

Business 101

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1 Introduction

Fundamentally, a business is an activity focused on generating revenue (sales) by providing goods or services. For example, we purchase an apple for 10 cents and re-sell it for 20 cents. That is business. Anyone can do it. This simplicity hides a lot of uncertainty and risks.

Most businesses fail shortly after starting—often before making any sales or profits. Businesses that manage to survive, are like resilient machines that run a very efficient loop of continuously selling goods or services. New businesses often have to deal with these established strong competitors. With these odds, it is often easier and less risky to invest in existing businesses than to start new ones.

2 The Market

The market is a set of potential customers. Every business needs to realistically define their potential customer—the market will subsequently drive the design/development of offered products and services.

2.1 Market Gaps

Often new businesses are started to take advantage of a market gap: a set of customers whose needs are not currently satisfied by existing businesses. Such gaps are often dangerous: the market may be too small to be profitable. If there is no competition, then research *why* there is no competition.

2.2 Competition

The existence of the business depends on retaining the market share. A successful business will study the market and the competition. Differentiate and market products in just the way that improves their perceived image in the eye of the consumer.

Often this means targeting a subset of the market: make cheapest or make the best product. It is harder to compete with a product that is in the middle of a spectrum of other products.

In new markets, it is often an advantage to be first—but a proven market will quickly attract competition, which often offers a better product, having learnt from the past.

If products/services have no competitive advantage, then don't compete. There are plenty of other things to do, concentrate business energy in areas that have competitive advantage.

3 Operations

Operations are business activities that directly or indirectly lead to sales. These include things like purchasing raw materials, working the raw materials into products, etc.

It is easy to imagine operations as a repeating loop of events: purchase, make, sell, purchase, make, sell, etc., the reality is that the business landscape is continuously changing, and requires active management to ensure continuity.

For example, purchasing raw materials often involves keeping internal stock and estimating production volumes, as well as the timing and cost (and financing) of purchases. Similarly, production often depends on availability of raw materials, labor, and equipment, as well as sales and inventory levels. Sales often depends on the market, marketing, and price of the good/service, as well as availability of inventory. Throw in some competition into the mix, and all these variables can vary wildly and require diligent management.

4 Leaders

Managers often make terrible leaders. The set of skills of enduring things are done right is often different than the set of skills to do the right things.

Businesses are organisms that not only need to survive, but need to evolve and compete. They need to grow and change. Without proper leadership, it is almost certain that competition will steal the market, even from the best ran operations.

Strategies to avoid irrelevance: diversity. Monocultures are a sure way to lose in a competition game. This applies to variety of perspectives, as well as variety of products and markets.

The power of teams only emerges when there is variety and specialization. None of us are as smart as all of us. Beware of group think and complacency. Think different.

5 Finance

Ultimately, the entire business needs to be financed by revenue (sales). If that is not happening, then there is no point in being in business.

Short term, a business may borrow money for operations or expansion. For example, a construction company may borrow money to buy land, raw materials, and pay workers to build a house. Once the house is sold, the debts are repaid with interest, and whatever is left over is profit.

Profit may be retained for the future, to avoid borrowing costs, or given back to owners/shareholders in the form of a dividend.

Some businesses have retained so much, that they invest in other businesses or bonds, earning a return. Occasionally those returns overshadow the operational returns of the business—and the business essentially becomes a sort-of-bank, that makes earnings from lending out money to other businesses.

5.1 Financing

There are essentially three ways to finance big-expenses:

- Pay from operations: This involves retaining earnings from operations, saving up over time, and paying for things from those savings. This is the slowest, but the safest method of growth.
- Borrow: this often involves getting a bank loan. Loans must be repaid, creating a burden that costs interest, and risk of bankruptcy if loan payment is missed.

Another way to borrow is to issue bonds: This often happens when the (investment) bank does not want to hold the loan on their books: they create these trade-ble contracts that the bank sells to the market (often institutional investors, such as pension plans, or the public, etc.). For the company, the risk is the same: they go bankrupt if they miss an interest payment on their bonds.

- Issue stock: a company can choose to sell a chunk of itself for a cash payment. This often involves an investment bank, that guesses the value of the whole company (e.g. \$100m), then pays the company the right amount for the share of the company they are buying (e.g. \$5m for a 5% stake in a \$100m company).

The investment bank then sells the shares in the market, often netting themselves a profit (e.g. they may sell 5% of the company for \$10m).

The upshot is that the company gets the money, but without the burden of the loan. Shares get dividends—but company cannot go bankrupt if they miss a dividend payment. The downside is that now there are more owners to split that dividend with.

The first time a company issues stock is called Initial Public Offering, or IPO. Subsequent sales are often done from market operations sale of treasury shares (that the company itself owns), or secondary offerings (getting a lump sum from investment bank that later sells shares in the market—mimicking the IPO second time around). Some compensation plans implicitly create shares—such as paying employees with stock options.

The type of financing a business uses often implies their internal perception about future profitability. For example, if a company is financing with bonds, and the leadership is thinking their shares will outperform bonds—and vice versa. So invest in the thing that the company is *not* trying to sell you.

5.2 Profit vs Cash flow

Cash flow and profit are not the same, and calculating profit is often very difficult. For example, construction company may be very profitable, but they may have to spend a lot of cash to buy land, equipment, raw materials, and labor, and only after selling the house potentially a year later recover the profits.

A business needs to have enough cash flow to cover immediate expenses and operation costs. A disruption in cash flow could mean a bankrupt business—even if ultimately it may turn out to be profitable.

6 Accounting

Accounting is the practice of writing down whatever the business does. Traditionally, this meant writing down all financial transactions, often using double-entry method.

6.1 Double Entry Accounting

There's a formula:

$$Assets = Liability + Equity$$

which essentially says whatever you have (assets) is what you borrow (liabilities) and what you own (equity). These are often broken up into more granular accounts in the general ledger:

- Assets: cash, accounts receivables, inventory, prepaid expenses, property-plant equipment
- Liabilities: account payable, salaries payable, accrued expenses, long-term debt, deferred/earned revenue.
- Equity: owner's equity, retained earnings

Any business transaction updates two of these accounts (double-entry). For example, a business buys \$10 of supplies. We'd take \$10 from cash, and put \$10 into inventory in the form of supplies.

One way to remember DEALER:

$$\begin{array}{rcl} \text{DIVIDENDS} + \text{EXPENSES} + \text{ASSETS} & = & \text{LIABILITIES} + \text{EQUITY} + \text{REVENUE} \\ (\text{increase when debited}) & = & (\text{increase when credited}) \end{array}$$

6.2 Activity Based Costing

One of the primary things we care about is calculating profit. A business does a lot of business related activities, and often there is no direct and easy to follow link to profit. In fact, calculating the cost of production is often guesswork.

To help with the problem, many modern businesses started to record and analyze all business activities, not just financial ones. With enough granularity in the activities being recorded, it is often possible to piece together the exact cost of production, the exact cost of expenses, as it relates to each item being sold.

7 Secondary Markets

On the other side of company financing (selling shares or bonds) are investors. During the IPO (or a bond sale), the company directly gets the money (often from an intermediary, such as an investment bank). The investors get the promise from a company. A bond is a promise to repay the debt (with interest). A share is a promise to share profits (in a form of a dividend).

Once investors have the shares or bonds, they can do whatever they want with them. Bonds are often held to maturity—which the company pays interest on. Stocks are often resold to other investors.

7.1 OTC

If the company is tiny, investors can negotiate the price with the current owner and just hand over the shares.

For slightly bigger companies, there's often an over-the-counter (OTC) market, where investors can get quotes (prices), and buy/sell companies that are not publicly-listed. These deals are often mediated by investment banks.

OTC markets are known for low liquidity and high price volatility. In other words, high risk. Such small companies often do not have rigorous financials and few eyes to do auditing of such financials. Investors beware.

7.2 Public Markets

There are public markets, such as the New York Stock Exchange, NASDAQ, etc., where the company shares can be listed. Such centralized markets enable public price discovery (everyone posts their bids and offers, and the ballpark mid-point between bids and offers is where trades happen).

The upshot is that the price is public. Everyone knows what price the last trade was for. Everyone knows what the current bid and offer is. Everyone knows where to go to get shares.

Each market has its own rules, which often overlap with the SEC and FINRA rules. Public companies are required to file financials with the SEC (through the EDGAR system). Corporate financial fraud is harder to hide, and once discovered often ends up ending the company, or at least its public-market side.

7.2.1 Brokers vs Dealers

A broker is legally bound to put customer interests ahead of their own. If you wish to buy a company, and involve the broker in a transaction, that broker is not allowed to buy the company ahead of you.

Dealers are specifically not brokers: they are allowed to put their interests ahead: if you involve a dealer to buy a company, that dealer can buy the company themselves and re-sell it to you at a profit.

Markets (public and not) are filled with participants, some of which are acting as individuals, brokers (for individuals or large funds), dealers (for investment banks), market-makers (often run by investment banks), etc.

7.2.2 Market Makers

The double-coincidence issue: an investor wishes to buy a stock—for this to occur, another investor must be willing to sell that stock at exactly the same time (at an agreed on price). With thousands of stocks and all potential price points, it is hard for these double-coincidences to occur often.

Market makers are dealers who act as intermediaries. They always quote a price at which they will buy *and* sell a security. Anyone can always sell and anyone can always buy. Market makers profit from the price spread between their buy price and their sell price.

On each market, there are often designated market makers for each security—such that buyers/sellers know where to go to get trades. Often market makers must follow specific market-making rules—such as always having a public quote.

7.3 Derivatives

Stocks and bonds are not the whole universe. Anything that can be valued in some way may be traded.

Options and futures are often standardized contracts, with markets, and market makers, dealers, speculators, etc. A bit less standardized are swaps.

7.3.1 Options

Options are contracts to buy or sell a security at a future time at a set price. The contract specifies the kind of option, underlying security, the exact future date, and the exact future price. The contract is optional, in that one side is allowed not to follow through.

For example, an investor believes company X will go up from \$100 today to \$120 in 9 months.

- The investor can purchase the stock today and wait 9 months. To make that happen, the investor needs to have \$100 today. There is also risk that the investor is wrong, and the price could go down to \$50 in 9 months instead.
- The investor can purchase a contract to purchase the stock for \$100 in 9 months. Entering that contract may cost them \$10 today. If investor is right, in 9 months, they purchase X for \$100, maybe immediately reselling it for \$120, and pocketing a \$10 profit (\$20 profit minus the \$10 option contract). If the investor was wrong (stock drops to \$50 in 9 months), then investor only loses the \$10 contract.

The contract has two sides—for an investor to buy an option, someone must be willing to sell an option. Many investors make their returns by writing contracts that have a high chance of expiring worthless.

In the middle of an options contract sits a clearing corporation—that ensures that buyers/sellers are matched up, and prevent counter-party risk (the risk that the other side simply walks away).

The Options Clearing Corporation (OCC) also ensures that the buyer/seller are decoupled: while each contract must have a buyer and seller, a buyer on one contract may be matched up to a seller on another contract, etc. ensuring that folks can enter and leave the market without being bound to the original counterparty.

7.3.2 Futures

A future is a contract to buy/sell a particular thing in the future for a set price. But unlike options, there is no backing out. E.g. a farmer may enter a futures contract to sell corn after the harvest. They know their expenses, they know the dates when the harvest will be ready, and they can lock in that price months in advance.

If the farmer's crop is destroyed (flood, etc.), then they must still deliver: often by going out and buying corn at the then market price.

This is often simplified by entering another futures contract on the opposite side: instead of buying corn and shipping it, the farmer can enter a contract to buy corn—netting out both of their sell-corn and buy-corn contracts to zero.

To make sure that everyone delivers (and doesn't disappear on the delivery day), futures contracts are settled every day—where the difference in cost is exchanged every day. By the time final day rolls around, each party already has all the money that is due to them.

7.3.3 Swaps

Swaps are another popular contract, in which counterparties agree to swap risk and cash-flows. For example, an interest-rate swap swaps variable rate for fixed rate cash flows from

an asset. If a bond pays 5% a year for 20 years, an investor can swap that for a rate that pays current Libor rate instead for 20-years.

The risk is obviously that the Libor rate would be different than the fixed rate. This being a zero-sum contract, one party will always benefit at the expense of the other—but nobody knows which when they enter the contract.

A currency swap swaps payments in one currency for payments in another currency... such as Euro payments to USD, etc.

A security based swap, such as total-return-swap, binds both parties to return total-return from a security. For example, stock valued at \$100, and next month it is \$110, then party *A* pays party *B* the \$10 difference. On the other hand, if the security drops to \$90, then party *B* pays party *A* the \$10 difference.

It is a good way to benefit from a price move without explicitly owning the security; or hiding ownership information (some large investors must disclose ownership if they own more than 5% of the company—but with total-return swaps, they can benefit from the price move without crossing that 5% boundary).

7.3.4 Repo

Repurchase agreements are another type of contract. Often companies need to temporarily unload an asset from their books—but they do not wish to get rid of it. For example, a company may *sell* \$1b stake in a risky asset, show \$1b cash on their balance sheet, and turn around and repurchase that same asset for nearly the same cost a month later.

8 Data Science

Data collection on each business activity as it happens enables data analysis of the entire business. To not just understand the source of profit and costs, but to understand how to improve the process.

The first step in improving is understanding where you are (data collection).