

# Accounting basics: inventory, working capital and cash generation

02

In this section we will dig into some accounting basics, which are required for a good understanding of the main text in the book. To better understand the link between inventory, working capital and cash generation, we will introduce and explain the three key financial statements of any publicly listed company: the profit and loss statement (P&L), the balance sheet and the statement of cash flows.

## **The profit and loss statement (P&L)**

Figure 11.4 shows a simplified P&L of an example company. Let's discuss how the different lines 'Sales Revenue' minus the 'Cost of Goods Sold' define the 'Gross Profit'. The 'Cost of Goods Sold' (COGS) includes the 'direct material costs', which is the cost of the raw materials and components going into the finished goods, the 'direct labour cost', which is any cost that can be directly allocated to the production of a specific product, for instance the line operators. The COGS also includes the manufacturing overhead, which can be variable (changing with the volume produced) or fixed (independent of the volume produced). The overhead can include the cost of the process

engineering, the planning department etc. Costs that are not linked to the manufacturing of the finished product are grouped into a category called the 'Selling, General and Administrative' costs, or SG&A.

The 'EBITDA' are the 'Earnings Before Interest, Taxes, Depreciation and Amortization'. If a company invests in a new production facility or a new warehouse, the cost of that investment is spread over its lifetime. This means we can do a €10 million investment this year, and spread the cost over 20 years, i.e. €500k per year. This is called a 'Depreciation'. If a company invests time or money in the creation of new products or services (R&D) the cost of that investment can also be spread over the lifetime of the product. The yearly cost is called an 'Amortization'. Notice that a depreciation or an amortization is not a cash out as of year 2. The only cash out is in year 1, when we do the investment.

The P&L traces all the revenues and all costs during a period, typically a quarter, a semester or a year. Subtracting all the costs from the revenues that relate to a given period gives the 'Net Income' or the 'Net Profit'. The 'Earnings Per Share' (EPS) shows the net income per share in the given period.

## The balance sheet

The balance sheet shows all that a company 'owns' at a specific moment in time (typically at the end of a year). What a company owns are called the 'Assets'. They are shown in Figure 11.5. The 'Current Assets' can be converted into cash in the short term, typically less than a year. Important components of the current assets are the 'cash' we have in the bank, the 'Accounts Receivable', which is the money we still need to receive from our customers. The 'Inventory' is also part of the current assets. The 'Fixed Assets' cannot easily be converted into cash. An example are the plants, the properties and the equipment in which we have invested in the past.

The balance sheet also shows the financing of these assets. This is shown in Figure 11.6. When starting a company, the owners will invest a certain amount of money. This is the 'Paid-in Capital'. When the company makes a profit, part of the profit can be returned to the shareholders via a dividend. The shareholders can decide to leave part of the profit in the company as so-called 'Retained Earnings'. So part of the financing of the assets comes from the so called 'Owners Equity' (paid-in capital + retained earnings). A second part of the financing is summarized as 'Liabilities'. 'Current liabilities'

**Figure 11.4** Profit and loss (P&L) of an example company

<b>Profit and Loss (2020)</b>			
Sales Revenue	€	75,600	
Cost of Goods Sold (COGS)	€	-52,920	→
<i>Gross Profit</i>	€	22,680	30%
Selling, General and Administrative (SG&A) Expenses	€	-15,120	→
<i>Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA)</i>	€	7,560	10%
Depreciation	€	-3,024	→
Amortization	€	-	
<i>Earnings Before Interest, Taxes (EBIT)</i>	€	4,536	6%
Taxes and Interest	€	-2,646	
<i>Net Income / Net Profit</i>	€	1,890	3%
Earnings Per Share (e.g. 1000 shares)	€	1.89	

Cost that can be directly attributed to the sale, e.g. purchasing cost.

Cost that can NOT be directly attributed to the sale, e.g. marketing costs.

'Investments' in e.g. warehouses are 'depreciated' for instance of 20 years. This implies we account for 1/20th of the total cost each year. A depreciation is not a 'cash-out'. The actual cash has been spent when the warehouse was built.

**Figure 11.5** Explaining the ‘asset’ side of the balance sheet of an example company

<b>Balance Sheet (31/12/2019)</b>			
<b>Assets</b>		<b>Liabilities and Owner's Equity</b>	
<i>Current Assets</i>		<i>Owner's Equity</i>	
Cash	€ 6,600	Paid-in Capital	€ 15,000
Accounts Receivable	€ 6,200	Retained Earnings	€ 800
Inventories	€ 5,000		
<b>Total Current Assets</b>	<b>€ 17,800</b>	<b>Total Owner's Equity</b>	<b>€ 15,800</b>
<i>Fixed Assets</i>		<i>Liabilities</i>	
Property Plant Equipment	€ 20,000	<i>Current Liabilities</i>	
		Accounts Payable	€ 8,000
		Short-Term Bank Loans	€ 4,000
		<i>Long-Term Liabilities</i>	
		Long-Term Bank Loans	€ 10,000
<b>Total Fixed Assets</b>	<b>€ 20,000</b>	<b>Total Liabilities</b>	<b>€ 22,000</b>
<b>Total Assets</b>	<b>€ 37,800</b>		<b>€ 37,800</b>

Current assets can be converted in money on the short-term. ‘Current’ refers to ‘short-term’.

Fixed assets are more difficult to convert in cash. They are ‘long-term’ assets.

Accounts Receivable = Turnover that has been invoiced to the customer, but has not yet been paid. e.g. partners that pay at 30 days or 60 days, e.g. consumers that buy on credit of 30 days.

are due in the short term. The ‘Accounts Payable’, which is the money still to be paid to suppliers, is part of the ‘Current Liabilities’. Any type of short-term debt will also be part of the ‘current liabilities’. Investments in ‘fixed assets’ (such as, plants, warehouses) are typically financed by long-term loans. These are part of the ‘Long-Term Liabilities’.

## EXERCISE

Understanding the profit and loss, balance sheet

Look at the latest financial reports from your company and two other key competitors. From the P&L compare revenue, cost of goods, SG&A, EBITDA, depreciation and amortization, EBIT, net income and earnings per share.

What do you learn about your profitability compared to your two key competitors? From the balance sheet compare the following metrics:

- current ratio = current assets / current liabilities
- debt ratio = total debt / total assets

The current ratio is what we call a ‘liquidity measure’. It explains how easily the short term liabilities can be returned from the short term assets like receivables and cash. A ratio below one indicates a lack of liquidity. The debt ratio indicates how much of the total assets is financed by debt (= liabilities) versus equity. Less debt financing, or a so-called ‘lower leverage’, makes it easier to get extra debt financing.

**Figure 11.6** Explaining the liabilities and owners equity side of the balance sheet of an example company

Balance Sheet (31/12/2019)			
Assets		Liabilities and Owner's Equity	
<i>Current Assets</i>		<i>Owner's Equity</i>	
Cash	€ 6,600	Paid-in Capital	€ 15,000
Accounts Receivable	€ 6,200	Retained Earnings	€ 800
Inventories	€ 5,000		
<b>Total Current Assets</b>	<b>€ 17,800</b>	<b>Total Owner's Equity</b>	<b>€ 15,800</b>
<i>Fixed Assets</i>		<i>Liabilities</i>	
Property Plant Equipment	€ 20,000	<i>Current Liabilities</i>	
		Accounts Payable	€ 8,000
		Short-Term Bank Loans	€ 4,000
		<i>Long-Term Liabilities</i>	
		Long-Term Bank Loans	€ 10,000
<b>Total Fixed Assets</b>	<b>€ 20,000</b>	<b>Total Liabilities</b>	<b>€ 22,000</b>
<b>Total Assets</b>	<b>€ 37,800</b>		<b>€ 37,800</b>

The Owner's Equity consists of the cash investments made in the company by the shareholders + any earnings that have not been paid as a dividend

Current Liabilities are payable on the short-term

Long-Term Liabilities are payable on the long-term

Accounts Payable = Costs that have been made and accounted for in the P&L, but that still need to be paid, e.g, we pay our suppliers only after 30 days or 60 days.

## The statement of cash flows

The 'statement of cash flows' explains the difference in the cash position at the end of the previous period and the end of the current period. As explained when discussing the P&L, a depreciation of an investment is not a cash out as of year 2. As a result, when starting from the net profit, we need to add the depreciation (and the amortization) if we want to know the actual cash generation (or consumption). If our accounts receivable have decreased, e.g. from €6,200 at the end of the previous period, to €5,000 at the end of the current period, we have been able to 'collect' €1,200 of cash from our customers. As a result, a decrease in the accounts receivable generates cash. An increase in the accounts receivable will consume cash. Likewise, a reduction in Inventory and an increase in the accounts payable, will generate cash.

Figure 11.7 shows the 'statement of cash flows' for our example company. The net income is €1,890. We have a depreciation of €3,024. Assuming the investment has been done in earlier years, this is not a cash out, so we can add it to the net income. Apparently over this period, our accounts receivable have increased, our Inventory has increased, and our accounts payable have decreased. As a result the cash we generated: €1,890 + €3,024 has been consumed by the increase in the receivables and the inventory and a reduction in the payables. In fact the cash generated is not sufficient. There is a deficit of -€1,586. This deficit will lower the cash we have available in the bank. If we don't have

**Figure 11.7** The statement of cash flows for our example company

Statement of Cash Flows (2020)	
Net Income	€ 1,890
+ Depreciation Expense	€ 3,024
+ Decrease in Accounts Receivable	€ -3,000
+ Decrease in Inventory	€ -2,500
+ Increase in Accounts Payable	€ -1,000
Cash Flow from Operations	€ -1,586

The net income or net profit is not equal to the cash we have generated.

For example, as already explained, a depreciation is not a 'cash-out'. The cash has been spent when the investment was initially done. As such, to calculate the actual cash generation, we add the depreciation expense to the net income.

If I decrease my inventory (e.g., from €5,000 at the end of 2012 to €4,000 then at the end of 2013 then I generate cash.

Likewise, if I decrease my AR (money to receive from customers), or increase my AP (money still to pay to suppliers) I also generate cash.

enough cash in the bank account, we'll need to extend our loans or ask shareholders to increase the capital to finance this deficit.

There is a saying that companies don't go bankrupt from making a loss. They go bankrupt from a lack of cash. The statement of cash flows is instrumental in understanding which are the cash generating versus the cash consuming factors over a given accounting period.

Figure 11.7 shows the so-called 'cash flow from operations'. We can also generate or consume cash from 'investing activities' and from 'financing activities'. The above mentioned investment in a new production facility or warehouse will typically be explained in the 'cash flow from investments'. This is a second and separate part of the overall statement of cash flows. If we make an investment of €10 million in year 1, it will show the €10 million here. If we depreciate over 20 years, we only show €500k in the P&L. That €500k is not an extra cash-out, so it should be added to the net income in the 'Operations' part of the statement of cash flows.

Roughly speaking the 'free cash flow' (FCF) equals the cash flow from operations minus the 'capital expenditures'. A capital expenditure is any investment in non-financial assets, like a new production facility or warehouse. It is called the 'free' cash flow, as it represents the cash that is available to all security holders, the holders of equity and the holders of debt. It is the cash flow that can be used to pay dividends, and to pay interest.

The exact definition of the 'free cash flow' (FCF) takes the 'interest' out, as interest is money returned to the holders of debt. That makes it a bit more complicated. The resulting definition is as follows:

$$\text{FCF} = \text{EBIT} \times (1 - \text{tax rate}) + \text{D\&A} - \Delta\text{WC} - \text{CAPEX}$$

Where  $\text{EBIT} \times (1 - \text{tax rate})$  is also called the net operating profit after tax (NOPAT), the D&A are the depreciation and amortization, the  $\Delta\text{WC}$  are the

changes in working capital and the CAPEX are the capital expenditures as just explained.

If we do a big investment, all or part of the investment may be financed by a new loan, or a capital increase by the shareholders. This financing is typically shown in the ‘cash flow from financing’. That is the third and last part of the overall ‘statement of cash flows’.

Figure 11.8 shows that the statement of cash flows can also be derived from comparing the balance sheet at the end of the previous and the current period. The depreciation shows as a reduction of the fixed assets. To come back to our example, each year we account for €500k in the P&L. In the balance sheet we reduce the value of the corresponding asset by €500k each year. The comparison also shows the increase in the receivables and the inventory, the decrease in the payables. The cash deficit of –€1,586 shows as a reduction of the cash balance from €600 to €5,014.

### EXERCISE

#### Understanding the cash flow statement

Take the latest two financial reports from your company and two key competitors. Try to derive the cash flow statement by comparing the balance sheets of the last two years, as shown in Figure 11.8. Compare your result with the cash flow statement in the financial reports. Try to understand any differences.

Take a step back and review the following questions: which activities have generated cash, which have been consuming cash. Was there a net cash generation or consumption? Review for your company and the two key competitors.

## Working capital

Working capital is defined as the current asset minus the current liabilities. Figure 11.9 shows the working capital for our example company is €5,800. Throughout the year, our working capital can go up and down as the underlying components go up and down. The working capital represents the capital we need to have smooth operations. You can consider it the oil into our operational engine.

Figure 11.9 also shows that our working capital is in fact financed by the ‘owners equity’ and the ‘long-term liabilities’. These do not come for free. We typically have an interest on the ‘long-term liabilities’. If we pay five per

**Figure 11.8** Deriving the statement of cash flows from the balance sheet at the end of the previous and the current period

Balance Sheet (31/12/2019)		Balance Sheet (31/12/2020)	
Assets		Liabilities and Owner's Equity	
Current Assets		Owner's Equity	
Cash	€ 6,600	Paid-in Capital	€ 5,014
Accounts Receivable	€ 6,200	Retained Earnings	€ 9,200
Inventories	€ 5,000		€ 7,500
Total Current Assets	€ 17,800	Total Owner's Equity	€ 17,690
Fixed Assets		Liabilities	
Property Plant Equipment	€ 20,000	Current Liabilities	
		Accounts Payable	€ 16,976
		Short-Term Bank Loans	€ 4,000
		Long-Term Bank Loans	€ 10,000
Total Fixed Assets	€ 20,000	Total Liabilities	€ 16,976
Total Assets	€ 37,800	Total Assets	€ 38,690

<p>– € 1,586 cash</p> <p>+ € 3,000 receivables</p> <p>+ € 2,500 inventory</p>	<p>– € 1,000 in payables</p>
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<p>Owner's Equity</p> <p>Paid-in Capital</p> <p>Retained Earnings</p> <p>Total Owner's Equity</p>	<p>Owner's Equity</p> <p>Paid-in Capital</p> <p>Retained Earnings</p> <p>Total Owner's Equity</p>
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<p>Current Assets</p> <p>Cash</p> <p>Accounts Receivable</p> <p>Inventories</p> <p>Total Current Assets</p>	<p>Current Assets</p> <p>Cash</p> <p>Accounts Receivable</p> <p>Inventories</p> <p>Total Current Assets</p>
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<p>Fixed Assets</p> <p>Property Plant Equipment</p> <p>Accounts Payable</p> <p>Short-Term Bank Loans</p> <p>Long-Term Bank Loans</p> <p>Total Liabilities</p> <p>Total Assets</p>	<p>Fixed Assets</p> <p>Property Plant Equipment</p> <p>Accounts Payable</p> <p>Short-Term Bank Loans</p> <p>Long-Term Bank Loans</p> <p>Total Liabilities</p> <p>Total Assets</p>
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**Figure 11.9** Deriving the ‘working capital’ for our example company

Balance Sheet (31/12/2019)			
Assets		Liabilities and Owner's Equity	
<i>Current Assets</i>		<i>Owner's Equity</i>	
Cash	€ 6,600	Paid-in Capital	€ 15,000
Accounts Receivable	€ 6,200	Retained Earnings	€ 800
Inventories	€ 5,000		
<b>Total Current Assets</b>	<b>€ 17,800</b>	<b>Total Owner's Equity</b>	<b>€ 15,800</b>
<i>Fixed Assets</i>		<i>Liabilities</i>	
Property Plant Equipment	€ 20,000	<i>Current Liabilities</i>	
		Accounts Payable	€ 8,000
		Short-Term Bank Loans	€ 4,000
		<i>Long-Term Liabilities</i>	
		Long-Term Bank Loans	€ 10,000
<b>Total Fixed Assets</b>	<b>€ 20,000</b>	<b>Total Liabilities</b>	<b>€ 22,000</b>
<b>Total Assets</b>	<b>€ 37,800</b>		<b>€ 37,800</b>

€17,800 – €12,000 = €5,800

cent to the bank, our shareholders will typically expect a higher return, like a 15 per cent. Without explaining the details, there is a financial metric which is called the ‘weighted average cost of capital’ or ‘WACC’. This WACC weighs the different types of debt and their corresponding return. For manufacturing and retail companies it typically varies between 8–12 per cent.

Figure 11.10 shows that the ‘working capital’ in our company has increased over the last period, from €5,800 to €10,714. Our ‘current liabilities’ decreased with €1,000. Our ‘current assets’ increased with €3,914.

## Working capital and supply chain

Figure 11.11 shows the primary components of the working capital on which we have an impact from the supply chain:

- Inventory: lowering inventories generates cash.
- Accounts receivable: reducing payment terms to clients or improving collection speed, generates cash.
- Account payable: increasing payment terms to suppliers, also generates cash.

‘Days of Inventory on Hand’ (DIOH), ‘Inventory Turns’, ‘Days of Sales Outstanding’ (DSO) and ‘Days of Payables Outstanding’ (DPO) are financial metrics that are commonly used to measure and follow-up these key components of the working capital. They are defined and applied to our example company in Figure 11.12. Notice that for the DSO it is common to

**Figure 11.10** ‘Working capital’ increase in our example company

Balance Sheet (31/12/2019)		Balance Sheet (31/12/2020)	
Assets	Liabilities and Owner's Equity	Assets	Liabilities and Owner's Equity
<i>Current Assets</i>	<i>Owner's Equity</i>	<i>Current Assets</i>	<i>Owner's Equity</i>
Cash € 6,600	Paid-in Capital € 15,000	Cash € 5,014	Paid-in Capital € 15,000
Accounts Receivable € 6,200	Retained Earnings € 800	Accounts Receivable € 9,200	Retained Earnings € 2,690
Inventories € 5,000		Inventories € 7,500	
<b>Total Current Assets € 17,800</b>	<b>Total Owner's Equity € 15,800</b>	<b>Total Current Assets € 21,714</b>	<b>Total Owner's Equity € 17,690</b>
<i>Fixed Assets</i>	<i>Liabilities</i>	<i>Fixed Assets</i>	<i>Liabilities</i>
Property Plant Equipment € 20,000	<i>Current Liabilities</i>	Property Plant Equipment € 16,976	<i>Current Liabilities</i>
	Accounts Payable € 8,000		Accounts Payable € 7,000
	Short-Term Bank Loans € 4,000		Short-Term Bank Loans € 4,000
	<i>Long-Term Liabilities</i>		<i>Long-Term Liabilities</i>
	Long-Term Bank Loans € 10,000		Long-Term Bank Loans € 10,000
<b>Total Fixed Assets € 20,000</b>	<b>Total Liabilities € 22,000</b>	<b>Total Fixed Assets € 16,976</b>	<b>Total Liabilities € 21,000</b>
<b>Total Assets € 37,800</b>	<b>Total Liabilities and Owner's Equity € 37,800</b>	<b>Total Assets € 38,690</b>	<b>Total Liabilities and Owner's Equity € 38,690</b>

€17,800 – €12,000 = €5,800

↑

€21,714 – €11,000 = €10,714

+ €4,914

**Figure 11.11** Supply chain components of working capital for our example company

Balance Sheet (31/12/2019)			
Assets		Liabilities and Owner's Equity	
<i>Current Assets</i>		<i>Owner's Equity</i>	
Cash	€ 6,600	Paid-in Capital	€ 15,000
Accounts Receivable	€ 6,200	Retained Earnings	€ 800
Inventories	€ 5,000		
<b>Total Current Assets</b>	<b>€ 17,800</b>	<b>Total Owner's Equity</b>	<b>€ 15,800</b>
<i>Fixed Assets</i>		<i>Liabilities</i>	
Property Plant Equipment	€ 20,000	<i>Current Liabilities</i>	
		Accounts Payable	€ 8,000
		Short-Term Bank Loans	€ 4,000
		<i>Long-Term Liabilities</i>	
		Long-Term Bank Loans	€ 10,000
<b>Total Fixed Assets</b>	<b>€ 20,000</b>	<b>Total Liabilities</b>	<b>€ 22,000</b>
<b>Total Assets</b>	<b>€ 37,800</b>		<b>€ 37,800</b>

Sales, logistics, manufacturing and procurement primarily have impact on:

- Inventory
- Accounts receivable (defined by payment terms for customers and speed of collection)
- Accounts payable (defined by payment terms for customers and respecting due dates)

**Figure 11.12** DPO, DSO, DIOH and inventory turns for our example company

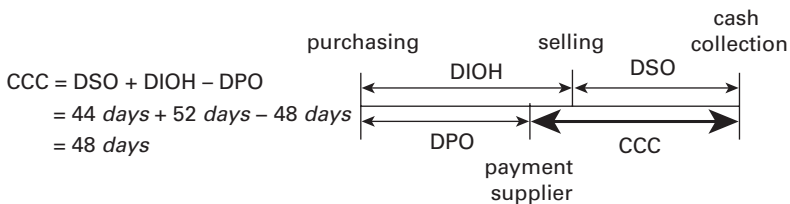
$$DSO = \frac{€9,200}{€75,600 / yr} \cdot 365 \text{ days / yr} = 44 \text{ days}$$

$$DPO = \frac{€7,000}{€52,920 / yr} \cdot 365 \text{ days / yr} = 48 \text{ days}$$

$$DIOH = \frac{€7,500}{€52,920 / yr} \cdot 365 \text{ days / yr} = 52 \text{ days}$$

$$\text{Inventory Turns} = \frac{€52,920 / yr}{€7,500} = 7 / yr$$

**Figure 11.13** Definition of CCC and application to our example company



divide by the net sales, whereas for the DPO, the DIOH and the inventory turns it is common to divide by the cost of goods sold. We see that different companies use different definitions, for instance excluding the labour cost and just looking at the direct material cost when calculating the DPO. We suggest to stick to commonly used standards to make comparisons across companies easier.

Another commonly used metric is the so-called ‘cash conversion cycle’ or the CCC. Figure 11.13 shows its definition and the application to our example company. The CCC indicates the number of days between disbursing cash to suppliers and collecting cash from customers. It is a direct measurement of the key components of the working capital. Reducing the CCC lowers the working capital and generates cash. Increasing the CCC increases the working capital and consumes cash.

### **EXERCISE**

Understanding working capital and the cash conversion cycle

From the latest two financial reports from your company and two key competitors, derive the working capital from the last two years as shown in Figure 11.13. Calculate and compare the cash conversion cycle using Figure 11.12 and Figure 11.13. Who has been generating cash from working capital? Who has consumed cash? Do we understand why and how? Which is a sign of weakness or strength?