase them from other companies.

There are plenty of examples given in the textbook and you should be sure you understand each of them.
You should note that labor is an intermediate input into just about every production process and is different from other inputs in an important way.

There are reasons why firms might want to make some inputs and buy others, and these reasons at least partially define what would be best in each situation.
One very important consideration is the structure of market for the input in question. If there are a lot of firms supplying the input or if there is free entry into the input market, then it is likely that firms are producing at something near minimum average cost and the price is very near that low average cost. On the other hand, if there are a small number of firms supplying the input or if there are significant barriers to entry in the market then the price charged may be well above the average or marginal cost. Make or buy decisions should not be made without consideration of the structure of the input market.

**Reasons to Not Expand Vertically**

1. The firm might not use sufficiently large quantities to take advantage of economies of scale. This is why firms typically buy things they use only a little of, such as office supplies or coffee.

2. An input can be purchased in a competitive market. You can’t produce an input any more cheaply than you can buy it in a competitive market.

3. Learning to produce the good might be so costly that the firm is willing to pay a price well above the average cost in order to avoid the cost of learning. This might be the case when the input is patented or when there is a difficult learning process involved. Boeing assembles aircraft using purchased jet engines because learning to make reliable jet engines would be unreasonably costly.

4. Special skills may be required, but the firm does not demand them in sufficient quantity to maintain a department of people with those skills. This is similar to the first reason in the list. The book gives a good example of this in discussing why British Petroleum (BP) chooses to purchase insurance against small losses. Insurance companies employ people who are experts at risk reduction, investigation of suspicious claims and litigation. It would be very costly for BP to achieve the high level of expertise it basically purchases when it pays another company for insurance. This is also why small companies hire lawyers from outside rather than maintaining in-house counsel.

5. By purchasing goods, the firm avoids monitoring (or agency) costs associated with production. That is, you don't have to hire managers and supervisors to monitor people producing that particular input. Even if the firm did have the capacity to match the efficiency of industry leaders in production of the input, it would still have the problem of carefully managing a new area of business with no immediate pressure from competitors to keep production efficient. Over a longer period of time, if they failed to keep up with leading firms in the production of that input, they might face the painful task of outsourcing and shutting down that division.
Reasons to Expand Vertically

1. Independent suppliers may not be able or may not choose to achieve the required level of timing and coordination. They may not match design specifications closely enough or they may not deliver inputs at the appropriate time, a particular problem for firms trying to practice just in time production.

2. Independent suppliers may not be as trustworthy with trade secrets as internal suppliers might be. A company protects non-patented information by not letting anyone outside of the company have access to it. Depending on the manufacturing process and the specific part involved, it may be the case that a supplier would need to know some secret information which the company would prefer to keep secret.

3. Independent suppliers might compromise on quality if the contract allows it in some way. No contract can specify every possible characteristic of a product (although some government contracts try) and there is always the danger that a supplier could take advantage of an unspecified attribute to cut her costs, supplying an unacceptable product which, nevertheless, conforms to the specifications of the contract. The costs of writing very complete contracts and enforcing those contracts can be prohibitively high. These issues fall under the heading of transactions costs and will be covered in the next chapter.

4. Supplying an input might involve assets that are specifically tied to the firm. Without the supplier, the firm would have to shut down and without the firm the input would be of no value. One example is the combination of an oil field, a pipeline and a refinery. In such a case, there is the potential for a hold-up problem, if one firm demands a large share of the total profits and threatens to shut down if they don’t get it.

5. Externalities related to actions of distributors. Any actions taken by distributors to promote your product will carry with them positive externalities. As a result, they will do too little of this. If a firm also distributes its products, it can do an efficient amount of advertising and promotion of the product.

6. Differential tax treatment of different steps in the production process. You might want to shift profits to the less taxed production step. Alternatively, if transfers from one firm to another, it may be possible to reduce the total tax liability by vertically integrating, though this is not usually the case.
**Fallacious Reasons Not to Buy**

1. Producing a product yourself protects you from increases in the market price. While it is true that prices fluctuate from time to time, even in competitive markets, producing an input and using it internally disguises rather than lowers the cost of using that input when its market price is very high. If a firm produces its own electricity, for example, and the price of electricity rises dramatically (as happened in December of 2000 in the western U.S.) the opportunity cost to a firm of using its own electricity is the price for which it might have been sold. Internal analyses stating that the cost of using that electricity was the generating cost would simply be incorrect.

   As mentioned in the text, there are financial instruments which allow firms to protect themselves from fluctuations in input prices and these are almost certainly better approaches to the problem.

2. By producing an input yourself, you keep for yourself that profit that you supplier would have earned. In fact, if you are purchasing inputs in a market which is fairly competitive, firms are probably only earning a fair rate of return on their capital. The best you could really hope to do by producing the input yourself is to achieve the same fair rate of return on your investment, and that would happen only if you could achieve a level of efficiency equal to that of established and time-tested firms in the industry.

   On the other hand, if you are purchasing inputs from a firm with some significant monopoly power which is charging a price much higher than their average cost, there is probably some barrier to entry which would prevent you from producing the input.

**Middle Ground Options Between Make and Buy**

We have already started to establish a continuum along which make or buy options might be considered in terms of how involved the firm is with the production of its inputs. At one extreme is buying in spot markets, then buying under contract. These are both forms of buying, although purchasing in spot markets implies less of a relationship between the two parties than does a contract. At the other extreme is complete vertical integration. On a line, they might look like this:
There are other options between "Buying Under Contract" and "Vertical Integration" although where they might lie in relation to one another is probably a matter of opinion. Among them are:

1. **Tapered Integration**
   This occurs when a firm works with both external and internal suppliers or distributors along the vertical production process. One advantage is that, like having multiple suppliers, it reduces the likelihood of a hold up problem. Another is that it is easy to assess the performance of an internal supplier by auditing their costs and reliability and comparing them to the benchmark of the external provider. Tapered integration is likely to be less successful when there are large economies of scale and one large supplier would gain significant advantages over several smaller suppliers.

   The text offers the example of fast food companies having both franchise restaurants and centrally owned restaurants. It may be that this tapering is designed with another intent. Quality is critical to both an individual restaurant and to others in the national chain. If a person gets a bad meal at one particular restaurant, not only will they not visit that particular restaurant ever again, they will also be less likely to visit others in the chain. At a restaurant whose business is primarily returning customers (like at a neighborhood hamburger place) the owner will have a sufficiently strong incentive to monitor quality, knowing that several poor meals will severely reduce his future business. At a restaurant whose business is primarily one time customers (like at an airport or along a remote stretch of interstate highway) the owner will have less incentive to monitor quality, knowing that most customers won't be back anytime soon. The lower quality at the second restaurant will threaten the reputation of the national chain, so the chain might choose to operate the second type of location itself while allowing franchises in locations where most business comes from repeat customers.

2. **Strategic Alliances and Joint Ventures**
   Under these types of organizations, firms either join forces for a particular project or create a new company which is jointly owned and to which they both contribute resources. These organizations arise when contracting would be too difficult due either to the large scope of the project or a high degree of uncertainty about what actions and expertise will be necessary for success.
Establishment of these relationships is typically very time consuming and worthwhile only if there is the expectation of large benefits, benefits which are likely to accrue over a long period of time. While the lack of specific and enforceable contracts in these organizations might normally lead to various problems, the implied length of these relationships and the knowledge that opportunistic activity on the part of one participant would threaten any long term benefits can work to discipline the participants. To put this another way, the participants work hard to form a relationship for large long term gains and they don't want to upset it for small short term gains.

3. Collaborative Relationships
Unofficial relationships exist in business. Firms maintain exclusive or consistent dealings with one another for a variety of reasons that may not seem rational.

In some cases, it may be that managers have social relationships with managers of their firms' suppliers, and looking elsewhere for inputs would cause these social relationships to deteriorate.

Reliance on small a circle of suppliers may also be due to lack of information or to risk aversion. The perceived gains from going outside a circle of known associates to find a supplier may not be worth the added search costs or the risk of choosing an inferior supplier. The risks involved in moving to a new supplier may deter a firm from abandoning a long standing supplier whose performance has been more or less satisfactory.

For whatever reasons, firms often have unwritten commitments for long term interactions with each other and do not stray, even if tempted by attractive new offers. These long term relationships persist, despite some loss of technical efficiency, due to the gains in agency efficiency they allow.

Summary
Firms use inputs to create their outputs and then need to something with their outputs.

They may find it advantageous to buy inputs if:
- they will use relatively small quantities of the input
- the input can be purchased in a competitive market
- the input is particularly difficult to produce
- there is some special expertise associated with the input which the firm lacks
- making the input would involve potentially large monitoring or agency costs
By purchasing inputs in markets, firms avoid the problems of vertical expansion, most notably getting into activities in which they have no efficiency advantage. Contracts allow firms to specialize in the activity at which they are most efficient, very often despite incomplete contracts, relationship specific capital and various other potential hazards. While these hazards sometimes manifest themselves, given a predictable legal environment and the potential for long term relationships these arrangements usually prove to be mutually beneficial. Under less stable or less predictable conditions more caution in contracting is required and vertical integration may be necessary.

Firms my find it advantageous to make inputs if:
- there are potential coordination problems with suppliers
- buying inputs would involve sharing trade secrets which the firm wants to protect
- the input is so complex that it can't be sufficiently well described in a contract
- supplying an input might involve assets that are specifically tied to the firm
- there are externalities associated with the actions of one part of the vertical chain
- there are tax advantages to vertical integration

Finally, there are some incorrect arguments about why inputs should be made rather than bought. It is fallacious to say that
- producing an input yourself protects you from price fluctuations
- you necessarily avoid paying for a supplying firm's profits by producing an input

The important issues in this chapter are the important characteristics of the input being considered, the relative abilities of suppliers to provide it, and the potential relationships between the firm and its suppliers. You should be able to look at situations, assess their potential for vertical integration and offer an opinion as to which form of relationship between a firm and its suppliers might be appropriate. Possibilities include:
- spot market purchases
- purchasing under contract
- tapered integration
- joint ventures or strategic alliances
- collaborative relationships
- vertical integration