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The Founder's Guide to Financial Modeling

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Introduction and Author's Note

So you had a great idea, assembled a team, and pitched the idea to investors, and then they asked for your financial model. What now? Knowing where to start with building a financial model can be overwhelming, particularly when you've never done it before. But, if you want to raise money for your startup (let alone manage your business), you need to learn how to do it. I'm here to help.

This guide is for startup founders building a financial model for the first time, although it can be valuable for founders of all experience levels. I work with dozens of founders every year and have witnessed the frustration and confusion around projecting financial performance for a brand new company. This guide offers a step-by-step tour to guide you through building a financial model.

I was inspired to write this book after being unable to find a comprehensive guide to financing modeling to share with one of my portfolio companies. After writing this book, I understand why. Financial modeling is a complex topic with innumerable subtle variations between business models and modeling techniques. I attempted to capture as much as possible without going into the weeds. Time will tell if I succeeded. I'm publishing this as an eBook, so it's easy to revise and republish if it's ineffective. If you have feedback—positive or negative—I'd love to hear it: dmlishego@gmail.com.

Also, please check out my other eBook, *The Founder's Guide to Venture Capital Finance* (http://www.foundersguides.com), to learn everything you need to know about understanding your cap table and the key terms of convertible note, equity, and SAFE financing rounds.

What Is a Financial Model?

Let's start at the beginning. A *financial model* is a simulation of a business, typically built in Microsoft Excel or Google Sheets. The model accepts a set of assumptions about the business and creates a *projection* or *forecast* of the financial performance of the business. The financial model should tell a story about the expected growth of your business.

The output of the model takes the form of the three basic financial statements:

- *Income statement*
- *Balance sheet*
- *Cash flow statement*

The chapters in this book describe each of these three statements in detail and provide instructions on how to create them. These chapters assume a basic working knowledge of financial statements. If you're brand new to finance and unfamiliar with financial statements, please review Appendices 1–3.

Income Statement

The income statement summarizes the operating activities of the business over a period of time. It answers such questions as How much revenue did the company generate? How much did it cost to generate and support that revenue? How much does the company pay its employees? How much does it pay for rent?

Balance Sheet

The balance sheet provides a snapshot of the financial position of the company at a specific moment in time. It answers such questions as How much cash is in the bank? How much money does the company owe to suppliers? How much money has been invested in the company?

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Cash Flow Statement

The cash flow statement is similar to the income statement, with a few subtle but important differences. The income statement summarizes only the *commercial* activities of the business (i.e., revenue from customers and expenses related to creating, marketing, and delivering a product), and the income statement may not accurately represent cash flowing into and out of the business. The cash flow statement summarizes *all* cash flowing in and out of the business, including that from noncommercial activities such as receiving investment and purchasing equipment. The cash flow statement answers the most important questions of all: How much cash is the company generating (or burning)? When will the company run out of cash?

Why Are Financial Models Important?

Financial models are important for a variety of reasons that fall into two broad categories:

1. Raising money from investors
2. Managing your business

I see many founders get too caught up in the former: raising money is a necessary component of growth but it's only part of the story.

Raising Money from Investors

To raise money from investors, you'll need to provide a financial model. Investors generally ask for a model that provides a 3- to 5-year financial forecast. Don't worry, investors don't expect you to accurately predict financial performance for 5 years. Given how quickly markets change and how many assumptions and unknowns we face in building a forecast, that's simply not a realistic expectation. But the financial model is still a critical element of the investment decision for at least two reasons:

- **Calibrating expectations.** Most venture capital (VC) investors seek companies that can achieve explosive growth. A 5-year financial forecast helps them identify whether expectations are aligned. If your model for a business-to-business (B2B) software-as-a-service (SaaS) company projects $1M in revenue after 5 years, it's probably not a good fit for VCs and it's better for both of you to recognize that up front. Alternatively, if your model projects $100B in revenue in 5 years, your credibility will suffer and investors will question your judgment.

- **Understanding your thought process and assumptions**. Most investors want to understand how you think about scaling the business and whether you're making reasonable assumptions about it will take to achieve significant scale are reasonable. Beyond calibrating expectations, as mentioned earlier, the exact output of the model matters far less than the underlying assumptions.

What Do Investors Want to See?

I'm frequently asked what investors want to see in a financial model. "How much revenue should I show in year five?" Unfortunately, there's no simple answer. Each investor has his or her own expectations and preferences. As mentioned earlier, if your model projects $1M in revenue in 5 years, it's probably not an exciting enough opportunity to attract VCs. Conversely, if it projects $100B in revenue in 5 years, it signals a disconnection from reality.

This may sound like a cop-out answer, but the truth is that the important part is to have conviction around your model. If you're making reasonable assumptions and have a conviction around a business model that can scale quickly with some sort of meaningful competitive advantage, you'll probably find willing investors.

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Managing Your Business

A financial model also allows you to simulate your business and test business decisions before committing time and resources.

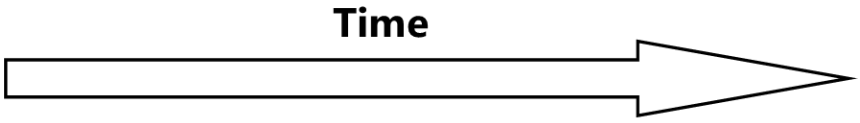
- **Testing ideas.** A model is a quick, low-cost way to iterate on ideas. This allows you test assumptions around business models and revenue streams before committing resources to them. If a model of a certain pricing structure, revenue stream, or customer acquisition strategy doesn't yield output representing a scalable, profitable business, it's better to identify the issue before dedicating time and money to pursuing it.

- **Monitoring cash.** A model helps to forecast your cash position, which is critical to managing your business and making decisions. Your business dies when it runs out of cash. Managing a business without monitoring your cash position is like driving a car blindfolded.

- **Financial planning.** In conjunction with forecasting your cash position, your model tells you whether you need to raise outside investment, how much you need to raise**,** and when you need to raise it.

A Few Caveats

Let's get a few things out of the way before we dive into the substance of this guide. When you first start out, you don't have any historical data to guide your assumptions and your model probably won't be very accurate. That's okay. As the business matures, the model gets to be more accurate because you have more historical data to guide your model, and growth rates begin to slow, which increases predictability. We can view this as a continuum from startup to mature business—from unpredictable to predictable. The goal is to get from unpredictable to predictable as quickly as possible while still growing fast. The ultimate goal is accurately predicting growth so that you can say that an $*X* investment will generate $*Y* in profits.



Startup	**Mature Business**
Simple Business Operations	**Complex Business Operations**
High Growth Rate	**Slower Growth Rate**
Limited Data	**Ample Historical Data**
Untested Assumptions	**Refined Assumptions**
Inaccurate Model	**Accurate Model**

There is no "right" or "best" way to build a financial model. The techniques presented in this book are ones that have worked well for my portfolio companies. I've erred toward techniques that are simple and easy to explain. There are more streamlined, robust, and sophisticated techniques, and I introduce a few of them in the appendices. If you're comfortable with Excel, feel free to model in whichever way you prefer.

I'm not a CPA, so some of my suggestions don't follow generally accepted accounting principles (GAAP). This was a deliberate choice to provide a simple, streamlined methodology to produce a useful financial model. Following all the GAAP protocols introduces unnecessary complications for our present purposes, and most investors don't care as long as the logic is sound.

I've also chosen not to include a template. This will be an unpopular choice, but I have good reasons. Every business is different enough that templates just don't work. I've had too many experiences where companies inadvertently plug

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things into a template that wasn't designed for their business model and get an output with logical flaws they don't even realize are there. Using a bad model is just as bad, if not worse, than having no model at all. It's important to perform the exercise of building a model yourself to understand the underlying structure and drivers of your business. While I'm not providing a template, I am providing a step-by-step guide to build a model and a "read only" example you can explore to see a fully functioning model.

Conclusion

This book offer guidelines on building an effective model for fund-raising and managing your company. The model we'll build throughout this book mimics the three basic financial statements. If you don't have experience with financial statements or need a refresher, read Appendices 1–3 before proceeding. If you're comfortable or at least familiar with financial statements, proceed to Chapter 1, which provides high-level rules for financial models. After understanding the high-level rules, we'll begin building a model in Chapter 2 with a discussion of customer acquisition models.

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Chapter 1

Basic Guidelines for Financial Models

As mentioned in the Introduction, the general structure of your model should mimic the three basic financial statements. If you're unfamiliar with financial statements or need a refresher, read Appendices 1–3 before proceeding.

Before we start building a model, it's important to introduce some guidelines and best practices. Building a model is often more art than science. There's rarely a right or wrong answer. However, I suspect that few investors or CFOs would argue with the following guidelines:

1. Build your model in Excel.
2. Always build a cash flow model.
3. Look ahead 3–5 years (for investors).
4. Build a monthly forecast and create an annual summary.
5. Build from the bottom up.
6. Dynamically code and clearly label assumptions.
7. Document assumptions.
8. Balance detail and simplicity.
9. Focus on expenses.
10. Be pessimistic.
11. Make it user-friendly.

Build Your Model in Excel

If you're sharing your model with investors, build it in Microsoft Excel. This isn't an endorsement of Excel but rather acknowledgment of the fact that it's more ubiquitous than Google Sheets or other modeling tools. Furthermore, an Excel model is a static snapshot. It's difficult and frustrating for investors to evaluate a Google Sheets model when it's being regularly modified.

If you strongly prefer Google Sheets for its collaborative capabilities, by all means build your model in Google Sheets. But if an investor asks for a copy, it's best to export it to Excel before sending it to her or at the very least make a new copy in Excel that you can edit and update. *Note:* If you export to Excel, double-check to ensure that all the functionality transfers properly.

Always Build a Cash Flow Model

At the end of the day, the key is question for an early-stage startup is usually: When does the company run out of cash? I recommend building an income statement, balance sheet, and cash flow statement, but the cash flow statement is by far the most important. We'll explore the importance of cash flow in Chapter 9.

Look Ahead 3–5 Years (For Investors)

If you're sharing a financial model with investors, it's important to provide a 3- to 5-year forecast. Different investors have preferences on the period they want to see. The important point is to project far enough into the future to show a big business with a clear path to profitability.

This can feel like an exercise in futility. Projecting 6 months into the future is hard. Accurately projecting 5 years into the future is basically impossible. But building a multiyear model is more about the process than the outcome. I can assure you that few investors expect a seed-stage company to exactly meet its 5-year forecast; however, it's helpful for understanding your thinking about the growth of the business and for calibrating expectations.

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Build a Monthly Forecast and Create an Annual Summary

When you build your model, it's best to create a monthly forecast for 3–5 years. You can then summarize the monthly forecast on a quarterly or annual basis to fit into a pitch deck, board pack, etc., but when you build it, it's important to have the granularity of a monthly model. Things change quickly at the early stages of building a company, and any time period longer than monthly fails to provide adequate detail.

Build From the Bottom Up

This is a critical point: always build your model from the bottom up. The output of the model shows *what* you expect to happen, but it's also important to show *how* it's going to happen. It should tell a story. In other words, your assumptions around spending on sales and marketing drive revenue growth in the model. We'll revisit this point a lot in the next several chapters and provide examples for different types of business models and show how to represent them.

Before departing this topic, it's helpful to illustrate what *not* to do. Never build a top-down forecast. A top-down forecast says: this is a $5B market, we're going to get 1% market share in 5 years, 1% market share is $50M, so we'll have $10M in revenue in year 1, $20M in revenue in year 2, $30M in revenue in year 3, etc. This grossly understates how hard it is to capture market share (it's *really* hard) and completely ignores *how* your company will generate that kind of growth. Top-down modeling isn't useful to investors and isn't useful for managing your business.

A bottom-up model tells a growth story. Resources are allocated to specific activities that drive growth. We'll spend the rest of this book building bottom-up models. It takes longer to build a bottom-up model, but it's worth the effort.

Dynamically Code and Clearly Label Assumptions

As mentioned earlier, assumptions around key revenue and expense drivers control your model. It's critical to dynamically code and clearly label all of these assumptions. Make it clear which cells in your model are assumptions. For example, I shade all assumption cells in yellow. Every cell in the model that is *not* an assumption should rely on the assumptions so that changes to the assumptions change the output of the model. Figure 1.1 provides an example.

Assumptions		**Month Ending**	**1/31/2019**	**2/28/2019**	**3/31/2019**
Minimum Ad Spending	$1,000	Ad Spending (Greater of Minimum Ad Spend and Target % of Gross Profit)	$1,000	$1,000	$1,000
Target Ad Spend (% of Gross Profit)	15%				
Cost per Click	$2.50	Site Visitors (Ad Spending / Cost per Click)	400	400	400
Visitor to Trial Conversion %	8%	Free Trials (Site Visitors x Visitor to Trial Conversion %)	30	30	30
Trial to Paid Conversion %	50%	New Users (Free Trials x Trial to Paid Conversion %)	15	15	15
		Beginning MRR	$0	$3,000	$6,000
MRR per User	$200	New MRR (New Customers x MRR per Customer)	$3,000	$3,000	$3,000
		Ending MRR (Beginning MRR + New MRR)	$3,000	$6,000	$9,000
Gross Margin %	80%	Gross Profit (Total MRR x Gross Margin %)	$2,400	$4,800	$7,200

Figure 1.1 *Example assumptions dashboard. The cells shaded in yellow are variables that drive the output of the model. All other cells depend on these assumptions. We'll spend more time on this concept and model structure in subsequent chapters.*

Again, it's illustrative to discuss what *not* to do. The worst models have assumptions that are hard-coded within cells in Excel. This forces anyone using the model to complete a scavenger hunt to determine where different assumptions are hidden. It doesn't make the logic explicit to potential investors, and when assumptions change, as they inevitably will, it's hard to remember which cells must be updated.

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Investors want to stress test your model and experiment with different scenarios and assumptions. Don't make it difficult for them. They see hundreds—often thousands—of investment opportunities every year. Don't do anything to make it harder for them to say "yes" to yours.

I strongly recommend building a dashboard where all assumptions are clearly laid out and your logic is explicit. Shade the assumptions in a different color so that it's easy to tell which variables can be changed. *All* other cells in the model should depend on the assumptions.

Document Assumptions

It's also helpful to document the sources of all your assumptions. If you've spoken to customers, read market research reports, have past experience in the market, etc., document your experience. It helps to make your logic explicit and reminds you of how you determined specific assumptions. Figure 1.2 provides an example.

Assumptions		**Source**
Minimum Ad Spending	$1,000	
Target Ad Spend (% of Gross Profit)	15%	
Cost per Click	$2.50	Google AdWords pricing
Visitor to Trial Conversion %	8%	SaaS metrics survey
Trial to Paid Conversion %	50%	SaaS metrics survey
MRR per User	$200	Estimated pricing
Gross Margin %	80%	

Figure 1.2 *Example assumptions dashboard with sources of assumptions documented.*

Balance Detail and Simplicity

Choosing the proper degree of detail to represent in the model is important. Every business is different, and it's difficult to prescribe the "right" amount of detail in any universal sense. To understand the boundaries, it's helpful to consider two extreme cases of the *wrong* degree of detail.

Too Much Detail

Too much detail makes it difficult to discern key drivers of the business. I once reviewed a 5-year (i.e., 60-month) forecast that featured 300+ rows of individual expense projections. The model estimated everything from salaries and bonuses to utility bills based on kilowatt-hours usage and rates and exact Amazon Web Services (AWS) usage for uploads, downloads, storage, etc. Amid all of this detail, this particular model overlooked the fact that the business generated most of its revenue seasonally and would face serious cash flow issues, which would have killed the company in less than a year.

The more complicated the model, the more assumptions, the greater room there is for error.

Not Enough Detail

While it's important to avoid getting into the weeds and providing extraneous detail on items that are impossible to forecast, it's equally bad to miss important details. For instance, not listing specific hires for at least the first year or two is a big mistake.

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I heard a cautionary tale about a startup that had raised millions in VC money that suddenly shut down without warning. The company paid its employees biweekly (i.e., 26 times per year), but its financial model assumed that it paid employees twice per month (i.e., 24 times per year). That is, the company actually paid employees two additional paychecks not captured in its models. One of those extra pay periods rolled around, and the company didn't have enough cash to cover payroll—and subsequently imploded.

Some details, such as how much and how often you pay your employees, are critical. Others, such as the price per kilowatt-hour paid to your electric utility company 5 years from now, are almost certainly not worth speculating about. It's your job to figure out the handful of most critical revenue and expense drivers and focus your energy there. The next several chapters provide guidelines and suggestions.

Focus on Expenses

A revenue forecast is important to illustrate that you understand how to scale the business and to calibrate expectations with investors, but it's almost certainly inaccurate. I have yet to see a startup that accurately projected its first-year revenue. There is minimal evidence on which to base the revenue forecast. For this reason, I recommend focusing most of your energy on expenses. There are a couple of good reasons for this:

- Expenses are more predictable. It's easy to research prices or solicit quotes for different software packages, service providers, equipment, etc.

- You have control over expenses. You may not have control over the dollar amount of a specific expense, but you choose whether to incur it. Revenue, by contrast, is generally out of your control; you can't make the customers buy.

Be Pessimistic

Every entrepreneur struggles with this. If you're starting a business with a vision to change the world, you're an optimist. Unfortunately, starting up is hard, and more often than not revenue fails to materialize as fast as we expect. Things cost more and take more time. Try to account for this and build in contingencies. Be conservative. I say "be pessimistic" in the hope that your pessimism will approach realism.

Given the inherent uncertainty, it can also be helpful to test several different scenarios for your model ranging from pessimistic to optimistic, but always base your fund-raising on a pessimistic case.

Make It User-Friendly

You wouldn't build a product with a terrible user interface (UI), and you should heed the same advice with your model. A financial model likely has at least two groups of users: internal users—you and your management team—and external users—potential investors. For both sets of users, it's beneficial to make your model as self-explanatory and user-friendly as possible.

Freeze Panes

Your model likely will have more rows and columns than can fit on the screen at a given time. It's helpful to freeze the first row and first column of your model so that anyone using the model can see the row and column headers when they're navigating the model.

Click on the first cell you *don't* want to freeze. In Excel, click "View." Then click "Freeze Panes." Finally, select "Freeze Panes." Figure 1.3 shows a screenshot of this procedure.

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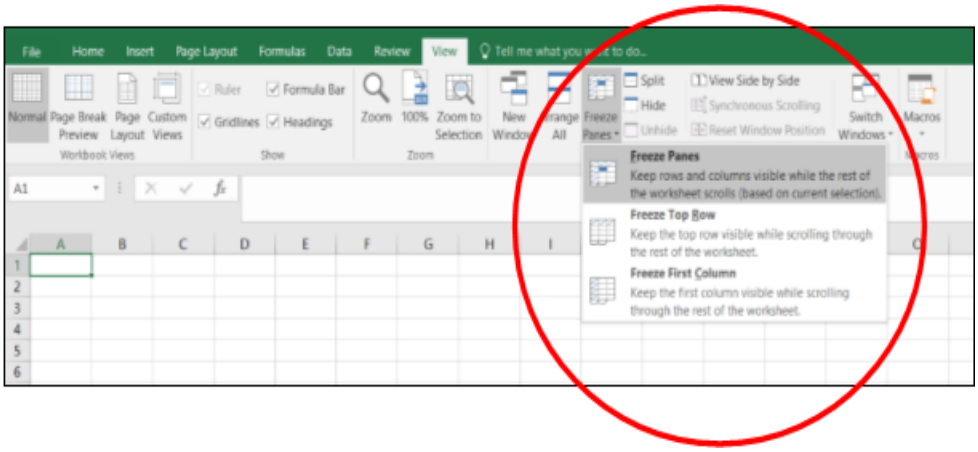

Figure 1.3 *Freezing panes in Excel.*

Never Link to External Sources

It's never a good idea to link to outside files. Capture your entire model in a single Excel file. Investors are busy and don't want to have to follow up to chase down additional files or links that didn't get sent along with the core model. Remember, never do anything to make it harder for investors to say "yes."

Add Descriptive Names to Tabs

Every tab in your Excel file should have a descriptive name to make it easy to navigate the model. It can be helpful to build a unique tab that contains specific assumptions, as we'll show in coming chapters.

Label Columns with Calendar Months

Always label your columns with actual calendar months (e.g., "January 2019") instead of generic index numbers (e.g., "Month 20"). It's important to provide a frame of reference for investors and others who are using your model.

Recap and Conclusion

Before diving into building a model, it's worth recapping what we just covered in this chapter.

1. Build your model in Excel.
2. Always build a cash flow model.
3. Look ahead 3–5 years (for investors).
4. Build a monthly forecast and create an annual summary.
5. Build from the bottom up.
6. Dynamically code and clearly label assumptions.
7. Document assumptions.
8. Balance detail and simplicity.
9. Focus on expense.
10. Be pessimistic.
11. Make it user-friendly.

Now that we've covered general guidelines to follow, it's time to start building. Our ultimate goal is a cash flow statement because cash flow is the most important thing to model and track. However, building the cash flow model directly can be complicated, and it's often easiest to build it indirectly by combining income statement and balance sheet items.

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The income statement is the foundation of our model. The next five chapters introduce components of the income statement: revenue, cost of goods sold (COGS), personnel expenses, other selling general and administrative expenses (SG&A), and nonoperating expenses. Each chapter provides detailed examples to help you build your model. We begin with a discussion of customer acquisition and revenue in Chapter 2.

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Chapter 2

Revenue and Customer Acquisition Models

This is the first of five chapters that provide step-by-step instructions on how to build an income statement model. If you're unfamiliar with income statements, please read Appendix 1. A generic income statement takes the form in Figure 2.1.

Income Statement	
Year	**2019**
Revenue	$761,496
COGS	($93,793)
Gross Profit	$667,703
Gross Margin %	88%
SG&A Expenses	($1,302,702)
Operating Income	($681,700)
Interest Expense	($30,932)
Income Taxes	$0
Depreciation Expense	($4,204)
Amortization Expense	$0
Net Income	($716,835)

Figure 2.1 *Generic income statement.*

In this chapter, we're focused on the revenue line of the income statement.

Revenue = Units Sold × Price per Unit

The company's customer acquisition model drives the number of units sold, and its pricing model dictates revenue. The customer acquisition model also drives the overall structure of the financial model, so that's where we'll begin.

Customer Acquisition Models

In order to generate revenue, you have to acquire customers. There are many different customer acquisition models, but you can visualize each of them as a funnel. Every customer acquisition funnel begins with potential customers on top and ends with paying customers on the bottom, with a variety of intermediate steps in between. Each intermediate step represents a step of the customer acquisition process where a potential customer can be lost. Intermediate steps are things such as sales calls, product demos, site visits, proposals issued, etc. Figure 2.2 provides an example.

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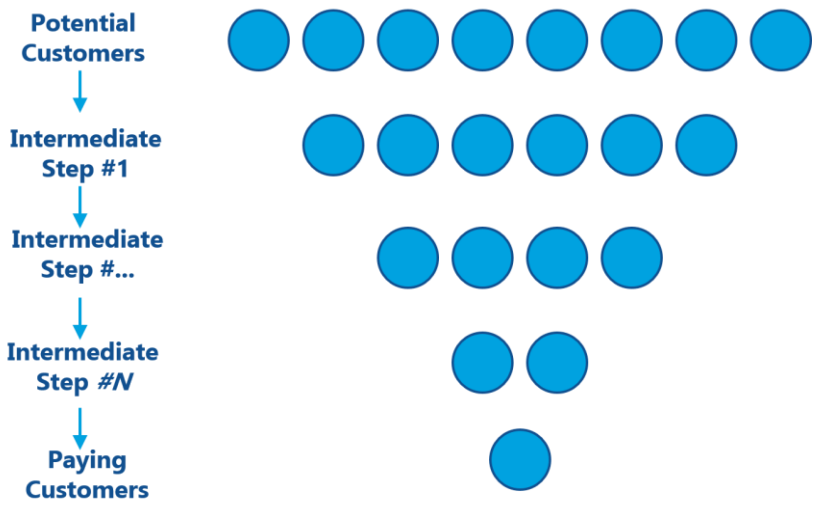

Figure 2.2 *Generic form of a customer acquisition funnel.*

Analyzing every possible type of customer acquisition model is beyond the scope of this book, but we'll consider three primary models that cover most businesses and demonstrate the concept:

- Direct sales
- Channel sales
- Inbound/self-serve

We'll explore each of these models in detail next.

Direct Sales

In a direct sales model, the company sells directly to customers via a direct sales force. Sales reps call on customers to sell products and services. Sales reps are expensive, so this model is most effective for B2B sales with large transaction values. The funnel looks something like Figure 2.3.

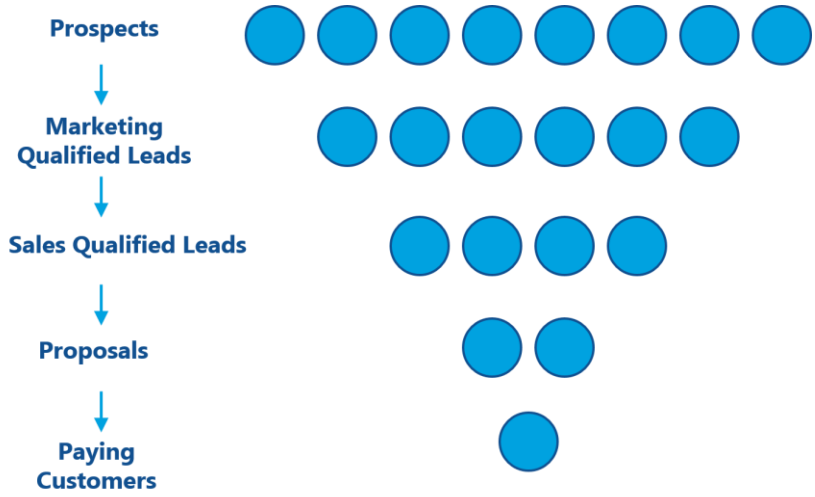

Figure 2.3 *Generic customer acquisition funnel for direct sales.*

As your business matures, your model will depend on detailed estimates of each stage of the funnel and will include information on the prospects that you're working with. Appendix 4 on detailed modeling techniques provides an

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example. At the beginning, it's easiest to keep it simple and assume that the size and effectiveness of the sales team drive customer acquisition. The primary variables to consider are

- Number of sales reps
- Effectiveness of sales reps (How many units they can sell in a given period?)

I recommend building a dashboard of sales hires including the proposed date of hire. Figure 2.4 provides an example of how to model this in Excel. The cells shaded in yellow are variables. The example that follows assumes that each sales rep can sell 2 units of product in a given month.

Title	Start Date
Sales Rep #1	30-Sep-2018
Sales Rep #2	15-Apr-2019
Sales Rep #3	15-Jul-2019

		Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019	30-Apr-2019
Assumptions		Sales Headcount (If Hire Date < Month Ending Date)	1	1	1	2
Units sold per Rep	2	Units Sold (Sales Headcount x Units Sold per Rep)	2	2	2	4

Figure 2.4 *Simple direct sales customer acquisition model.*

If we increase the number of sales reps or the number of units sold per rep, the number of units sold in any given month increases.

This simple model fails to address the fact that new sales reps often require time to learn before they are as effective as established reps. In other words, rather than selling 2 units the first month, a new rep might sell 0 units the first month, 1 unit the second month, and 2 units the third month after learning the ropes.

The simplest, and most conservative, way to model is to assume that sales reps generate 0 sales prior to a specified time. For instance, if sales reps close two new deals per month, but it takes 3 months to train a new sales rep, the new rep generates 0 sales in the first 3 months and 2 sales per month starting in month 4. Figure 2.5 illustrates this concept in Excel.

Title	Start Date
Sales Rep #1	30-Sep-2018
Sales Rep #2	15-Apr-2019
Sales Rep #3	15-Jul-2019

		Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019	30-Apr-2019
Assumptions		Sales Headcount (If Hire Date < Month Ending Date)	1	1	1	2
Time to Productivity (Days)	90	Productive Reps (Hire Date < Month Ending Date - Time to Productivity)	1	1	1	1
Units sold per Productive Rep	2	Units Sold (Productive Reps x Units Sold per Productive Rep)	2	2	2	2

Figure 2.5 *Direct sales customer acquisition model assuming learning period for new sales personnel.*

We model this using Excel's "countif" function.

Productive Reps = countif(List of Hire Dates, "<="& Model Date – Time to Productivity)

Appendix 4 introduces several additional ways to model sales efficiency that are more complex and less conservative.

Note: Another weakness with this model is that it fails to address the length of the sales cycle and assumes that sales reps close one or more deals each month. When you have more information, you can produce an explicit sales funnel as shown in Appendix 4. At intermediate stages, you can add additional rows to your model to represent intermediate steps in the sales process.

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Channel Sales

Channel sales entail selling products or services through a third party so that your business is one step (or more) removed from the end user. Retail sales, resellers, distributors, and partnerships are all examples of channel strategies. In some businesses—for example, alcohol sales—distribution relationships are legally required. In others, they can be a valuable tool to increase revenue without incurring the expense of building a large sales team. This strategy tends to work best for midpriced items that don't require a highly customized or consultative sales process.

The actual funnel in this case is complex. The business development (biz dev) team establishes channel partner relationships, and each channel partner has its own sales funnel. We'll simplify and assume that the logic of the model is similar to the direct sales model above, but we introduce an additional layer. The key revenue drivers are

- Number of business development reps
- Effectiveness of business development reps (How many channel relationships can they close in a given period?)
- Cumulative number of channel partners
- Effectiveness of channel partners (How many units can they sell in a given period?)

Figure 2.6 shows an example. The model assumes that each business development rep can close one new channel partner relationship per month and that each channel partner can sell 20 units of product per month.

Title	Start Date
Biz Dev #1	30-Sep-2018
Biz Dev #2	15-Apr-2019
Biz Dev #3	15-Jul-2019

Assumptions	
Channel Partners per Rep	1
Units Sold per Partner	20

Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
Biz Dev Headcount (If Hire Date < Month Ending Date)	1	1	1
New Channel Partners (Biz Dev Headcount x Channel Partners per Rep)	1	1	1
Total Channel Partners (Total Channel Partners + New Channel Partners)	1	2	3
Units Sold (Total Channel Partners x Units Sold per Partner)	20	40	60

Figure 2.6 *Simple channel sales customer acquisition model.*

As we did for direct sales, it's prudent to assume that new business development reps and channel partners require time to reach full efficiency. Again, the simplest and most conservative approach is to assume that they generate zero activity within the first several months, as shown in Figure 2.7. The technique is the same as that introduced earlier for direct sales. You can find additional techniques in Appendix 4.

Title	Hire Date
Biz Dev #1	30-Sep-2018
Biz Dev #2	15-Apr-2019
Biz Dev #3	15-Jul-2019

Assumptions	
Time to Productivity (Days)	60
Channel Partners per Productive Rep	1
Time to Productivity (Days)	90
Units Sold per Productive Channel	20
Price	$150

Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
Biz Dev Headcount (If Hire Date < Month Ending Date)	1	1	1
Productive Reps (If Hire Date < Month Ending Date - Time to Productivity)	1	1	1
New Channel Partners (Productive Reps x Channel Partners per Productive Rep)	1	1	1
Total Channel Partners (Total Channel Partners + New Channel Partners)	1	2	3
Productive Channels (Sum of New Channels < Month Ending Date - Time to Productivity)	0	0	0
Units Sold (Productive Channels x Units Sold per Productive Channel)	0	0	0
Revenue (Units Sold x Price)	$0	$0	$0

Figure 2.7 *Channel sales customer acquisition model with ramp time for new business development reps and channel partners.*

Inbound/Self-Serve

A pure inbound marketing strategy focuses on driving traffic to a website where customers serve themselves. This strategy works best for low-cost, low-risk products such as consumer products or freemium SaaS subscriptions. Paid

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advertisements, social media, blog posts, and word of mouth drive users to the site, and some subset of those visitors makes a purchase. Figure 2.8 shows an example sales funnel.

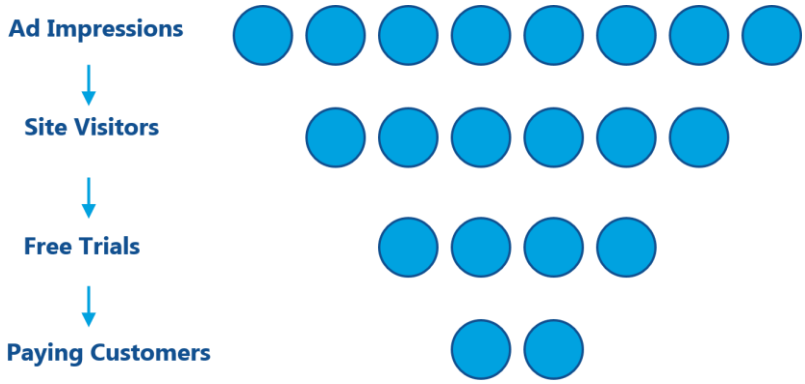

Figure 2.8 *Generic sales funnel for inbound/self-serve customer acquisition.*

In an inbound model, several factors drive customer acquisition:

- Visitors to site (function of amount spent on ads and cost per click and/or referrals from current user base)
- Conversion rate from site visitors to free trials (if applicable)
- Conversion rate from site visitor or free trial to paying customer

Figure 2.9 shows an example model. This example assumes that we spend $2,500 per month on advertising and pay $0.50 per click for ads. This drives 5,000 visitors ($2,500/$0.50) to the site each month. If 5% of those 5,000 visitors sign up for a free trial and 50% of the free-trial customers convert to paying customers, we sell 125 new units (5,000 × 0.05 × 0.50) each month.

		Month Ending	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**	**30-Apr-2019**	**31-May-2019**	**30-Jun-2019**
		Advertising Spend	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500
Cost per Click	$0.50	Cost per Click	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50
		Visitors (Ad Spend / Cost per Click)	5,000	5,000	5,000	5,000	5,000	5,000
Visitor to Trial	5%	Trials (Visitors x Conversion %)	250	250	250	250	250	250
Trial to Paid	50%	Units Sold (Trials x Conversion %)	125	125	125	125	125	125

Figure 2.9 *Simple inbound customer acquisition model.*

Revenue Models

We discussed customer acquisition, which is only half the equation. We also need to understand how the business generates revenue from those customers. I use the term *revenue model* to describe how the company charges its customers. We'll discuss two types of revenue models in this book:

- *Transactional* (i.e., single purchases)
- *Recurring* (i.e., subscription)

Transactional

A *transactional* revenue model means that each sale to customers is a single, independent transaction. There is no commitment from the customer to make subsequent purchases. Restaurants, retail stores, car dealerships, real estate brokerages, and equipment manufacturers are all examples of businesses with transactional business models.

Revenue = Units Sold × Price

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Using the example for direct sales from Figure 2.5 and assuming a price of $15,000 per unit, we see the revenue model in Figure 2.10.

Title	Start Date
Sales Rep #1	30-Sep-2018
Sales Rep #2	15-Apr-2019
Sales Rep #3	15-Jul-2019

Assumptions	
Time to Productivity (Days)	90
Units sold per Productive Rep	2
Price	$15,000

Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
Sales Headcount (If Hire Date < Month Ending Date)	1	1	1
Productive Reps (Hire Date < Month Ending Date - Time to Productivity)	1	1	1
Units Sold (Productive Reps x Units Sold per Productive Rep)	2	2	2
Revenue (Units Sold x Price)	$30,000	$30,000	$30,000

Figure 2.10 *Example revenue model for direct sales with a transactional business model.*

Recurring

Recurring revenue business models, also known as *subscription* business models, collect regular (monthly, quarterly, or annual) subscription revenue from customers in exchange for ongoing service, support, or products. Netflix, Amazon Prime, magazine subscriptions, internet access, and cell phone plans are examples of businesses with recurring revenue business models. All things being equal, recurring revenue is preferable to transactional revenue because it's more predictable and predictability is good. But it's not a fit for every business.

With recurring revenue, the revenue generated each month (abbreviated as MRR for "monthly recurring revenue") depends not only on the new subscribers acquired that month but also on the *cumulative* number of subscribers.

Revenue = Total Subscribers × Price = (Subscribers at Beginning of Period + New Subscribers) × Price

Figure 2.11 provides an example of this revenue model, assuming a price of $2,250 per month.

Title	Start Date
Sales Rep #1	30-Sep-2018
Sales Rep #2	15-Apr-2019
Sales Rep #3	15-Jul-2019

Assumptions	
Time to Productivity (Days)	90
Units sold per Productive Rep	2
Price per Month	$2,250

Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
Sales Headcount (If Hire Date < Month Ending Date)	1	1	1
Productive Reps (Hire Date < Month Ending Date - Time to Productivity)	1	1	1
Units Sold (Productive Reps x Units Sold per Productive Rep)	2	2	2
Beginning MRR	$0	$2,000	$4,000
New MRR	$4,500	$4,500	$4,500
Ending MRR	$2,000	$4,000	$6,000

Figure 2.11 *Example revenue model for direct sales with a subscription business model.*

The ending MRR for one month becomes the beginning MRR for the next month.

We're missing a critical detail: customers can cancel their subscriptions. In any given month, businesses experience *churn,* which reduces total MRR. I recommend calculating churn as a percentage of MRR at the beginning of the month.

Churn = MRR Lost Due to Cancellations/Beginning MRR

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It's also possible to represent churn as a percentage of the number of customers at the beginning of the month, but this is less informative, particularly for a business with multiple pricing tiers (i.e., different prices for different sets of features). The following example illustrates why:

> *Suppose that we sell a basic subscription for $10/month and a premium subscription for $500/month. At the beginning of January, we have 50 premium subscribers and 50 basic subscribers. Thus we're generating $25,500 of MRR ($10 × 50 + $500 × 50). If we experience 2% customer churn, we know that we lost 2 customers (100 × 0.02), but we must know which customers churned to understand the financial impact. If the lost customers are basic subscribers, we lose $20 of MRR ($10 × 2) which equates to 0.08% MRR churn ($20/$25,500). If the lost customers are premium customers, we lose $1,000 in MRR ($500 × 2), equating 3.92% MRR churn ($1,000/$25,500). The financial impact of losing a premium customer is 50 times that of losing a basic customer.*

A high churn rate is a barrier to growth. Even 2% monthly churn can have dramatic effects. This means that you retain 98% of your revenue each month. Over the course of a year, assuming no new sales, you'd only have 78.5% of the revenue you started with (0.98^{12}). You'd have to replace almost 22% of your revenue each year just to stay in the same place. Typical churn rates vary significantly from industry to industry, so it's helpful to benchmark your churn against competitors if possible. If your churn rate is too high, it's important to interview the churned customers to understand *why* they left. It's usually a combination of

- Bad product (objectively or relative to competitors)
- High price (objectively or relative to competitors)
- Poor customer service

Figure 2.12 introduces churn into the model from Figure 2.10, assuming 1.5% monthly churn.

Title	Start Date
Sales Rep #1	30-Sep-2018
Sales Rep #2	15-Apr-2019
Sales Rep #3	15-Jul-2019

Assumptions	
Time to Productivity (Days)	90
Units sold per Productive Rep	2
Price per Month	$2,250
Monthly Churn	2.0%

Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
Sales Headcount (If Hire Date < Month Ending Date)	1	1	1
Productive Reps (Hire Date < Month Ending Date - Time to Productivity)	1	1	1
Units Sold (Productive Reps x Units Sold per Productive Rep)	2	2	2
Beginning MRR	$0	$4,500	$8,910
New MRR	$4,500	$4,500	$4,500
Churn MRR (Monthly Churn x Beginning MRR)	$0	($90)	($178)
Ending MRR	$4,500	$8,910	$13,232

Figure 2.12 *Example revenue model for direct sales with a subscription business model, including churn.*

A Note on Market Size

You may have noticed that I completely ignored market size in the discussion of revenue models. That was a deliberate choice. Market size doesn't add much value to a seed-stage financial model. In my experience, market size is only relevant to illustrate a large opportunity and to serve as a sanity check on projected revenue. In other words, if projected revenue exceeds the current market size or reaches an unrealistically high percentage of market size, it's probably time to revisit some of the assumptions.

As stated in Chapter 1, building a top-down forecast that assumes that your company will achieve *X*% market share by year *Y* is misguided and uninformative. I don't care how big the market is; it doesn't make selling your product and scaling a business any easier.

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Conclusion

We've covered three customer acquisition models and two revenue models, which yields six possible permutations. Many companies employ more than one model or a hybrid approach, so you may have to combine several of these models. However, the guidelines in this chapter should provide a solid foundation.

Now that we've covered customer acquisition models—which dictate the overall structure of the financial model—it's time to dig into the other half of the income statement: expenses. As mentioned in Chapter 1, it's best to focus much of our energy on expenses because they're more predictable and controllable than revenue. The types of expenses differ slightly from company to company, but the techniques for modeling expenses are universal. We'll begin with cost of goods sold (COGS) in Chapter 3.

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Chapter 3

Cost of Goods Sold (COGS)

After building your customer acquisition and revenue model, it's time to focus on cost of goods sold (COGS). Figure 3.1 highlights the COGS section of a typical income statement.

Income Statement	
Year	**2019**
Revenue	$761,496
COGS	($93,793)
Gross Profit	$667,703
Gross Margin %	88%
SG&A Expenses	($1,302,702)
Operating Income	($681,700)
Interest Expense	($30,932)
Income Taxes	$0
Depreciation Expense	($4,204)
Amortization Expense	$0
Net Income	($716,835)

Figure 3.1 *Generic income statement.*

As discussed in Chapter 1, COGS are the expenses directly related to producing your product or service. I find it helpful to think of COGS as the critical expenses without which you couldn't deliver your product (i.e., materials, labor, etc.).

Understanding COGS is critical to understanding your *unit economics* (i.e., the profit you generate per unit sold). If your COGS are low relative to revenue, you generate substantial profit from each unit that can pay overhead expenses (e.g., advertising, salaries, etc.) and build additional units. If your COGS are high relative to revenue, you have far less flexibility. In an extreme case, if your COGS exceed revenue, you're losing money on every unit you sell and don't have a sustainable business.

The difference between revenue and COGS is *gross profit*:

Gross Profit = Revenue – COGS

It is also helpful to express gross profit in terms of gross margin %:

Gross Margin % = (Revenue – COGS)/Revenue

Here is a simple example:

Company A and Company B sell identical products. Both sell their product for $100. Company A has COGS of $10 (i.e., 90% gross margin %), and Company B has COGS of $50 (i.e., 50% gross margin %). Thus Company A can produce 10 new units for every unit sold ($100 price/$10 COGS). Company B can only produce two new units for every unit sold ($100 price/$50 COGS). Company A has much more money available to produce

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> *additional units, pay for advertising, hire additional personnel, etc. and can grow faster without outside investment.*

As mentioned earlier, it's helpful to think of COGS as the costs that are absolutely necessary to serve customers. For a hardware business, this means the cost of manufacturing your product. For a software business, it means the cost of hosting your site and supporting customers. In general, your total COGS expense scales as a function of the number of units (or subscriptions) sold, but gross margin improves with volume.

The expenses under COGS vary from business to business but typically include some subset of the following:

- Hosting fees
- Customer support/customer success salaries and overhead
- Raw materials
- Labor for manufacturing and assembly

We'll explore each in detail in the following section.

Elements of COGS for Software Companies

COGS for software companies consist primarily of hosting and customer support/customer success expenses. Gross margins for software companies vary from company to company, but I recommend targeting at least 80%.

Hosting

Software businesses allocate hosting fees and other site-related expenses to COGS. You can't provide your product without hosting it. Amazon (AWS) and other hosting providers supply cost estimation tools. There is a typically a fixed component and a variable component that scales with usage, so the gross margins for software companies often increase over time.

It can be challenging to estimate hosting fees on a per-unit or per-subscription basis. However, it's possible to estimate based on current costs and usage and adjust as the business scales.

> *Company A provides a SaaS solution. It currently serves 4,000 users with hosting fees of approximately $12,000/month. Analysis shows that $10,000 is fixed, and the other $2,000 of the hosting expense scales relative to usage. Thus Company A estimates a $0.50 per user variable expense ($2,000 variable expense/4,000 users).*
>
> *When Company A serves 10,000 users, its COGS will be approximately $15,000 ($10,000 fixed cost + $0.50 variable cost × 10,000 users), equating to $1.50 per user ($15,000/10,000). When Company A serves 100,000 users, its COGS will be approximately $60,000/month ($10,000 fixed cost + $0.50 variable cost × 100,000 users) equating to $0.60 per user ($60,000/100,000). If the company charges customers $3.00 per customer per month for a subscription, its gross margin improves from 50% [($3.00 – $1.50)/$3.00] to 80% [($3.00 – $0.60)/$3.00] as the company scales (ignoring customer support/customer success expenses).*

Customer Support/Customer Success

On-boarding and supporting customers are often integral parts of the product experience. Salaries, benefits, etc. for customer support/customer success reps are also allocated to COGS for many software businesses.

As a first approximation, estimate how many customers a single rep can support, and scale the customer support team as a function of customers. Alternatively, estimate an amount of *revenue* supported by each customer support rep.

You can find salary estimates on websites such as Glassdoor, AngelList, and Comparably.

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> *Company A estimates that each of its customer support reps can service 1,000 customers. As a rough estimate, when the company has fewer than 1,000 customers, it will employ one customer support rep. When it has greater than 1,000 but fewer than 2,000 customers, it will employ two customer support reps. When it has greater than 2,000 but fewer than 3,000 customers, it will employ three customer support reps, and so on.*

Don't Forget Customer Support

A common financial modeling mistake is ignoring or underestimating customer support/customer success expenses. Every company needs to have some degree of customer support, and it can represent a major expense.

Elements of COGS for Hardware Companies

COGS are more complicated for hardware companies. Building a physical product requires raw materials, manufacturing, and assembly. The gross margins for hardware products can vary dramatically, but I suggest targeting at least 50%.

Raw Materials

Building a physical product requires raw materials. The cost of materials—including shipping to your location—is allocated to COGS. If you're already manufacturing a product, you likely know these costs. If you're just getting started, you can get quotes from suppliers to estimate your bill of materials (BOM).

Manufacturing and Assembly (Labor)

Converting raw materials to a finished product requires labor. The labor expenses associated with manufacturing and assembly must be included in COGS. This includes salaries, benefits, and allocation of other overhead expenses.

If you use contract manufacturers, you have an invoice that tells you exactly how much you pay on a per-unit basis. If you haven't started manufacturing yet but plan to use contract manufacturers, estimate these expenses by getting quotes from manufacturers.

Allocating costs is more complex if you do the manufacturing and assembly in-house. In this case, it's necessary to estimate the value of the labor expended to produce and assemble your product. This means allocating the salaries, benefits, and overhead expenses associated with production workers based on the amount of time they spent manufacturing the product. The following example illustrates the idea.

> *Company A employs two full-time production employees dedicated to manufacturing and assembling its product. Each works 40 hours per week at a rate of $20 per hour. Benefits and overhead expenses are estimated at $100 per week per employee. Collectively, these two employees produce 100 units of product per week. Thus the labor contribution to COGS is $18.00 per unit (2 employees × 40 hours per week × $20 per hour + 2 employees × $100 per week per employee)/100 units per week.*

These estimates can become complex when you don't have a dedicated production staff and allocate expenses based on the percentage of time individual employees spend on manufacturing and assembly. However, it's important to expend the effort to understand your COGS.

Even if you're just a team of founders that aren't taking salaries yet, you should estimate potential COGS at market rates. While the labor component of COGS is currently zero, that won't always be the case. You can get into trouble building a business model around artificially inflated margins.

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How to Model

Now that we know the elements of COGS, we can add them to our model. I recommended building a separate tab in your model to estimate your COGS on a per-unit basis and then applying this amount as an input to the unit forecast we built in Chapter 2. Below are a few examples to illustrate the concept.

Software Product

In this example, we estimate hosting fees on a per-customer basis, and we estimate customer support expenses based on the number of customers a single customer support rep can serve. Figure 3.2 shows an example of the input dashboard.

Software Product (With Customer Support)		
Expense	**Amount**	**Source**
Hosting Costs (per Customer per Month)	$100.00	Hosting provider cost estimates
Customer Support Salary (Annual)	$40,000	Estimated from Glassdoor & AngelList
Monthly Customer Support Salary	$3,333	Annual Salary /12
Customers per Customer Support Rep	25	Estimated
Customer Success Costs (per Customer per Month)	$133.33	Monthly Customer Support Salary / Customers per Customer Suport Rep
Total COGS (per Customer per Month)	$233.33	Hosting Costs + Customer Success Costs

Figure 3.2 *Example of COGS dashboard for a software company.*

Note that we have to add customer support personnel incrementally. A simple way to model this is to make assumptions around the number of customers each rep can support. When the total customer count exceeds that value, add one more rep. A simple formula for modeling is

Customer Support Headcount = roundup((Ending MRR/Price)/Customers per Customer Support Rep, 0)

We can layer the estimated COGS into the revenue model we built in Chapter 2. As you can see in Figure 3.3, the gross margins fluctuate in this model.

		Month Ending	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
Income Statement Assumptions		Sales Headcount (If Start Date < Month Ending Date) See Hiring Plan Tab	1	1	1
Time to Productivity (Days)	90	Productive Reps (Start Date < Month Ending Date - Time to Productivity)	1	1	1
Units sold per Productive Rep	2	Units Sold (Productive Reps x Units Sold per Productive Rep)	2	2	2
Price per Month	$2,250	New MRR (Units Sold x Price)	$4,500	$4,500	$4,500
		Beginning MRR	$0	$4,500	$8,910
		New MRR	$4,500	$4,500	$4,500
Monthly Churn	2.0%	Churn MRR (Monthly Churn x Beginning MRR)	$0	($90)	($178)
		Ending MRR	$4,500	$8,910	$13,232
		Revenue	$4,500	$8,910	$13,232
Hosting Expense per User	$100.00	Hosting Expense (Hosting Expense per User x Users)	($200)	($396)	($588)
Customers per Customer Support Rep	25	Customer Support Headcount	1	1	1
Customer Support Salary (Monthly)	$3,333.33	Customer Support Expense (Customer Support Headcount x Customer Support Salary)	($3,333)	($3,333)	($3,333)
		Total COGS (Hosting Expense + Customer Support Expense)	($3,533)	($3,729)	($3,921)
		Gross Profit (Revenue - Total COGS)	$967	$5,181	$9,310
		Gross Margin % (Gross Profit / Revenue)	21.5%	58.1%	70.4%

Figure 3.3 *Example of a units-level forecast with COGS for a software company with variable customer support expenses.*

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They decrease when a new customer support rep is hired and increase as that rep is used closer to full capacity. In this example, a second customer support rep is hired in November 2019, as shown in Figure 3.4.

		Month Ending	31-Oct-2019	30-Nov-2019	31-Dec-2019
Income Statement Assumptions		Sales Headcount (If Start Date < Month Ending Date) See Hiring Plan Tab	3	3	3
Time to Productivity (Days)	90	Productive Reps (Start Date < Month Ending Date - Time to Productivity)	3	3	3
Units sold per Productive Rep	1	Units Sold (Productive Reps x Units Sold per Productive Rep)	6	6	6
Price per Month	$2,250	New MRR (Units Sold x Price)	$13,500	$13,500	$13,500
		Beginning MRR	$50,639	$63,126	$75,363
		New MRR	$13,500	$13,500	$13,500
Monthly Churn	2.0%	Churn MRR (Monthly Churn x Beginning MRR)	($1,013)	($1,263)	($1,507)
		Ending MRR	$63,126	$75,363	$87,356
		Revenue	$63,126	$75,363	$87,356
Hosting Expense per User	$100.00	Hosting Expense (Hosting Expense per User x Users)	($2,806)	($3,349)	($3,882)
Customers per Customer Support Rep	25	Customer Support Headcount	2	2	2
Customer Support Salary (Monthly)	$3,333.33	Customer Support Expense (Customer Support Headcount x Customer Support Salary)	($6,667)	($6,667)	($6,667)
		Total COGS (Hosting Expense + Customer Support Expense)	($9,472)	($10,016)	($10,549)
		Gross Profit (Revenue - Total COGS)	$53,654	$65,347	$76,807
		Gross Margin % (Gross Profit / Revenue)	85.0%	86.7%	87.9%

Figure 3.4 *Example of a units-level forecast with COGS for a software company with variable customer support expenses, showing hiring of second customer support rep in November 2019*

Hardware Product

Figure 3.5 provides an example COGS dashboard for a hardware company.

Hardware Product		
Expense	**Amount**	**Source**
Bill of Materials (per Unit)	$4,000	Supplier quotes
Delivery (per Unit)	$500	Supplier quotes
Labor per Unit (Hours)	20	Estimated production & assembly time
Labor Rate (per Hour)	$25	Hourly wage
Labor Cost	$500	Labor Rate x Hours
Total COGS (per Unit)	$5,000	Bill of Materials + Delivery + Labor Cost

Figure 3.5 *Example of a COGS dashboard for a hardware company.*

We use the value estimated per unit value for COGS as an input to the units-level revenue model we developed in Chapter 2, as shown in Figure 3.6.

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Title	Hire Date
Sales Rep #1	30-Sep-2018
Sales Rep #2	15-Apr-2019
Sales Rep #3	15-Jul-2019

		Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
Assumptions		Sales Headcount (If Hire Date < Month Ending Date)	1	1	1
Time to Productivity (Days)	90	Productive Reps (Hire Date < Month Ending Date - Time to Productivity)	1	1	1
Units sold per Productive Rep	2	Units Sold (Productive Reps x Units Sold per Productive Rep)	2	2	2
Price per Unit	$15,000	Revenue (Units Sold x Price)	$30,000	$30,000	$30,000
COGS per Unit	$5,000	COGS (Units Sold x COGS per Unit)	($10,000)	($10,000)	($10,000)
		Gross Profit (Revenue - COGS)	$20,000	$20,000	$20,000
		Gross Margin % (Gross Profit / Revenue)	66.7%	66.7%	66.7%

Figure 3.6 *Example of a unit-level forecast with COGS.*

Conclusion

In many businesses, COGS change over time. For instance, when manufacturing a physical product, production costs on a per-unit basis decrease with volume. If you have clear estimates of these reductions, perhaps tied to unit volume, it's helpful to build them into your COGS model. We cover this topic in Appendix 4 on advanced modeling techniques.

However, it's often difficult to forecast those reductions. In my experience, it's better for seed-stage companies to build forecasts based on a slightly inflated value for COGS and be pleasantly surprised by a cost reduction than vice versa. With this caveat in mind, you still have to have manageable gross margins. Running a low (or negative) margin business in hopes of margin improvement but no clear path to improvement is a really bad idea.

It's possible to make estimating COGS extremely complicated. It's also possible to model each individual component of COGS over time with changing assumptions. The appropriate level of detail varies on a case-by-case basis. So far in this guide, we've kept it very simple. If you're comfortable with Excel and have data to inform a more complex model, it makes sense to predict COGS as granularly and accurately as possible. Figure 3.7 provides an example of an income statement model as built to this point in the book.

		Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
Income Statement Assumptions		Sales Headcount (If Start Date < Month Ending Date) See Hiring Plan Tab	1	1	1
Time to Productivity (Days)	90	Productive Reps (Start Date < Month Ending Date - Time to Productivity)	1	1	1
Units sold per Productive Rep	2	Units Sold (Productive Reps x Units Sold per Productive Rep)	2	2	2
Price per Month	$2,250	New MRR (Units Sold x Price)	$4,500	$4,500	$4,500
		Beginning MRR	$0	$4,500	$8,910
		New MRR	$4,500	$4,500	$4,500
Monthly Churn	2.0%	Churn MRR (Monthly Churn x Beginning MRR)	$0	($90)	($178)
		Ending MRR	$4,500	$8,910	$13,232
		Revenue	$4,500	$8,910	$13,232
Hosting Expense per User	$100.00	Hosting Expense (Hosting Expense per User x Users)	($200)	($396)	($588)
Customers per Customer Support Rep	25	Customer Support Headcount	1	1	1
Customer Support Salary (Monthly)	$3,333.33	Customer Support Expense (Customer Support Headcount x Customer Support Salary)	($3,333)	($3,333)	($3,333)
		Total COGS (Hosting Expense + Customer Support Expense)	($3,533)	($3,729)	($3,921)
		Gross Profit (Revenue - Total COGS)	$967	$5,181	$9,310
		Gross Margin % (Gross Profit / Revenue)	21.5%	58.1%	70.4%

Figure 3.7 *Income statement model built through Chapter 3.*

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Now that we understand our unit economics, we know now how much profit we would generate if we could sell directly to customers without any customer acquisition or overhead costs. In reality, we have to spend money to acquire customers and support them, develop new products, manage back office activities such as human resources (HR) and accounting, etc. All these other activities associated with managing a business fall under selling, general, and administrative (SG&A) expenses.

The next two chapters discuss components of SG&A expenses. We begin in Chapter 4 with personnel expenses. The expenses associated with your employees—salaries, health insurance, retirement benefits, etc.—are generally the single largest expense for a startup, and it's critical to consider them in detail.

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Chapter 4

Personnel Costs (SG&A Expenses Part 1)

This is the first of two chapters tackling selling, general, and administrative (SG&A) expenses. Figure 4.1 highlights the SG&A expense section of a typical income statement.

Income Statement	
Year	**2019**
Revenue	$761,496
COGS	($93,793)
Gross Profit	$667,703
Gross Margin %	88%
SG&A Expenses	($1,302,702)
Operating Income	($681,700)
Interest Expense	($30,932)
Income Taxes	$0
Depreciation Expense	($4,204)
Amortization Expense	$0
Net Income	($716,835)

Figure 4.1 *Generic income statement.*

It's helpful to think of two components of SG&A expenses: personnel expenses and other overhead expenses. This chapter focuses on personnel expenses. Employees are the most important resource and largest expense for most businesses. In addition to direct compensation expense, employees drive many other expenses. Thus it's important to focus considerable time and energy on your hiring plan and understanding the related expenses. This chapter explores the costs we should consider and describes how to model them.

Elements of Personnel Costs

Salaries/Wages

The largest, and most obvious, components of personnel expenses are salaries and hourly wages. It's important to consider what roles you need to hire and how much you'll have to pay them. AngelList, Comparably, and Glassdoor can all be helpful resources for estimating compensation for specific positions.

Payroll Taxes

Employers are required to pay a portion of Social Security, Medicare, and Federal Unemployment Tax (FUTA) for each employee. FUTA is generally negligible, but as of this writing, Social Security and Medicare taxes represent 7.65% of wages. In other words, your actual payroll expense will be 7.65% higher than the total salaries paid to employees.

> *Company A pays $50,000 in total salaries each month. It also pays $3,825 in Social Security and Medicare tax ($50,000 salaries × 7.65% tax rate). Thus Company A's total payroll expense is $53,825 per month.*

Additionally, different states and local jurisdictions may require employers to pay a portion of employees' taxes. If you work with a payroll provider such as ADP, Paychex, or Gusto, they'll have detailed information on all your tax

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obligations. If you're just getting started and don't have paid employees yet, you can research these rates yourself. Your state's department of revenue website likely has a guide for employers, and local taxing authorities have information on local tax obligations.

Employee Benefits

At the earliest stages of development, you may not offer employee benefits such as health insurance or a retirement plan to your employees. However, as the company grows, these will be necessary to attract—and retain—quality talent. I recommend building them into your model so that you don't inadvertently overlook them later.

- Health insurance
- Dental insurance
- Vision insurance
- Retirement plan administration and employer match

How to Model

This section provides a step-by-step walkthrough for modeling the personnel-driven expenses for your business. It's hard to prescribe what roles you need to hire at what time because that is very company dependent. The following is intended to illustrate the modeling procedure and not to recommend a specific hiring plan.

Estimate Your Hiring Plan

Start with your hiring plan—which roles you need to hire and when you need to hire them. Recall that we already modeled customer support headcount in Chapter 3. The hiring plan addresses all other employees. At a very high level, it's important to understand what you need to accomplish and who you'll need to accomplish it. I'll assume that you've thought through your hiring plan and have an understanding of your personnel needs.

Begin by creating a schedule of roles—including current employees—and estimated start dates. For existing employees, you can use their actual hire date. Figure 4.2 shows an example with the assumptions (job titles and start dates) shaded in yellow.

Sales Headcount

Title	Start Date
Sales Rep #1	30-Sep-2018
Sales Rep #2	15-Apr-2019
Sales Rep #3	15-Jul-2019

Other Headcount

Title	Start Date
CEO (Existing)	1/1/2018
CTO (Existing)	1/1/2018
COO (Existing)	1/1/2018
UI / UX Designer	2/15/2019
Back-end Developer	3/15/2019
Marketing Associate	6/1/2019

Figure 4.2 *Example hiring schedule.*

Build a Dynamic Hiring Plan to Make Your Model More Robust

To make your model more robust, you can make the start date for each role dynamic. Instead of manually entering a start date for each role, the start dates depend on hitting specific commercial or funding milestones. For example, instead of hiring a back-end developer on March 15, 2019, hire the back-end developer when you close $1M in seed funding. Instead of hiring a marketing associate on June 1, 2019, hire a marketing associate when the company is generating at least $50K MRR. Appendix 4 on advanced techniques describes how to create dynamic hiring plans.

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Estimate Salaries/Wages

Next, add assumptions on the compensation paid to each of these employees (or actual compensation in the case of existing employees). Sites such as Glassdoor, AngelList, and Comparably all provide useful compensation data for various positions. Figure 4.3 shows an example.

Sales Headcount

Title	Start Date	Salary
Sales Rep #1	30-Sep-2018	$75,000
Sales Rep #2	15-Apr-2019	$75,000
Sales Rep #3	15-Jul-2019	$75,000

Other Headcount

Title	Start Date	Salary
CEO (Existing)	1/1/2018	$60,000
CTO (Existing)	1/1/2018	$60,000
COO (Existing)	1/1/2018	$60,000
CMO	3/15/2020	$120,000
UI / UX Designer	2/15/2019	$70,000
Back-end Developer	3/15/2019	$90,000
Marketing Associate	6/1/2019	$65,000

Figure 4.3 *Hiring schedule with salaries.*

Note: we'll tackle commissions for sales staff in Chapter 5.

Model Monthly Salary Expense Based on Hiring Plan

Once you have an estimated hiring plan, use it as an input to the income statement model we've developed over the last several chapters. Begin by estimating salary expense in each month of your model. For each month, include the salary expense for employees whose start date is earlier than that month. In Excel, "if" statements provide a simple way to model:

Monthly Salary Expense = if(Start Date <= Model Date, – Annual Salary/12, 0)

Figure 4.4 provides an example of the salary model.

Sales Headcount

Title	Start Date	Salary
Sales Rep #1	30-Sep-2018	$75,000
Sales Rep #2	15-Apr-2019	$75,000
Sales Rep #3	15-Jul-2019	$75,000

Other Headcount

Title	Start Date	Salary
CEO (Existing)	1/1/2018	$60,000
CTO (Existing)	1/1/2018	$60,000
COO (Existing)	1/1/2018	$60,000
CMO	3/15/2020	$120,000
UI / UX Designer	2/15/2019	$70,000
Back-end Developer	3/15/2019	$90,000
Marketing Associate	6/1/2019	$65,000

Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
Sales Rep #1	($6,250)	($6,250)	($6,250)
Sales Rep #2	$0	$0	$0
Sales Rep #3	$0	$0	$0
	$0	$0	$0
CEO (Existing)	($5,000)	($5,000)	($5,000)
CTO (Existing)	($5,000)	($5,000)	($5,000)
COO (Existing)	($5,000)	($5,000)	($5,000)
	$0	$0	$0
UI / UX Designer	$0	($5,833)	($5,833)
Back-end Developer	$0	$0	($7,500)
Marketing Associate	$0	$0	$0

Figure 4.4 *Salary expense model driven by hiring schedule.*

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Salary Increases

Compensation is not static. Employees receive pay raises and bonuses. It can be helpful to build these increases into the model. Candidly, I often ignore pay raises when I build a model because the expense of new hires typically dwarfs the impact of pay increases for existing employees. And those raises are unpredictable.

If you choose to model, one of the simplest ways to model is to assume a generic salary increase applied to the entire workforce once a year. Figure 4.5 provides an example. This example assumes that all employees receive a 5% pay increase in January 2020.

Sales Headcount

Title	Start Date	Salary
Sales Rep #1	30-Sep-2018	$75,000
Sales Rep #2	15-Apr-2019	$75,000
Sales Rep #3	15-Jul-2019	$75,000

Other Headcount

Title	Start Date	Salary
CEO (Existing)	1/1/2018	$60,000
CTO (Existing)	1/1/2018	$60,000
COO (Existing)	1/1/2018	$60,000
CMO	3/15/2020	$120,000
UI / UX Designer	2/15/2019	$70,000
Back-end Developer	3/15/2019	$90,000
Marketing Associate	6/1/2019	$65,000

Average Annual Salary Increase: 5%

Month Ending	31-Dec-2019	31-Jan-2020	29-Feb-2020
Sales Rep #1	($6,250)	($6,250)	($6,250)
Sales Rep #2	($6,250)	($6,250)	($6,250)
Sales Rep #3	($6,250)	($6,250)	($6,250)
	$0	$0	$0
CEO (Existing)	($5,000)	($5,000)	($5,000)
CTO (Existing)	($5,000)	($5,000)	($5,000)
COO (Existing)	($5,000)	($5,000)	($5,000)
	$0	$0	$0
UI / UX Designer	($5,833)	($5,833)	($5,833)
Back-end Developer	($7,500)	($7,500)	($7,500)
Marketing Associate	($5,417)	($5,417)	($5,417)
Salary Increases	$0	($2,625)	($2,625)
Total SG&A Salaries	($52,500)	($55,125)	($55,125)

Figure 4.5 *Hiring schedule with simple salary increases beginning in January 2020.*

The formula for determining the salary increase for a given month is simple:

Salary Increase = Prior Month Salary Increase + if(month(Model Date) = 1, Salary Increase × Total Salaries, 0)

Recall the discussion on customer support/customer success personnel from Chapter 3. If you included these roles as part of COGS, be sure to capture the salary amounts in total salaries so that you don't ignore payroll taxes and other items driven by salary expense.

Review Appendix 4 for several additional, more granular methods of modeling salary increases.

Model Payroll Tax Expense

After determining total monthly salary expense, it's simple to determine the monthly payroll tax expense (i.e., Social Security, Medicare, FUTA, etc.). Recall that payroll tax percentage is simply the product of the tax rate and the salary expense. Remember to include customer support salaries when determining payroll taxes. Figure 4.6 provides an example.

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Sales Headcount

Title	Start Date	Salary
Sales Rep #1	30-Sep-2018	$75,000
Sales Rep #2	15-Apr-2019	$75,000
Sales Rep #3	15-Jul-2019	$75,000

Other Headcount

Title	Start Date	Salary
CEO (Existing)	1/1/2018	$60,000
CTO (Existing)	1/1/2018	$60,000
COO (Existing)	1/1/2018	$60,000
CMO	3/15/2020	$120,000
UI / UX Designer	2/15/2019	$70,000
Back-end Developer	3/15/2019	$90,000
Marketing Associate	6/1/2019	$65,000

Average Annual Salary Increase	5%
Payroll Tax %	7.65%

Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
Sales Rep #1	($6,250)	($6,250)	($6,250)
Sales Rep #2	$0	$0	$0
Sales Rep #3	$0	$0	$0
	$0	$0	$0
CEO (Existing)	($5,000)	($5,000)	($5,000)
CTO (Existing)	($5,000)	($5,000)	($5,000)
COO (Existing)	($5,000)	($5,000)	($5,000)
	$0	$0	$0
UI / UX Designer	$0	($5,833)	($5,833)
Back-end Developer	$0	$0	($7,500)
Marketing Associate	$0	$0	$0
Salary Increases	$0	$0	$0
Total SG&A Salaries	($21,250)	($27,083)	($34,583)
Payroll Taxes			
[Customer Support + SG&A Salaries] x Payroll Tax %	($1,881)	($2,327)	($2,901)

Figure 4.6 *Hiring schedule and payroll taxes. Note that payroll taxes apply to SG&A salaries as well as customer support salaries discussed in Chapter 3.*

Model Retirement Benefits

As mentioned previously, it's unlikely that a seed-stage company will provide a retirement plan with matching contributions. However, it doesn't hurt to build it into the model for future use.

The simplest, and most conservative, way to model is to assume a fixed percentage for the employer match and assume that all employees will take advantage of the benefit. Modeling this expense is analogous to the payroll tax model we just created.

Retirement Benefit Expense = Total Salaries × Employer Match %

You can find reports from benefits brokerages and other service providers to help understand typical employer match rates. Figure 4.7 provides an example.

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Sales Headcount

Title	Start Date	Salary
Sales Rep #1	30-Sep-2018	$75,000
Sales Rep #2	15-Apr-2019	$75,000
Sales Rep #3	15-Jul-2019	$75,000

Other Headcount

Title	Start Date	Salary
CEO (Existing)	1/1/2018	$60,000
CTO (Existing)	1/1/2018	$60,000
COO (Existing)	1/1/2018	$60,000
CMO	3/15/2020	$120,000
UI / UX Designer	2/15/2019	$70,000
Back-end Developer	3/15/2019	$90,000
Marketing Associate	6/1/2019	$65,000

Payroll Tax %	7.65%
401k Match %	4%

Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
Sales Rep #1	($6,250)	($6,250)	($6,250)
Sales Rep #2	$0	$0	$0
Sales Rep #3	$0	$0	$0
	$0	$0	$0
CEO (Existing)	($5,000)	($5,000)	($5,000)
CTO (Existing)	($5,000)	($5,000)	($5,000)
COO (Existing)	($5,000)	($5,000)	($5,000)
	$0	$0	$0
UI / UX Designer	$0	($5,833)	($5,833)
Back-end Developer	$0	$0	($7,500)
Marketing Associate	$0	$0	$0
Total SG&A Salaries	($21,250)	($27,083)	($34,583)
Payroll Taxes			
[Customer Support + SG&A Salaries] x Payroll Tax %	($1,881)	($2,327)	($2,901)
401(k) Match	($983)	($1,217)	($1,517)

Figure 4.7 *Hiring schedule including employer 401(k) match applied to all salaries.*

Note: The company will also incur expenses from the plan administrator, but they can be complex to model and are generally trivial compared with the matching contribution. We'll ignore them in this guide.

Determine Monthly Employee Headcount

Many expenses are driven by the number of employees rather than the compensation rate. Determine your employee headcount for each month of your model. The "countif" function in Excel is helpful for determining headcount:

Employee Headcount = countif(Salary Expense, "<0")

Note that we used the condition that salary expense is less than zero because our expense model treats salaries as a negative number. Figure 4.8 provides an example.

Sales Headcount

Title	Start Date	Salary
Sales Rep #1	30-Sep-2018	$75,000
Sales Rep #2	15-Apr-2019	$75,000
Sales Rep #3	15-Jul-2019	$75,000

Other Headcount

Title	Start Date	Salary
CEO (Existing)	1/1/2018	$60,000
CTO (Existing)	1/1/2018	$60,000
COO (Existing)	1/1/2018	$60,000
CMO	3/15/2020	$120,000
UI / UX Designer	2/15/2019	$70,000
Back-end Developer	3/15/2019	$90,000
Marketing Associate	6/1/2019	$65,000

Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
Sales Rep #1	($6,250)	($6,250)	($6,250)
Sales Rep #2	$0	$0	$0
Sales Rep #3	$0	$0	$0
	$0	$0	$0
CEO (Existing)	($5,000)	($5,000)	($5,000)
CTO (Existing)	($5,000)	($5,000)	($5,000)
COO (Existing)	($5,000)	($5,000)	($5,000)
	$0	$0	$0
UI / UX Designer	$0	($5,833)	($5,833)
Back-end Developer	$0	$0	($7,500)
Marketing Associate	$0	$0	$0
Headcount			
SG&A Headount (If Salary < 0)	4	5	6
Customer Support Headcount	1	1	1
Total Headcount	5	6	7

Figure 4.8 *Hiring schedule and headcount calculation. Remember to include the customer success headcount.*

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As with total salary expense, don't forget to include the headcount associated with customer support/customer success personnel you may have allocated to COGS. Headcount will drive some of our employee benefit expenses as well as many of the SG&A expenses that we'll discuss in Chapter 5.

Estimate Health Insurance Benefits Expense

I typically model employee benefits such as health, vision, and dental insurance as a cost per employee. You can find a variety of benefits surveys online as well as quotes from insurance brokers to estimate these expenses. Estimate a dollar amount per employee per month, and multiply by the total headcount, as shown in Figure 4.9.

		Month Ending	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
		Headcount			
		SG&A Headount (If Salary < 0)	4	5	6
		Customer Support Headcount	1	1	1
		Total Headcount	5	6	7
		Insurance Benefits Expense			
Insurance Benefits per Employee	$350	(Total Headcount x Benefits per Employee)	($1,750)	($2,100)	($2,450)

Figure 4.9 *Model with health, vision, and dental insurance benefits as an expense per employee.*

Conclusion

We've now covered revenue, COGS, and compensation expenses. Figure 4.10 shows an example income statement model as built so far.

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			Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
Income Statement Assumptions			Sales Headcount (If Start Date < Month Ending Date) Hiring Plan T	1	1	1
Time to Productivity (Days)	90		Productive Reps (Start Date < Month Ending Date - Time to Produc	1	1	1
Units sold per Productive Rep	1		Units Sold (Productive Reps x Units Sold per Productive Rep)	2	2	2
Price / Month	$2,250		New MRR (Units Sold x Price)	$4,500	$4,500	$4,500
			Beginning MRR	$0	$4,500	$8,910
			New MRR	$4,500	$4,500	$4,500
Monthly Churn	2.0%		Churn MRR (Monthly Churn x Beginning MRR)	$0	($90)	($178)
			Ending MRR	$4,500	$8,910	$13,232
			Revenue	$4,500	$8,910	$13,232
Hosting Expense per User	$100.00		Hosting Expense (Hosting Expense per User x Users)	($200)	($396)	($588)
Customers per Customer Support Rep	25		Customer Support Headcount	1	1	1
Customer Support Salary (Monthly)	$3,333.33		Customer Support Expense (Customer Support Headcount x Salary)	($3,333)	($3,333)	($3,333)
			Total COGS (Hosting Expense + Customer Support Expense)	($3,533)	($3,729)	($3,921)
			Gross Profit (Revenue - Total COGS)	$967	$5,181	$9,310
			Gross Margin % (Gross Profit / Revenue)	21.5%	58.1%	70.4%
			Headcount			
			SG&A Headount (If Salary < 0)	4	5	6
			Customer Support Headcount	1	1	1
			Total Headcount	5	6	7

Sales Headcount

Title	Start Date	Salary
Sales Rep #1	30-Sep-2018	$75,000
Sales Rep #2	15-Apr-2019	$75,000
Sales Rep #3	15-Jul-2019	$75,000

Other Headcount

Title	Start Date	Salary
CEO (Existing)	1/1/2018	$60,000
CTO (Existing)	1/1/2018	$60,000
COO (Existing)	1/1/2018	$60,000
CMO	3/15/2020	$120,000
UI / UX Designer	2/15/2019	$70,000
Back-end Developer	3/15/2019	$90,000
Marketing Associate	6/1/2019	$65,000

		SG&A Expenses			
		Sales Rep #1	($6,250)	($6,250)	($6,250)
		Sales Rep #2	$0	$0	$0
		Sales Rep #3	$0	$0	$0
			$0	$0	$0
		CEO (Existing)	($5,000)	($5,000)	($5,000)
		CTO (Existing)	($5,000)	($5,000)	($5,000)
		COO (Existing)	($5,000)	($5,000)	($5,000)
			$0	$0	$0
		UI / UX Designer	$0	($5,833)	($5,833)
		Back-end Developer	$0	$0	($7,500)
		Marketing Associate	$0	$0	$0
		Total SG&A Salaries	($21,250)	($27,083)	($34,583)
Average Annual Salary Increase	5%	Salary Increases	$0	$0	$0
		Total SG&A Salaries	($21,250)	($27,083)	($34,583)
		Payroll Taxes			
Payroll Tax %	7.65%	([Customer Support + Total SG&A Salaries] x Payroll Tax %)	($1,881)	($2,327)	($2,901)
401k Match %	4%	401(k) Match	($983)	($1,217)	($1,517)
		Insurance Benefits Expense			
Insurance Benefits per Employee	$350	(Total Headcount x Benefits per Employee)	($1,750)	($2,100)	($2,450)

Figure 4.10 *Income statement model as built through* Chapter 4.

We're almost done building an income statement model. In Chapter 5, we consider other overhead expenses such as rent, insurance, legal expenses, etc. These are the most important and complex items to model in the income statement.

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Chapter 5

Other Overhead Expenses (SG&A Expenses Part 2)

This is the second of two chapters tackling selling, general, and administrative (SG&A) expenses. Figure 5.1 highlights the SG&A expense section of a typical income statement.

Income Statement	
Year	**2019**
Revenue	$761,496
COGS	($93,793)
Gross Profit	$667,703
Gross Margin %	88%
SG&A Expenses	($1,302,702)
Operating Income	($681,700)
Interest Expense	($30,932)
Income Taxes	$0
Depreciation Expense	($4,204)
Amortization Expense	$0
Net Income	($716,835)

Figure 5.1 *Generic income statement.*

In the previous chapter, we covered personnel expenses. This chapter introduces the other selling, general, and administrative (SG&A) expenses that you're likely to encounter. Note that not every expense introduced in this chapter is relevant to every business, and it may not be an exhaustive list. It's very helpful to review the income statements of publicly traded companies similar to yours to understand their major SG&A expenses and ensure that you're not overlooking anything significant.

I'm splitting the expenses discussed in this chapter into three primary categories:

- Sales, marketing, and advertising expenses
- Headcount-driven expenses
- Miscellaneous (payment processing, insurance, service providers)

At the end of this chapter, our model will encompass all operating expenses (i.e., COGS and SG&A expenses), and we can then examine operating income. Operating income is the income from the commercial operation of the business. Chapter 6, the last chapter on the income statement, addresses interest, taxes, depreciation, and amortization, which are nonoperating expenses.

Sales, Marketing, and Advertising Expenses

Attracting customers costs money. These expenses include paid advertising, sponsorships, sales visits, trade shows, sales commissions, and more. They are some of the most important expenses to consider in scaling your business. The goal is to maximize customer acquisition while minimizing sales and marketing expenses. If you can attract customers quickly and inexpensively and generate significant or long-lasting revenue from them, you probably have a strong business.

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The mix of sales and marketing expenses varies dramatically from business to business depending on the type of product, target customers, and maturity of the company, among other things. A detailed exploration of strategies is beyond the scope of this book, but in general, companies using an inbound customer acquisition strategy rely heavily on paid advertising, and companies using a direct-sales approach rely heavily on trade shows and sales visits.

We explore several of the important expense categories—and how to model them—next.

Paid Advertising

Paid advertising encompasses a broad category of spending ranging from traditional radio and print media ads to online ads channels such as Google AdWords and Facebook ad campaigns. A company's reliance on paid advertising—and the types of ads it employs—depends on its business model and target market.

For a primarily inbound customer acquisition strategy, where ad spend and conversion rates drive customer and revenue growth, ad spending ties directly into the revenue forecast as described in Chapter 2. Figure 5.2 provides a refresher.

Assumptions		**Month Ending**	**1/31/2019**	**2/28/2019**	**3/31/2019**
		Ad Spending	$1,000	$1,000	$1,000
Cost per Click	$2.50	Site Visitors (Ad Spending / Cost per Click)	400	400	400
Visitor to Trial Conversion %	8%	Free Trials (Site Visitors x Visitor to Trial Conversion %)	30	30	30
Trial to Paid Conversion %	50%	New Users (Free Trials x Trial to Paid Conversion %)	15	15	15

Figure 5.2 *Paid advertising model for inbound customer acquisition strategy.*

> *Tip: A Simple Formula to Scale Ad Spending*
>
> I sometimes model advertising spend as a percentage of gross profit, subject to a minimum value. So the company spends on marketing as it grows but never spends so much that it's blindly burning through cash and ramping spending faster than earnings. This provides a simple way to scale advertising spend as the business grows while making a conservative financial decision:
>
> *Ad Spending = Max(Minimum Ad Spend Amount, Target Percentage × Gross Profit)*

Figure 5.3 shows an example.

Assumptions		**Month Ending**	**1/31/2019**	**2/28/2019**	**3/31/2019**	**4/30/2019**
Minimum Ad Spending	$1,000	Ad Spending (max(Minimum Ad Spend, % of Gross Profit)	$1,000	$1,000	$1,000	$1,080
Target Ad Spend (% of Gross Profit)	15%					
Cost per Click	$2.50	Site Visitors (Ad Spending / Cost per Click)	400	400	400	432
Visitor to Trial Conversion %	8%	Free Trials (Site Visitors x Visitor to Trial Conversion %)	30	30	30	32
Trial to Paid Conversion %	50%	New Users (Free Trials x Trial to Paid Conversion %)	15	15	15	16
		Beginning MRR	$0	$3,000	$6,000	$9,000
MRR per User:	$200	New MRR (New Customers x MRR per Customer)	$3,000	$3,000	$3,000	$3,240
		Ending MRR (Beginning MRR + New MRR)	$3,000	$6,000	$9,000	$12,240
Gross Margin %	80%	Gross Profit (Total MRR x Gross Margin %)	$2,400	$4,800	$7,200	$9,792

Figure 5.3 *Ad spending as a percentage of gross profit. Note that spending increases in April 2019 as the target percentage of gross profit allocated to advertising exceeds the minimum target ad expense.*

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Trade Shows and Travel

Like paid advertising, trade shows and conferences are more important to some types of businesses than others. Start by explicitly identifying which events you believe you'll attend, and make an effort to forecast the costs. Don't forget to include costs for marketing collateral, giveaways, etc. on top of the cost of attending the show. For instance, you may need to build or purchase a booth, print brochures, or buy T-shirts or other items to give to visitors at a trade show: All these costs are tangible and estimable.

You can apply the same logic to other travel expenses, such as sales visits to prospective customers.

While this isn't an exact science, it's simple enough to research the registration costs for different events and research hotel and flight information to estimate how much you'll spend on trade shows and conferences. Increase this estimate by 50% to provide a buffer for unforeseen expenses or additional events that may warrant attendance. Figure 5.4 provides an example of a dashboard of expected travel expenses.

Travel & Trade Shows

Margin of Safety | 50% | Increase estimated expense by this amount to provide a buffer

Event	Date	Registration Fee	Travel & Other Expenses	Total Expense	Index Date
Trade Show #1	3/15/2019	$5,000	$1,000	$9,000	3/31/2019
Trade Show #2	7/23/2019	$2,500	$2,000	$6,750	7/31/2019
Trade Show #3	12/8/2019	$3,300	$1,500	$7,200	12/31/2019
Sales Visit #1	2/15/2019		$700	$1,050	2/28/2019

Figure 5.4 *Travel and trade show dashboard.*

I also suggest budgeting a baseline amount for generic day-to-day travel expenses if you reimburse employees for mileage or do a lot of regional traveling. Your total travel expense is the sum of the explicit forecast and the baseline day-to-day expenses. Figure 5.5 provides an example of travel expenses in the income statement model.

Income Statement

		Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
Travel & Trade Shows (Baseline)	$500	Travel & Trade Shows (Baseline + Specific Trade Shows) Trade Shows Tab	($500)	($1,550)	($9,500)

Figure 5.5 *Travel and trade show expenses in income statement model.*

The model records a baseline expense of $500 each month plus the explicit expenses forecast in the travel and trade shows dashboard in Figure 5.4. The formula for coding is

Travel and Trade Show Expense = Baseline + sumifs(Total Expense from Dashboard, Index Date, "<="&Model Date)

Index Date = eomonth(Date, 0)

Sales Commissions

Most companies pay a sales commission to provide an incentive to their sales force. Commission structures vary from company to company and industry to industry and can become very complex. If you haven't determined a structure,

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simply model the sales commission as a percentage of revenue. For instance, the sales team receives 10% of new revenue each month. Remember to apply the commission to the *annual* revenue for subscription-based business models in addition to any salary paid to sales reps.

Headcount-Driven Expenses

The expenses in this section share a common theme: employee headcount drives them. They're not direct compensation expenses but rather necessary costs of employing a workforce that scale with the size of the company. Recall that we determined employee headcount in Chapter 4. We can view these expenses in two categories: recurring expenses and one-time expenses.

Recurring Expenses

Software Subscriptions

We operate in an increasingly SaaS-driven economy. You need to provide your employees with access to a variety of software subscriptions. Whether we're talking about licenses for Salesforce, JazzHR, Hubspot, or others, there is generally a tangible cost associated with adding additional users to an account. As the company grows, you can get more granular and estimate the costs of specific software platforms for specific roles. However, in the early days, let's keep it simple and estimate a fixed dollar amount per employee. Figure 5.6 provides an example.

		Month Ending	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
		Total Headcount (SG&A Headcount + Customer Support Headcount)	5	6	7
Subscriptions per Employee	$300	Subscriptions (Total Headcount x Subscriptions per Employee)	($1,500)	($1,800)	($2,100)

Figure 5.6 *Example of software subscription expense model.*

Office Supplies, Snacks, Coffee, etc.

There are also ongoing expenses associated with providing miscellaneous office supplies (pens, paper, ink cartridges, coffee, snacks, etc.) required for day-to-day business. It's unnecessary to forecast each of these items independently but worthwhile to estimate an amount per employee that increases as the company grows.

Figure 5.7 provides an example.

		Month Ending	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
		Total Headcount (SG&A Headcount + Customer Support Headcount)	5	6	7
Office Supplies per Employee	$50	Office Supplies (Total Headcount x Office Supplies per Employee)	($250)	($300)	($350)
Subscriptions per Employee	$300	Subscriptions (Total Headcount x Subscriptions per Employee)	($1,500)	($1,800)	($2,100)

Figure 5.7 *Headcount-driven expenses for office supplies and software subscriptions.*

Rent and Utilities

When you're just getting started, you may work from home or receive free office space from an accelerator. But eventually you'll have to rent office space.

Rent can be difficult to forecast. My recommended method is to estimate a cost per square foot based on local commercial real estate prices and a required number of square feet per employee, which you can find in a variety of surveys from commercial real estate brokers. For example, if you estimate $150/square foot per employee and local real estate prices of $20/square foot annually, each new employee increases annual rent expense by $3,000. Of course, this isn't totally realistic because rent expense is generally "lumpy": you don't pay a little bit more each time you hire a new employee; you pay a *lot* more when you outgrow your current space and move into a larger one.

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We can solve this problem using a dashboard of estimated office capacities representing different spaces, as shown in Figure 5.8.

Assumptions

Description	Value	Source
Sq. Ft. per Employee	150	https://mehiganco.com/?p=684
Price per Sq. Ft. (Annual)	$20	http://www.loopnet.com/pennsylvania/pittsburgh-commercial-real-estate/

Capacity (Headcount)	Min Employees	Sq. Ft.	Price (Monthly)
6	0	900	$1,500
20	7	3,000	$5,000
50	21	7,500	$12,500
100	51	15,000	$25,000

Figure 5.8 *Rent expense dashboard.*

Using this dashboard, we assume that our rent costs $20/square foot annually ($1.66/square foot monthly) and that we require 150 square feet per employee. The lower half of the dashboard assumes that our current office space can accommodate a team of 6. When we outgrow it, we'll move into a slightly larger space that can accommodate a team of 20. When we reach 20 employees, we'll move into a space that can accommodate 50 employees, etc. We can then use Excel's vlookup function to calculate expected rent expense based on employee headcount. The cells to include in the vlookup are outlined with a blue dashed line in Figure 5.8.

Rent Expense = vlookup(Model Headcount, Min Employees : Price, 3, TRUE)

Figure 5.9 provides an example.

Month Ending	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
Headcount			
SG&A Headcount (Count if Start Date < Month End Date)	4	5	6
Customer Support Headcount	1	1	1
Total Headcount (SG&A Headcount + Customer Support Headcount)	5	6	7
Rent (Based on Total Headcount & Real Estate Prices) **See Rent Tab**	($1,500)	($1,500)	($5,000)

Figure 5.9 *Rent expense calculation in income statement based on dashboard.*

When headcount exceeds 6 individuals (the maximum capacity of the first space), the company moves to a space that can accommodate 20 employees, and rent increases from $1,500/month to $5,000/month.

You may also be responsible for paying for various utilities such as electricity, water, and internet access. The simplest way to model is as a percentage of rent expense because these expenses will roughly scale with the size of the physical space.

One-Time Expenses

Furniture and Equipment

You'll likely provide each employee with a desk, a computer, a chair, etc. when he or she joins the company. I find that $2,000 to $3,000 per employee as a one-time onboarding expense provides a reasonable estimate, although it differs from business to business. Note that this expense differs from the ones described under "rent and Utilities." It's not a

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monthly recurring expense based on total employee headcount; rather, it is a one-time expense based on new employees. Figure 5.10 shows an example.

		Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
		Customer Support Headcount	1	1	1
		SG&A Headcount	4	5	6
		Total Headcount	5	6	7
		New Employees	0	1	1
Onboarding Expense per Employee	$3,000	Onboarding Expense (New Employees x Expense per Employee)	$0	($3,000)	($3,000)

Figure 5.10 *Furniture and equipment onboarding expense per new employee.*

You can calculate the number of new employees using the following formula:

New Employees = Current Month Headcount – Prior Month Headcount

Miscellaneous

The last category of SG&A expenses we'll cover is a mixed bag that includes payment processing fees, insurance, and service providers. Every business should be properly insured, have a good lawyer, and have a good accountant. Additionally, you may hire consultants to assist in areas when you lack in-house expertise or you have a temporary need that exceeds your team's capacity.

Payment Processing Fees

If you accept credit-card payments from customers, you'll incur payment processing fees. Credit-card processing fees are complex and typically include a fix fee per transaction and a variable expense structured as a percentage of the transaction. For example, Square charges 2.9% + $0.30 per transaction for online payments.

If you know the specific terms of your credit-card processing partner (Square, PayPal, Stripe, etc.), you can model these fees explicitly based on revenue and the number of customers or transactions from your unit-level forecast. However, for the sake of simplicity, in this guide we'll assume a fixed percentage of revenue. (*Note:* Processing fees apply to payments rather than revenue. If a customer prepays for an annual subscription, you incur payment processing fees at the time of that payment, not each month as you recognize revenue. However, the method proposed here is a simple proxy.)

Payment Processing Fees = Revenue × Fee %

If you generate $5,000 in revenue and pay a 3% fee to your credit-card processing company, the fee is $150 ($5,000 × 0.03).

If only a portion of customers pay by credit card, you can also make assumptions around the percentage of invoices paid by credit card. Then

Payment Processing Fees = Revenue × % of Customer Paying with Credit Card × Fee %

In this example, assume that 75% of customers pay with a credit card. Then the payment processing fee is $113 ($5,000 × 0.75 × 0.03). Figure 5.11 provides an example.

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		Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
		Revenue	$4,500	$8,910	$13,232
% of Customers Paying with Credit Card	75%				
Payment Processing Fee	3%	Payment Processing	($101)	($200)	($298)

Figure 5.11 *Payment processing fees for companies accepting credit-card transactions.*

Insurance

Insurance policies come in several different forms, but most companies pay for some combination of the following:

- General liability insurance
- Property insurance
- Directors and officers (D&O) insurance
- Key person insurance
- Workers compensation insurance

It's difficult to prescribe specific guidelines or budget amounts for these expenses—there are a lot of variables to consider. However, you can get accurate quotes for each from an insurance agent and model as a recurring monthly premium or annual payment.

Legal

Every business will incur legal expenses for creating or reviewing contracts, employment agreements, financing documents, etc. It's prudent to budget for regular legal expenses on a monthly basis.

It's also important to remember that you'll likely incur large lump-sum legal expenses around financing events. A typical convertible note financing can cost a company $5–10K in legal expenses, and a preferred stock financing can cost $20–30K in legal expenses.

It's helpful to build a dashboard of proposed financing events and estimated legal fees, as shown in Figure 5.12. The dates of financing events come from dashboards of financing events we'll build in Chapter 8. Enter other projected legal expenses manually.

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Convertible Notes (from Convertible Notes tab)

Transaction	Date	Legal Expense	Index Date
Note #1	1/15/2019	$8,000	1/31/2019
Note #2	2/20/2019	$3,000	2/28/2019

Equity Investments (from Equity tab)

Transaction	Date	Legal Expense	Index Date
Seed Round	10/1/2019	$20,000	10/31/2019

SAFE Investments (from SAFE tab)

Transaction	Date	Legal Expense	Index Date
	0		1/31/1900

Other Legal Expenses

Transaction	Date	Legal Expense	Index Date
Employment Agreements, Option Plan, etc	1/1/2019	$6,000	1/31/2019

Figure 5.12 *Dashboard of discrete legal expenses. Index date represents the last day of the month in which the expense is incurred.*

Then the total legal expense is

Legal Expense = Baseline Monthly Expense + sumifs(Legal Expense, Index Date, "<="& Model Date, Index Date, ">"& eomonth (Model Date, −1)

Index Date = eomonth(Date, 0)

Accounting/Bookkeeping

If you're inexperienced with finance and accounting, I highly recommend paying a professional bookkeeper or accountant to manage your monthly reporting and tax returns. It's best to do this stuff properly from the beginning. It's too much of a distraction to learn it yourself for the trivial amount of money you'll save. Seed-stage companies can typically find a qualified part-time bookkeeper for less than $1,000 per month.

Consultants and Contractors

As mentioned earlier, you may encounter scenarios where your existing team lacks the necessary expertise and you must hire consultants. You may also encounter situations where you need temporary assistance on a project that doesn't warrant a full-time employee, and you hire a part-time contractor for support. These needs vary dramatically on a company-by-company basis, so I don't have a specific prescription for dollar amounts, but it makes sense to budget for these expenses if you think you'll need them.

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Figure 5.13 shows an example of insurance and service provider expenses in an income statement model.

		Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
Insurance Premiums (Monthly)	$200	Insurance	($200)	($200)	($200)
Legal Fees (Monthly)	$1,500	Legal (Baseline + Specific Transactions)	($15,500)	($4,500)	($1,500)
Accounting / Bookkeeping (Month)	$500	Accounting / Bookkeeping	($500)	($500)	($500)
Contractors & Consultants	$500	Contractors & Consultants	($500)	($500)	($500)

Figure 5.13 *Insurance and service provider expenses.*

Operating Income

Our model has now captured all the operating characteristics of the business. We understand our revenue, COGS, and SG&A expenses. The difference between revenue and these expenses is called *operating income*:

Operating Income = Revenue – COGS – SG&A Expenses

Operating income provides an indicator of the profitability of the business without considering how the company is structured or financed. It can also be expressed as a percentage or *operating margin*:

Operating Margin % = Operating Income/Revenue = (Revenue – COGS – SG&A Expenses)/Revenue

Figure 5.14 shows the entire model we've built so far.

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			Month Ending	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
			Year	2019	2019	2019
			Month	1	2	3
Income Statement Assumptions			Sales Headcount	1	1	1
Time to Productivity (Days)	90		Productive Reps	1	1	1
Units sold per Productive Rep	1		Units Sold	2	2	2
Price / Month	$2,250		New MRR	$4,500	$4,500	$4,500
			Beginning MRR	$0	$4,500	$8,910
			New MRR	$4,500	$4,500	$4,500
Monthly Churn	2.0%		Churn MRR (Monthly Churn x Beginning MRR)	$0	($90)	($178)
			Ending MRR	$4,500	$8,910	$13,232
			Revenue	$4,500	$8,910	$13,232
Hosting Expense per User	$100.00		Hosting Expense (Hosting Expense per User x Users)	($200)	($396)	($588)
Customers per Customer Support Rep	25		Customer Support Headcount	1	1	1
Customer Support Salary (Monthly)	$3,333.33		Customer Support Expense	($3,333)	($3,333)	($3,333)
			Total COGS	($3,533)	($3,729)	($3,921)
			Gross Profit (Revenue - Total COGS)	$967	$5,181	$9,310
			Gross Margin % (Gross Profit / Revenue)	21.5%	58.1%	70.4%
			Headcount			
			Customer Support Headcount	1	1	1
			SG&A Headcount	4	5	6
			Total Headcount	5	6	7
			New Employees	0	1	1
			SG&A Expenses			
Sales Headcount						
Title	**Start Date**	**Salary**				
Sales Rep #1	30-Sep-2018	$75,000	Sales Rep #1	($6,250)	($6,250)	($6,250)
Sales Rep #2	15-Apr-2019	$75,000	Sales Rep #2	$0	$0	$0
Sales Rep #3	15-Jul-2019	$75,000	Sales Rep #3	$0	$0	$0
Other Headcount						
Title	**Start Date**	**Salary**		$0	$0	$0
CEO (Existing)	1/1/2018	$60,000	CEO (Existing)	($5,000)	($5,000)	($5,000)
CTO (Existing)	1/1/2018	$60,000	CTO (Existing)	($5,000)	($5,000)	($5,000)
COO (Existing)	1/1/2018	$60,000	COO (Existing)	($5,000)	($5,000)	($5,000)
CMO	3/15/2020	$120,000		$0	$0	$0
UI / UX Designer	2/15/2019	$70,000	UI / UX Designer	$0	($5,833)	($5,833)
Back-end Developer	3/15/2019	$90,000	Back-end Developer	$0	$0	($7,500)
Marketing Associate	6/1/2019	$65,000	Marketing Associate	$0	$0	$0
			Total SG&A Salaries	($21,250)	($27,083)	($34,583)
Average Annual Salary Increase	5%		Salary Increases	$0	$0	$0
			Total SG&A Salaries	($21,250)	($27,083)	($34,583)
Payroll Tax %	7.65%		Payroll Taxes	($1,881)	($2,327)	($2,901)
Insurance Benefits per Employee	$350		Insurance Benefits Expense	($1,750)	($2,100)	($2,450)
401k Match %	4%		401(k) Match	($983)	($1,217)	($1,517)
Onboarding Expense per Employee	$3,000		Onboarding Expense (New Employees x Expense per Employee)	$0	($3,000)	($3,000)
Office Supplies per Employee	$50		Office Supplies	($250)	($300)	($350)
Subscriptions per Employee	$300		Software Subscriptions	($1,500)	($1,800)	($2,100)
			Rent (Based on Total Headcount & Real Estate Prices)	($1,500)	($1,500)	($5,000)
Sales Commission (% of Revenue)	10%		Sales Commissions	($5,400)	($5,400)	($5,400)
Advertising Expense	$5,000		Advertising	($5,000)	($5,000)	($5,000)
Travel & Trade Shows (Baseline)	$500		Travel & Trade Shows (Baseline + Specific Events)	($500)	($1,550)	($9,500)
% of Customers Paying with Credit Card	75%					
Payment Processing Fee	3%		Payment Processing	($101)	($200)	($298)
Insurance Premiums (Monthly)	$200		Insurance	($200)	($200)	($200)
Legal Fees (Monthly)	$1,500		Legal (Baseline + Specific Transactions)	($15,500)	($4,500)	($1,500)
Accounting / Bookkeeping (Month)	$500		Accounting / Bookkeeping	($500)	($500)	($500)
Contractors & Consultants	$500		Contractors & Consultants	($500)	($500)	($500)
			Total SG&A Expenses	($56,815)	($57,177)	($74,798)
			Operating Income	($55,849)	($51,997)	($65,488)

Figure 5.14 *Income statement model as built through Chapter 5.*

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In Chapter 6, our last chapter on the income statement, we'll discuss nonoperating expenses. These are things such as interest, taxes, depreciation, and amortization. They're unrelated to the core business. Rather, corporate structure and financing decisions drive them. Because nonoperating expenses are different in nature from operating expenses, they get their own section of the income statement. Nonoperating expenses are typically trivial for early-stage startups, particularly for software startups, and you can safely skip to Chapter 7.

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Chapter 6

Nonoperating Expenses

The final section of the income statement is nonoperating expenses. These are expenses such as interest, taxes, depreciation, and amortization that result from corporate structure and financing decisions. Figure 6.1 below highlights the nonoperating expenses on a typical income statement.

Income Statement	
Year	**2019**
Revenue	$761,496
COGS	($93,793)
Gross Profit	$667,703
Gross Margin %	88%
SG&A Expenses	($1,302,702)
Operating Income	($681,700)
Interest Expense	($30,932)
Income Taxes	$0
Depreciation Expense	($4,204)
Amortization Expense	$0
Net Income	($716,835)

Figure 6.1 *Generic income statement.*

Most of these expenses are negligible for startup companies, and it's safe to ignore them. I'm including them here for the sake of completeness, but feel free to skip ahead to Chapter 7.

Interest Expense

Interest expense relates to the interest charged on outstanding debt. In the early stages of a company, it's highly unlikely that you'll have debt that requires a cash interest payment. However, accrued interest on convertible notes also appears on the income statement.

> *Company A raised $250K in convertible debt that accrues interest at a rate of 8% annually. Although Company A doesn't make cash interest payments, it recognizes an expense of $20K ($250K × 0.08) each year until the debt converts to equity or reaches maturity.*

The simplest way to model interest expense is to build a dashboard summarizing any outstanding (and planned) debt, including convertible debt. Figure 6.2 provides an example.

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Financing Activities

Convertible Note Financing

Investment	Issue Date	Principal	Interest Rate	Maturity Date	Index Date	Daily Interest
Note #1	1/15/2019	$250,000	8%	1/1/2021	1/31/2019	$54.79
Note #2	2/20/2019	$250,000	6%	3/20/2021	3/31/2019	$41.10

Month Ending	12/31/2018	1/31/2019	2/28/2019	3/31/2019	4/30/2019	5/31/2019	6/30/2019
Note #1 Accrued Interest	$0	($877)	($2,411)	($4,110)	($5,753)	($7,452)	($9,096)
Note #2 Accrued Interest	$0	$0	($329)	($1,603)	($2,836)	($4,110)	($5,342)
Total Accrued Interest	$0	($877)	($2,740)	($5,712)	($8,589)	($11,562)	($14,438)
Interest Expense		($877)	($1,863)	($2,973)	($2,877)	($2,973)	($2,877)

Figure 6.2 *Convertible note dashboard.*

It's easiest to calculate the interest expense indirectly. Begin by calculating the daily interest accrued on each note:

Daily Interest = Principal Amount × (Interest Rate/365)

Next, calculate the total accrued interest on each note, that is, the interest accrued since the note issue date, assuming that the note issue date is earlier than the model date and the note hasn't matured yet:

Accrued Interest = if(AND(Issue Date <= Model Date, Maturity Date > Model Date),
(Model Date – Issue Date) × Daily Interest)

When we know the total accrued interest each month, we can determine the monthly interest expense by taking the difference between the current month and the preceding month:

Interest Expense = Current Month Accrued Interest – Previous Month Accrued Interest

The monthly interest expense is an input to the income statement model. The accrued interest is also used in the balance sheet model we'll build in Chapter 8.

Depreciation/Amortization

For most startup companies, capital expenditures (i.e., purchases of equipment, buildings, etc.) are insignificant. Thus depreciation expenses – the expense associated with the deterioration of physical assets - are not significant. My accountant friends will probably cringe, but I find that it easiest to ignore depreciation and move all capital expenditures directly to the income statement. The same goes for amortization expense which deals with the deterioration of intangible assets (patents, trademarks, etc.)

For companies that have significant capital expenditures (i.e., equipment and other hard assets), we can build a dashboard of capital expenditures as shown in Figure 6.3.

Investment Activities (Capital Expenditures)

Item	Purchase Amount	Purchase Date	Salvage Value	Useful Life (Months)	Monthly Depreciation	Disposal Date
3D Printer	$3,000	2/15/2019	$500	12	($208.33)	2/15/2020
3D Printer #2	$5,000	4/15/2019	$750	20	($212.50)	12/15/2020

Month Ending	1/31/2019	2/28/2019	3/31/2019	4/30/2019	5/31/2019	6/30/2019
Depreciation Expense	$0	($208)	($208)	($421)	($421)	($421)

Figure 6.3 *Capital expenditure dashboard.*

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The monthly depreciation is calculated by

Monthly Depreciation = (Purchase Amount – Salvage Value)/Useful Life

Then we can incur a depreciation expense for any month after the purchase date of an asset but before its disposal date. For a given asset,

Depreciation Expense = sumifs(Monthly Depreciation, Purchase Date, "<="&Model Date, Disposal Date, ">"&Model Date)

Disposal Date = date(year(Purchase Date), month(Purchase Date) + Useful Life, day(Purchase Date))

The depreciation expense is an input in the income statement model.

Amortization expense works the same way, but it's applied to intangible assets (like purchased intellectual property) and something you're unlikely to encounter.

Taxes

Companies structured as C-Corps must pay corporate income taxes when they generate positive income. If your company is an LLC or S-Corp, feel free to skip ahead. Losses in early years can offset future tax obligations. The U.S. Tax Code is obscenely complicated, and a detailed exploration is way beyond the scope of this book (and my abilities). For seed-stage companies, positive earnings are likely several years away, and it's generally safe to ignore taxes. I recommend modeling such that

Taxable Income = Operating Income – Interest Expense – Depreciation – Amortization

= Revenue – COGS – SG&A Expenses – Interest Expense – Depreciation – Amortization

Tax Expense = max(Taxable Income × Tax Rate, 0)

Thus, if operating income is negative, tax liability is zero. If operating income is positive, tax liability equals operating income multiplied by the tax rate. This ignores the ability to use losses to offset future obligations, as discussed earlier, but provides a simple way to model.

Conclusion

.We've now finished our first iteration of the income statement model. Figure 6.4 shows interest, taxes, depreciation, and amortization added to the model below the operating income line.

Assumptions		**Month Ending**	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
		Operating Income (Gross Profit - SG&A Expenses)	($55,248)	($53,453)	($68,961)
		Operating Margin (Operating Income / Revenue)	-2455%	-1200%	-1042%
		Interest Expense **Convertible Debt Tab**	($877)	($1,863)	($2,973)
Tax Rate	35%	Income Taxes	$0	$0	$0
		Depreciation Expense **Capital Expenditures Tab**	$0	($208)	($208)
		Amortization Expense (Ignored)	$0	$0	$0
		Net Income (Operating Income - Interest - Taxes - Depreciation - Amortization)	($56,125)	($55,525)	($72,142)
		Net Income Margin (Net Income / Revenue)	-2494%	-1246%	-1090%

Figure 6.4 *Nonoperating expenses in income statement model.*

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Note that I said we finished our *first* iteration. Modeling is an iterative process, and a model is never "finished' because assumptions change regularly. In Chapter 7, we'll explore some sanity checks to ensure that we captured everything and that we're not making any grossly unrealistic assumptions. Once we're reasonably happy with the current incarnation of our model, we'll move into building the balance sheet model in Chapter 8.

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Chapter 7

Common Mistakes (Sanity Checks)

So far I showed how to build the structure of an income statement model but didn't recommend specific assumptions given that they're very company and industry specific. It's important to test your assumptions to understand whether they're realistic. Building a model is an iterative process that requires several cycles of revisions and tests. This chapter provides a list of suggested "sanity checks" to perform on your model. If you're making any of the following mistakes, your model likely requires an additional set of iterations.

Unrealistic Efficiency Assumptions

It's helpful to think of your company's efficiency in terms of revenue per resources expended. I find it helpful to examine the following metrics to understand whether a model makes realistic assumptions.

Revenue per Employee

As a business scales, it requires additional sales andmarketing resources to drive growth, additional customer support resources to support the increasing customer volume, additional administrative resources to manage a growing organization, etc. The revenue per employee metric provides a generalized metric to test whether headcount assumptions are realistic. A reasonable figure for revenue per employee varies for different types of businesses, and there is no objective rule, but when I see a figure upward of $1M per employee, I start to question assumptions. There are undoubtedly companies that generate significantly more revenue per employee (e.g., Facebook, Apple), but those are unusual cases, and I find it better to err on the side of conservatism in building a model.

Revenue per Sales/Marketing Employee

The concept is the same as described earlier, but by breaking it into its component parts, we can determine where the assumptions may be too aggressive. As a business grows and refines its sales and marketing efforts, creates brand recognition, etc., it's sales engine may become more efficient. However, seeing a dramatic increase in revenue per sales and marketing employee is often an indication of overly aggressive assumptions. I often plot new revenue (or new customers) per sales and marketing employee on a graph. If there is a dramatic spike without a good explanation, I revisit the assumptions.

Revenue per Customer Support Employee (or Customers per Customer Support Employee)

Another common oversight is lack of commensurate scaling of customer support/customer success resources as the company grows. Again, companies gain efficiency as their products improve, and they learn to anticipate customer issues and streamline operations accordingly. However, a dramatic increase in revenue (or customers) supported per customer support representative without a good explanation is often an indicator of overly aggressive assumptions.

Figure 7.1 provides an example of several of these measures plotted on a graph.

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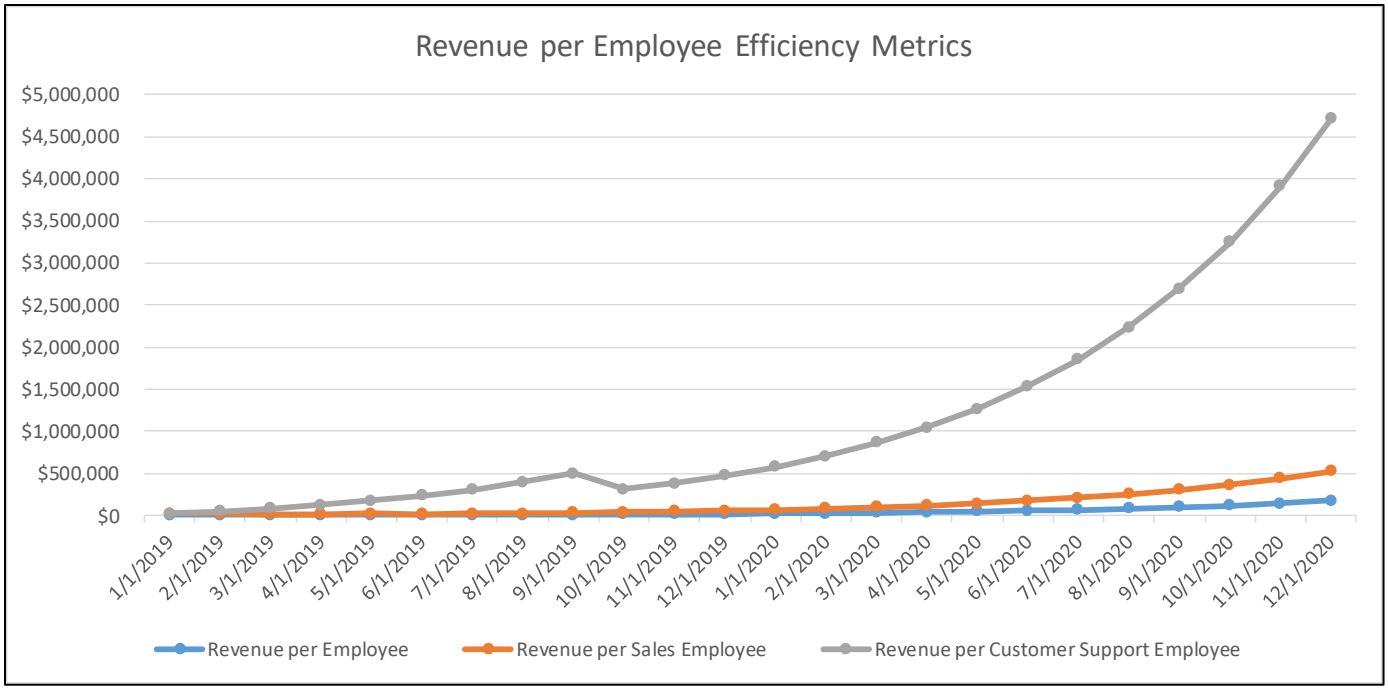

Figure 7.1 *Revenue per employee efficiency metrics.*

In this particular example, the revenue per customer support employee grows dramatically throughout the year 2020, which indicates that the company probably isn't budgeting a large enough customer support headcount.

Revenue per Sales/Marketing Expenditure

This metric is most relevant to companies using an inbound marketing approach. This is the corollary to revenue per sales headcount for businesses that operate a self-serve or inbound model that may have high leverage in terms of the personnel required. If the business depends on paid advertising, the advertising spend should be driving revenue growth. If revenue growth is detached from this spend, you have overly aggressive assumptions. Viral growth is real and it does occur, but it's difficult to predict or plan for.

Revenue Greater than Market Size

I mentioned in Chapter 1 that market sizing isn't terribly useful for financial projections, except as a sanity check. I don't recommend basing your revenue projections on market size because it's far better to build a bottom-up forecast. However, market size is a useful calibration tool. If you're projecting a $1B market for your product or service and your model reflects $2B in revenue, you're being overly aggressive.

Revenue exceeding total market size is the extreme case, but it's still valuable to compare your revenue projections with the market to understand your market share:

Market Share = Revenue/Total Market Size

If you're operating in a highly competitive market, a model that indicates an extremely high market share is probably unrealistic. It's difficult to point to a specific guideline for a realistic market share, but note that even a 1% share of a competitive market is hard to achieve. If your model reflects a 30%, 40%, or 50% share of a competitive market in a modest time period, you're probably being unrealistically aggressive.

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Assuming New Sales Reps And Channel Partners Are Immediately Effective

If your business employs a direct-sales force, new sales reps will likely require an acclimation period to learn your products and processes before they can sell as much, and as effectively, as your experienced reps. A common mistake in financial models is to assume that new reps are as effective as experienced reps from the minute they walk in the door. The result is typically an overly aggressive revenue forecast. It's best to assume some ramp-up period over several months, for instance, 25% of quota in month 1, 50% in month 2, 75% in month 3, and full efficiency in month 4. Like everything else in modeling, there isn't a right or a best answer, but it's an effect that should be included in the model. We addressed this issue in Chapter 2 and offer additional suggestions in Chapter 4.

Overly Aggressive Hiring Ramp

The discussion of personnel costs in Chapter 4 touched on some of the hidden costs associated with hiring. It's also important to consider the time lags introduced by sourcing, interviewing, and hiring candidates. To scale a business quickly, hiring people rapidly is a necessity. But, there are limitations to how quickly we can realistically expand the size of the company. Review your hiring plan, and compare your existing resources (or resources at the time of hiring) to ensure that you're comfortable that you're allowing enough lead time to source candidates, conduct multiple rounds of interviews, extend offers to the best candidates, provide them lead time to leave their current employment, etc.

For example, growing a team of 10 to a team of 30 in two months while also ramping revenue is probably unrealistic. You'd need an awful lot of resources dedicated to HR to make it happen. Not to mention that you'd quickly swamp your existing culture with a 2:1 ratio of "outsiders," which could be catastrophic. I hesitate to offer a "right" answer or prescription for how quickly a company can grow its headcount, but it's important to think through the mechanics to ensure that you're not being overly optimistic.

Ignoring Sales Commissions/Channel Partner Margins

This is a surprisingly common oversight. If you're selling through channel partners, be sure that your model reflects revenue as a function of the wholesale price (i.e., the price your channel partners pay to you) and not the retail price (i.e., the price end users pay to the channel partners). Similarly, if you pay commissions to any of your sales personnel, don't forget to include them in your model. We discussed modeling sales commissions in Chapter 5.

Conclusions

Remember, building a model is an iterative process. If your model fails any of these sanity checks, work through revisions and test it again. A good model will almost certainly require multiple iterations.

This concludes our discussion of building an income statement model. In Chapter 8, we cover modeling a balance sheet and then move on to our ultimate goal—a cash flow statement. For SaaS businesses with monthly billing, the cash flow statement will mirror the income statement pretty closely. However, for hardware businesses or companies that bill on an annual basis, the difference between the cash flow statement and income statement can be dramatic. We begin our balance sheet model in Chapter 8.

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Chapter 8

Balance Sheet

This chapter walks through building a balance sheet model. If you're unfamiliar with balance sheets, please review Appendix 2.

The balance sheet provides a financial snapshot of the company at a specific moment in time. It summarizes the company's financial position across three different categories:

- Assets
- Liabilities
- Equity

Figure 8.1 shows a typical balance sheet.

Balance Sheet	
Year	**2019**
Assets	
Current Assets	
Cash (From Income Statement Tab)	$59,906
Accounts Receivable	$150,840
Inventory	$0
	$0
Long-term Assets	$0
Property Plant & Equipment	$8,000
- Accumulated Depreciation	($4,204)
Net PPE	$3,796
Total Assets	$214,542
Liabilities	
Current Liabilities	
Accounts Payable	$231,696
Deferred Revenue	$168,750
Short-term Debt	$0
Short-term Accrued Interest Payable	$0
	$0
Long-term Liabilities	
Long-term Debt	$500,000
Long-term Accrued Interest Payable	$30,932
Total Liabilities	$931,378
Equity	
Common Stock	$0
Preferred Stock	$0
Additional Paid-in Capital	$0
Retained Earnings	($716,835)
Total Equity	($716,835)

Figure 8.1 *Generic balance sheet.*

Assets are the things your company owns. Asset accounts include cash, inventory, and equipment.

Liabilities and *equity*, collectively, are sources of funding for assets. Liabilities are obligations to pay another party, things such as debt, prepayments from customers, and money owed to suppliers. Equity reflects profits retained in the company and investments made for company stock.

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Because assets represent the things your company owns and liabilities and equity represent sources of funding for those things, they must equal one another. You can't purchase things (assets) without sources of funding (liabilities and equity), so they must be equal. If they're not equal, something is wrong. The fundamental equation is

Assets = Liabilities + Equity

Candidly, the utility of model balance sheets is debatable. I use the balance sheet model primarily as an intermediate step to creating a cash flow statement (addressed in Chapter 10). If you operate a software-only business, your income statement is probably a good proxy for your cash flow statement, and you can likely stop here. However, for hardware companies, your cash flow and income statement can be dramatically different, and modeling your balance sheet is an important step. We'll discuss cash flow and why this is so important in Chapter 9.

How to Model

We're going to introduce the modeling techniques for the balance sheet items a little bit out of order because it's easiest to model the cash balance based on the cash flow statement that we'll develop in Chapter 10.

Assets

Cash

The cash account on the balance sheet includes the balance in your company's bank accounts. This is the most critical item to track. If you run out of cash, your company dies. We'll postpone the discussion of cash until Chapter 10. The cash balance on our balance sheet comes from our cash flow model, which we haven't built yet.

Accounts Receivable

Accounts receivable are IOUs from customers. The customers have received the good or service you're selling but haven't paid yet. This is very common in B2B sales. Typical payment terms are 30–90 days.

A useful metric in analyzing how long it takes to collect cash from customers is *days sales outstanding* (DSO). DSO tells us how many days, on average, the company takes to collect payment from its customers. The faster you can collect cash from customers, the better. All other things being equal, a low figure for DSO is preferable.

When analyzing performance of a company, you can calculate DSO using the following formula:

DSO = Accounts Receivable/(Annual Revenue/365)

For example, if a company generated $500K in revenue in the last 12 months and has $100K in receivables, it requires approximately 73 days on average to collects its receivables ($100K/($500K/365)).

We can use the concept of DSO to model accounts receivable. If you don't have data to estimate DSO, make an assumption about how long it takes to collect payment from customers (DSO). Then accounts receivable on a monthly balance sheet is

Accounts Receivable = (Monthly Revenue/30) × DSO

Figure 8.2 provides an example.

		Month Ending	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
		Ending MRR	$4,500	$8,910	$13,232
Assumptions		**Current Assets**			
Days Sales Outstanding (DSO)	30	Accounts Receivable (Ending MRR / 30) x DSO	$4,500	$8,910	$13,232

Figure 8.2 *Accounts receivable model.*

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This method has some shortcomings. If the company is growing fast or it takes longer than 30–45 days to collect payment from customers, the forecast value of accounts receivable is likely to be overstated.

Nonetheless, the method just described provides a simple, conservative approach. Appendix 4 contains several advanced methods for interested readers.

Inventory

If your business doesn't have a hardware component, feel free to skip ahead. If you sell hardware, this is important.

Forecasting inventory for seed-stage companies is challenging. The simplest method is analogous to the method for accounts receivable described earlier. Define *days inventory outstanding* (DIO) as

DIO = Inventory/(Annual COGS/365)

If you don't have data to calculate DIO, estimate a number of days of inventory as a function of sales: 30–90 days is probably adequate. Note that inventory is based on COGS rather than revenue:

Inventory = (Monthly COGS/30) × DIO

Figure 8.3 provides a simple example.

		Month Ending	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
		COGS (Units Sold x COGS per Unit)	($10,000)	($10,000)	($15,000)
Assumptions		**Current Assets**			
Days Inventory Outstanding (DIO)	45	Inventory (COGS / 30) x DIO	$15,000	$15,000	$22,500

Figure 8.3 *Simple inventory model.*

If you have visibility into when you'll purchase inventory or components, you can build a dashboard of order quantities, times, and costs to forecast inventory more explicitly. Figure 8.4 provides an example.

Inventory

Units Purchased	**Date**	**Cost per Unit**	**Total Cost**	**Index Date**
3,000	1/15/2019	$20	$60,000	1/31/2019
2,000	4/23/2019	$20	$40,000	4/30/2019

Month Ending	**1/31/2019**	**2/28/2019**	**3/31/2019**	**4/30/2019**	**5/31/2019**	**6/30/2019**
Beginning Inventory	$0	$50,000	$38,000	$23,600	$46,320	$25,584
Inventory Purchases (from Dashboard to left)	$60,000	$0	$0	$40,000	$0	$0
COGS (from Income Statement)	($10,000)	($12,000)	($14,400)	($17,280)	($20,736)	($24,883)
Ending Inventory (Beginning + Purchases - COGS)	$50,000	$38,000	$23,600	$46,320	$25,584	$701

Figure 8.4 *Explicit inventory model.*

In this model, we begin with a given level of inventory, add new inventory based on the schedule, and subtract the COGS from our income statement to get ending inventory for that period. The beginning inventory for a given period is the ending inventory from the prior period.

Index Date = eomonth(Date, 0)

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Inventory is a complicated topic, and I'm greatly simplifying it for the purposes of this book. Remember, as discussed in Chapter 3, COGS changes over time, which adds complexity to this model.

> ### *Don't Purchase Too Much Inventory*
> Purchasing material in bulk typically results in a lower cost per unit than purchasing smaller order quantities. However, it's dangerous for an early-stage company to purchase too much inventory. More often than not, founders create overly optimistic sales forecasts. Couple an overly optimistic forecast with a bulk inventory purchase, and you sink significant cash into a product that nobody wants to buy (yet). This can be disastrous because there's not an easy way to recover the cash invested in inventory until you sell the product.

Property, Plant, and Equipment

Property, plant, and equipment (PP&E) represents money spent on tangible assets that are not sold to customers, for example, manufacturing equipment, office furniture, buildings, etc. Most software businesses don't have many tangible assets and will have a minimal spend on PP&E (also called *capital expenditures* or *cap ex*). However, companies producing a physical product may purchase fabrication equipment or other equipment for research and development (R&D).

As mentioned previously, for software startups, I generally ignore PP&E and treat all capital expenditures as expenses. While it's not the proper accounting treatment, it makes life a lot easier.

If your business requires significant capital expenditures, you should model them explicitly. I suggest creating a tab of assumptions around the dates and amounts of various capital expenditures, like we introduced in Figure 6.3 to calculate depreciation expense. Figure 8.5 shows an expanded version of this dashboard that includes balance sheet items.

Investment Activities (Capital Expenditures)

Item	Purchase Amount	Purchase Date	Salvage Value	Useful Life (Months)	Monthly Depreciation	Disposal Date
3D Printer	$3,000	2/15/2019	$500	3	($208.33)	2/15/2020
3D Printer #2	$5,000	4/15/2019	$750	24	($177.08)	4/15/2021

Month Ending	1/31/2019	2/28/2019	3/31/2019	4/30/2019	5/31/2019	6/30/2019
Depreciation Expense	$0	($208)	($208)	($385)	($385)	($385)
PP&E	$0	$3,000	$3,000	$8,000	$8,000	$8,000
Accumulated Depreciation	$0	($208)	($417)	($802)	($1,188)	($1,573)
Net PP&E (PP&E - Accumulated Depreciation)	$0	$2,792	$2,583	$7,198	$6,813	$6,427

Figure 8.5 *Capital expenditure dashboard.*

The PP&E line item for a given month is the sum of the purchase amounts where model date is greater than purchase date and less than disposal date:

PP&E = sumifs(Purchase Amount, Purchase Date, "<="&Model Date, Disposal Date, ">"&Model Date)

Accumulated depreciation for a given month is the sum of the depreciation expense from all prior months. However, there is one wrinkle to calculating it. After an asset reaches the end of its useful life and we dispose of it, we remove it from the balance sheet and remove its contribution to accumulated depreciation. The simplest way to code in Excel is

Accumulated Depreciation = Prior Month Accumulated Depreciation + Depreciation Expense
– sumproduct((Disposal Date < Model Date), Monthly Depreciation, Useful Life)

The last term removes the accumulated depreciation attribute to any assets that reach the end of their useful life.

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Liabilities

Accounts Payable

Accounts payable is money that you owe to suppliers for goods or services that you've already received. It is the inverse of accounts receivable, and you can model analogously. Specifically, calculate or estimate the number of days that payables remain on the company's books before being paid:

Days Payables Outstanding (DPO) = Accounts Payable/(Nonpayroll Expenses/365)

The simplest way to model accounts payable is to estimate DPO and calculate using the method described earlier for receivables. This presents the same challenges as DSO and DIO but is generally adequate for seed-stage companies. For a software company:

Accounts Payable = (Nonpayroll Expenses/30) × DPO

Note that the preceding formula only accounts for nonpayroll expenses because you don't have payment terms with employees the way you do with suppliers. Ideally, the model should also capture accounts payable related to inventory purchases and capital expenditures, which do not appear on the income statement. The method above may understate accounts payable. However, given that accounts payable has a positive impact on cash flow (as we'll see in Chapter 9 and Chapter 10), the method above is simpler and more conservative than capturing inventory and capital expenditures.

The formulas above are simplifications. If you have visibility into your payment terms with various suppliers, you can make this calculation more granular and only include those expenses. However, the method described above is generally adequate in the early days.

Deferred Revenue

Deferred revenue represents cash payments received from customers for a product that hasn't been delivered yet. This is common with SaaS businesses, where customers pay in advance for an annual subscription, but revenue is recognized on a monthly basis as the service is delivered. In general, deferred revenue is good for cash flow because you have cash in the bank before you've had to incur the expenses associated with supplying your product or service.

For a seed-stage company, I prefer to ignore deferred revenue. Without data on the percentage of customers prepaying, it's difficult to predict accurately. Ignoring deferred revenue is more conservative because it assumes that you receive cash later. If you choose to include it in your model, the simplest way is to estimate the percentage of customers who prepay. Figure 8.6 provides a simple example.

		Month Ending	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
		New MRR	$4,500	$4,500	$4,500
Assumptions					
Percentage of Prepaid Contracts	15%	Beginning Deferred Revenue	$0	$7,425	$14,175
Existing Deferred Revenue	$0				
		New Deferred Revenue (New MRR x % Prepaid x 12)	$8,100	$8,100	$8,100
		Recognized Portion of Deferred Revenue (Sum of New MRR from Previous 12 Months x % Prepaid)	($675)	($1,350)	($2,025)
		Ending Deferred Revenue (Beginning - Recognized + New)	$7,425	$14,175	$20,250

Figure 8.6 *Simple deferred-revenue model.*

The model in Figure 8.6 assumes that 15% of customers prepay their contracts for an entire year. In January, the company receives $9,000 cash for prepaid contracts ($5,000/month × 15% of customers × 12 months). However, it

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recognizes revenue for 1/12 of that amount. Additionally, it recognizes revenue for 1/12 of the prepaid contracts from the prior 12 months. Excel's sumifs function provides a simple way to model. For SaaS contracts paid annually,

Deferred Revenue = Beginning Deferred Revenue + New Deferred Revenue – Recognized Revenue

New Deferred Revenue = New MRR × Percentage of Prepaid Contracts × 12

Recognized Portion of Deferred Revenue = sumifs(New MRR, Month Ending, "<="&Model Date, Month Ending, ">=" &eomonth(Model Date, –12) × Percentage of Prepaid Contracts

Short-Term Debt

Short-term debt is debt that matures within the next 12 months. This includes convertible debt. We'll tackle the issue of how much money to raise in Chapter 11 when we discuss how to use your model. For now, you can build in placeholders and update the dollar amounts later.

I recommend modeling short-term debt using the schedule of debt investments that we created in Chapter 6 when we discussed interest expense. Figure 8.7 shows the same schedule.

Convertible Note Financing						
Note	**Principal Amount**	**Issue Date**	**Interest Rate**	**Maturity Date**	**Issue Month End**	**Daily Interest**
Note #1	$250,000	1/15/2019	8%	1/1/2021	1/31/2019	$54.79
Note #2	$250,000	3/20/2019	6%	3/20/2021	3/31/2019	$41.10
Month Ending	**1/31/2019**	**2/28/2019**	**3/31/2019**	**4/30/2019**	**5/31/2019**	**6/30/2019**
Short-term Debt (Maturity < 1 Year)	$0	$0	$0	$0	$0	$0
Long-term Debt (Maturity > 1 Year)	$250,000	$250,000	$500,000	$500,000	$500,000	$500,000

Figure 8.7 *Debt schedule.*

We can calculate the balance of short-term debt for any given month using Excel's sumifs function to sum all the debt that has been issued and matures within the next 365 days.

Short-Term Debt = sumifs(Principal Amount, Issue Date, "<="&Model Date, Maturity Date, "<="&Model Date + 365)

Recall that the dates of the note financing events feed into the legal expense dashboard that we created in Chapter 5. Enter estimated legal fees for the transaction within that dashboard

Long-Term Debt

Long-term debt is the sum of all the debt that matures more than 12 months in the future. Using the same schedule of debt and methodology we just described for short-term debt, we can calculate the long-term debt balance in any given month:

Long-Term Debt = sumifs(Principal Amount, Issue Date, "<="&Model Date, Maturity Date, ">"&Model Date + 365)

Accrued Interest Payable

Most convertible notes accrue interest even though no cash payment is required. This appears as an interest expense on the income statement. However, because it doesn't require a cash payment, it collects as a liability on the balance sheet (you have an obligation to pay interest in the future). We also break interest into short- and long-term components based on whether the note matures within 12 months or beyond 12 months, respectively.

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Convertible Note Financing						
Note	**Principal Amount**	**Issue Date**	**Interest Rate**	**Maturity Date**	**Issue Month End**	**Daily Interest**
Note #1	$250,000	1/15/2019	8%	1/1/2021	1/31/2019	$54.79
Note #2	$250,000	3/20/2019	6%	3/20/2021	3/31/2019	$41.10
Month Ending	**1/31/2019**	**2/28/2019**	**3/31/2019**	**4/30/2019**	**5/31/2019**	**6/30/2019**
Short-term Debt (Maturity < 1 Year)	$0	$0	$0	$0	$0	$0
Long-term Debt (Maturity > 1 Year)	$250,000	$250,000	$500,000	$500,000	$500,000	$500,000
Accrued Interest Payable						
Note #1 Accrued Interest	($877)	($2,411)	($4,110)	($5,753)	($7,452)	($9,096)
Note #2 Accrued Interest	$0	$0	($452)	($1,685)	($2,959)	($4,192)
Total Accrued Interest	($877)	($2,411)	($4,562)	($7,438)	($10,411)	($13,288)
Short-term (Maturity < 1 Year)	$0	$0	$0	$0	$0	$0
Long-term (Maturity > 1 Year)	($877)	($2,411)	($4,562)	($7,438)	($10,411)	($13,288)

Figure 8.8 *Debt schedule with interest calculations.*

In the example in Figure 8.8, we calculate accrued interest on the individual notes and sum them together. You don't have to break them out separately, but it's helpful for illustrative purposes in this example. Recall from Chapter 6 that

Daily Interest = Principal Amount × (Interest Rate/365)

And the total accrued interest on each note is given by

Accrued Interest = if(AND(Issue Date <= Model Date, Maturity Date > Model Date),
(Model Date – Issue Date) × Daily Interest)

For each note that has been issued and hasn't matured, we calculate total interest accrued since the issue date. Lastly, we can calculate the monthly short- and long-term interest payable using the sumifs function:

Short-Term Interest Payable = sumifs(Accrued Interest Payable, Issue Date, "<="&Model Date, Maturity Date, "<="&Model Date + 365)

Long-Term Interest Payable = Total Accrued Interest – Short-Term Interest Payable

Equity

Common Stock

For the purpose of a model, the common stock account on the balance sheet is the total dollar amount invested in common stock. As with debt, it is helpful to create a schedule of past and future investments. Figure 8.9 provides an example.

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Equity Financing							
Amount	Date	Type (Common / Preferred)					
$1,000,000	5/15/2019	Preferred					
Month Ending		**1/31/2019**	**2/28/2019**	**3/31/2019**	**4/30/2019**	**5/31/2019**	**6/30/2019**
Equity							
Common Stock		$0	$0	$0	$0	$0	$0
Preferred Stock		$0	$0	$0	$1,000,000	$1,000,000	$1,000,000

Figure 8.9 *Schedule of equity investments.*

We can calculate the common stock balance for any given month using the following formula:

Common Stock = sumifs(Amount, Type, "Common", Date, "<="&Model Date)

Preferred Stock

The preferred stock account represents the dollar amount invested in preferred stock. Use the same schedule for common stock and the same methodology, but distinguish between common and preferred stock.

Preferred Stock = sumifs(Amount, Type, "Preferred", Date, "<="&Model Date)

Recall that the dates of the note financing events feed into the legal expense dashboard that we created in Chapter 5. Enter estimated legal fees for the transactions within that dashboard.

Additional Paid-In Capital

For the purpose of our model, additional paid-in capital captures the total investment in the form of *simple agreements for future equity* (SAFEs), which are technically neither debt nor equity. We use a similar schedule for equity and debt investments, as shown in Figure 8.10.

SAFE Financing							
Amount	**Issue Date**						
Month Ending		**1/31/2019**	**2/28/2019**	**3/31/2019**	**4/30/2019**	**5/31/2019**	**6/30/2019**
Additional Paid-in Capital		$0	$0	$0	$0	$0	$0

Figure 8.10 *Schedule of SAFE investments.*

In the preceding example, the company doesn't have any SAFE investments. The methodology for modeling is identical to that for common and preferred stock described earlier.

Additional Paid-in Capital = sumifs(Amount, Issue Date, "<=" Model Date)

Recall that the dates of the note financing events feed into the legal expense dashboard that we created in Chapter 5. Enter estimated legal fees for the transactions within that dashboard.

Retained Earnings

Retained earnings are the cumulative net income (or loss) since the company's inception. This figure comes directly to from the income statement:

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Current Period Retained Earnings = Previous Period Retained Earnings + Current Period Net Income

Figure 8.11 provides an example.

Month Ending	**1/31/2019**	**2/28/2019**	**3/31/2019**
Beginning Retained Earnings	$0	($56,725)	($110,793)
Net Income	($56,725)	($54,068)	($68,669)
Ending Retained Earnings	($56,725)	($110,793)	($179,462)

Figure 8.11 *Retained earnings model.*

Expect retained earnings to be negative for the first several years.

Sanity Check

At the risk of belaboring the point, the balance sheet has to balance:

Assets = Liabilities + Equity

If it doesn't balance, something is wrong. I recommended building a sanity check into your model to confirm that the balance sheet balances. When it doesn't, you'll have to do some detective work to figure out why.

Conclusion

Figure 8.12 shows the full balance sheet model that we've created throughout this chapter.

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		Assets				
Assumptions		**Current Assets**				
		Cash (From Cash Flow Statement)	$258,979	$443,321	$397,380	$316,221
Days Receivables Outstanding	30	Accounts Receivable	$4,500	$8,910	$13,232	$17,467
Days Inventory Outstanding	0	Inventory	$0	$0	$0	$0
		Long-term Assets				
		Property Plant & Equipment	$0	$3,000	$3,000	$8,000
		- Accumulated Depreciation	$0	($208)	($417)	($838)
		Net PPE	$0	$2,792	$2,583	$7,163
		Total Assets	$263,479	$455,022	$413,196	$340,851
		Liabilities				
		Current Liabilities				
Days Payables Outstanding	60	Accounts Payable	$61,903	$48,901	$66,695	$49,586
% of Annual Contracts	15%	Deferred Revenue	$7,425	$14,175	$20,250	$25,650
Beginning Deferred Revenue	$0	Short-term Debt	$0	$0	$0	$0
		Short-term Accrued Interest Payable	$0	$0	$0	$0
		Long-term Liabilities				
		Long-term Debt	$250,000	$500,000	$500,000	$500,000
		Long-term Accrued Interest Payable	$877	$2,740	$5,712	$8,589
		Total Liabilities	$320,204	$565,816	$592,658	$583,825
		Equity				
		Common Stock	$0	$0	$0	$0
		Preferred Stock	$0	$0	$0	$0
Beginning Retained Earnings	$0	Additional Paid-in Capital	$0	$0	$0	$0
		Retained Earnings	($56,725)	($110,793)	($179,462)	($242,974)
		Total Equity	(56,725)	(110,793)	(179,462)	(242,974)

Figure 8.12 *Detailed monthly balance sheet model.*

Now that we've built our income statement and balance sheet, we have everything in hand to build a cash flow forecast. We had to take a roundabout route to get there, but the cash flow statement is the most important statement. Before building a cash flow model in Chapter 10, we're going to take a brief digression in Chapter 9 to discuss the concept of cash flow and why it's so important, particularly for hardware startups.

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Chapter 9

Brief Digression on Cash Flow

Before we tackle the cash flow statement, it's worth a brief digression to discuss cash flow in general. Cash flow is a critical concept—particularly for hardware businesses. Failure to understand and monitor it appropriately can kill your company. So far we've covered the income statement view of the world, but as we'll soon see, it provides a distorted image.

The Income Statement View of the World

The income statement presents a tidy picture of the world where revenue and expenses sync cleanly. Figure 9.1 illustrates the idea.

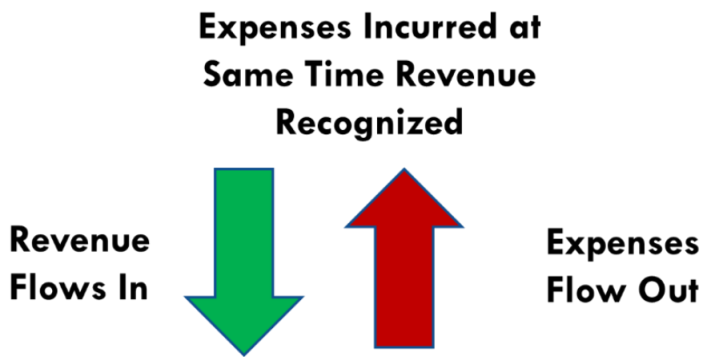

Figure 9.1 *Income statement view of business (expenses matched to revenue).*

The income statement assumes that you receive payments from customers and pay for COGS simultaneously. As long as your gross margins are high enough and your overhead expenses aren't excessive, you have a profitable business. There's a major problem with this perspective: *it's not how cash flows in and out most businesses in the real world.*

What Happens in the Real World (Cash Flow Statement View of the World)

The income statement view ignores timing and paints an artificially neat view of the world. In reality, you usually have to spend cash to create a product before you can sell it to customers and receive cash from them. The whole cash cycle is described next in the context of a simple business we all understand: a lemonade stand.

Accounts Payable

Before you can sell a product, you have to build it. In the case of a hardware product, this means expenses for raw materials, assembly, etc. If you operate a lemonade stand, you purchase sugar, lemons, and cups before you can sell lemonade. As discussed in Chapter 8, suppliers sell goods on credit (i.e., accounts payable). In general, you receive goods or services, create an account payable on the balance sheet, and get to pay the supplier later as shown in Figure 9.2

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Figure 9.2 *Purchasing raw materials on credit and establishing account payable with supplier. Company receives goods and gets to pay supplier later.*

Typical payment terms can range from 0 days (i.e., paying up front) to 90 days. The longer the better because you can wait longer to part with your cash.

Inventory

Manufacturing and assembling a product take time. There is a lag between receiving raw materials and completing a finished product ready to sell to customers. During that time, the company holds an inventory of raw materials and work-in-progress as shown in Figure 9.3.

It's also important to avoid situations where a customer wants to buy from you but you don't have a product to sell. Therefore, if you're producing a physical product, it's a good idea to maintain an inventory of extra product above what you'll sell in the current period. However, building inventory consumes cash because you incur the expense of building and storing those units. In other words, you're fronting the COGS expense before you generate any revenue.

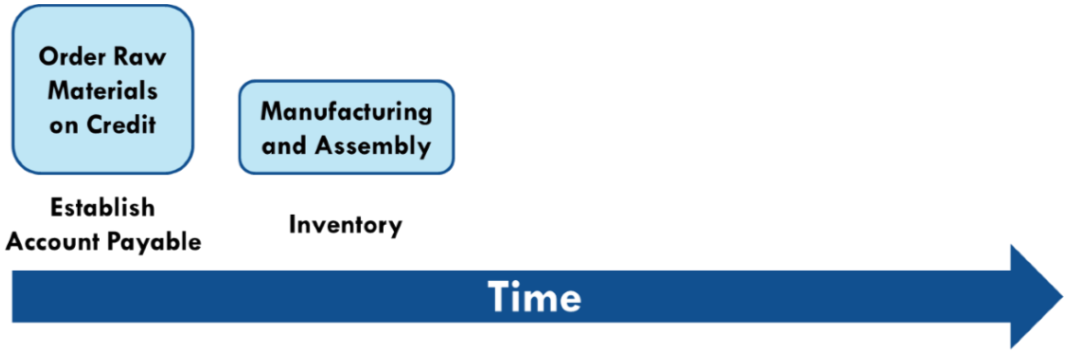

Figure 9.3 *Manufacturing and assembly take time. The company holds an inventory of raw materials and work-in-progress while building its product.*

Let's go back to the lemonade stand. You want to have extra lemons available so that you can produce more lemonade if demand dictates it. You can make a pitcher or cooler full of lemonade in advance so that you don't have to make each cup on demand. But there's a point of diminishing returns. If you make a 50-gallon barrel full of lemonade, you're incurring the costs but may take a long time to sell it all to customers. Figure 9.4 provides an example.

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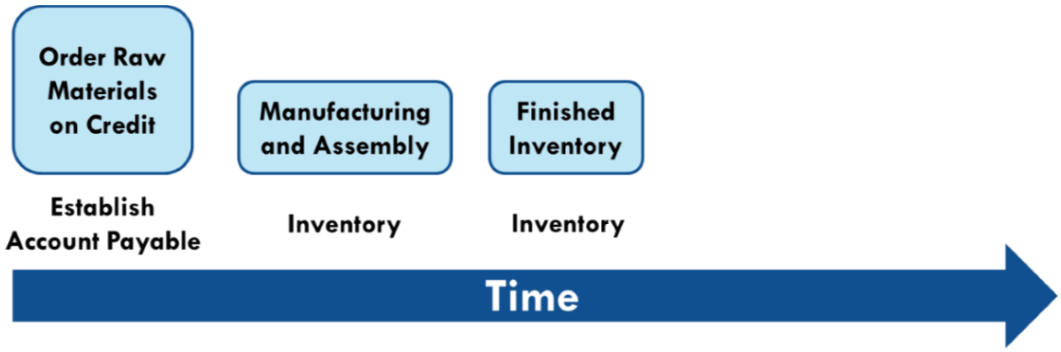

Figure 9.4 *Company holds inventory of finished goods to avoid stock-out situations where a customer wants to purchase but product is unavailable.*

At some point, the company owes cash to suppliers for the previously established accounts payable described earlier, as shown in Figure 9.5.

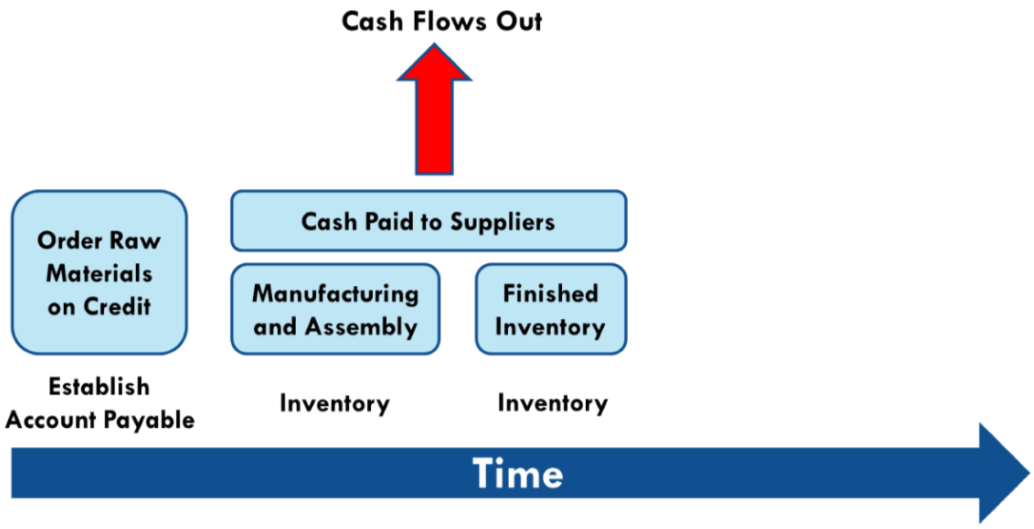

Figure 9.5 *Cash flows out of the business to pay suppliers for goods previously purchased on credit (accounts payable).*

This figure assumes that the company pays suppliers 0–90 days after creating the account payable and that this occurs before selling any product to customers. This is not always the case because the timing of payables and the amount of time required to manufacture, assemble, and ship product vary dramatically from business to business.

Accounts Receivable

As discussed in Chapter 8, unless you sell directly to consumers, customers expect that they can receive their product or service now and pay later. This is the corollary to accounts payable. Your accounts receivable are your customers' accounts payable, and your accounts payable are your suppliers' accounts receivable. Figure 9.6 illustrates the idea.

In the lemonade stand example, suppose that you let a customer take a glass of lemonade today in exchange for payment next month. You've spent money to make the lemonade but won't receive payment until next month.

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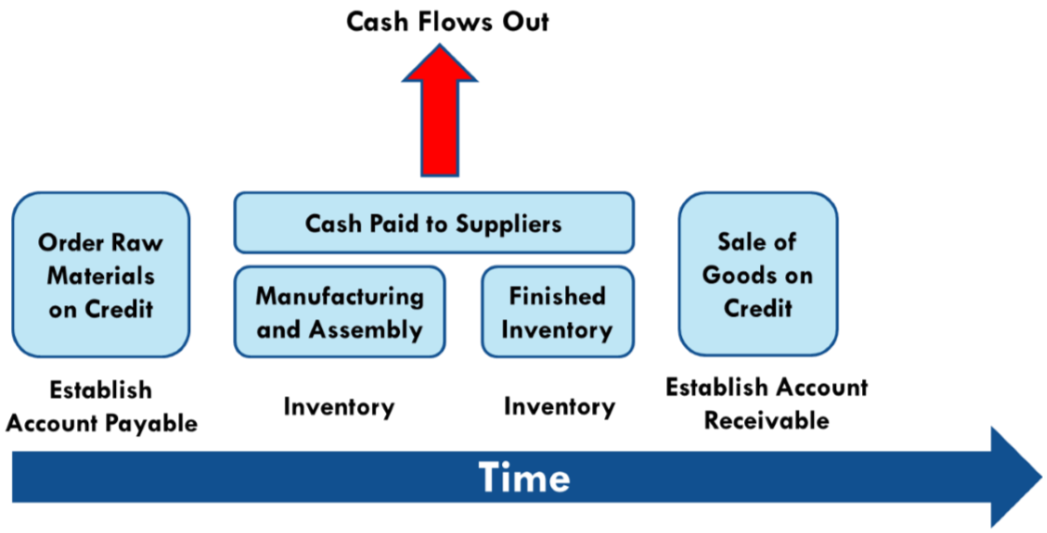

Figure 9.6 *Customers purchase goods on credit, and company establishes account receivable. Cash flows out of the business to pay suppliers, but cash from customers has not yet flowed into the business.*

Similar to accounts payable, typical terms for receivables range from 0 days (upfront payment) to 90 days as shown in Figure 9.7. In general, the shorter the payment terms the better that so you can collect cash faster.

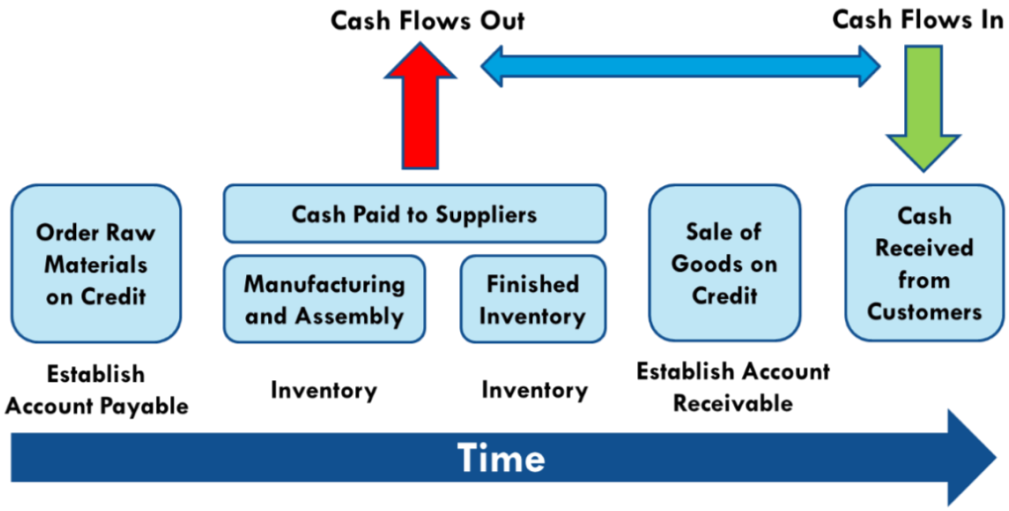

Figure 9.7 *Cash received from customers for previously created accounts receivable. Typical timeline is 0–90 days.*

In some cases, customers prepay for transactions or subscriptions. When you receive cash but haven't delivered a product or service yet, that payment is a liability called *deferred revenue*. After you deliver your end of the bargain, you can recognize revenue. Deferred revenue improves the cash flow situation because you've received cash before incurring all the expenses associated with delivering the product or service.

The Bad News for Startups

The net effect is that cash flows out of the business for expenses months before cash from customers flows into the business. The bad news for startups is that you don't have much negotiating leverage with suppliers or customers. Suppliers are unlikely to extend generous credit terms (60 or 90 days for payment) because they're not confident that

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you'll still be in business 60 or 90 days from now. They may require upfront payment. Similarly, customers likely will push for generous payment terms for themselves because you may need them more than they need you.

The net result is that there can be a significant lag between the time that cash flows out of your business to purchase raw materials and the time that you receive cash from customers, as shown in Figure 9.8.

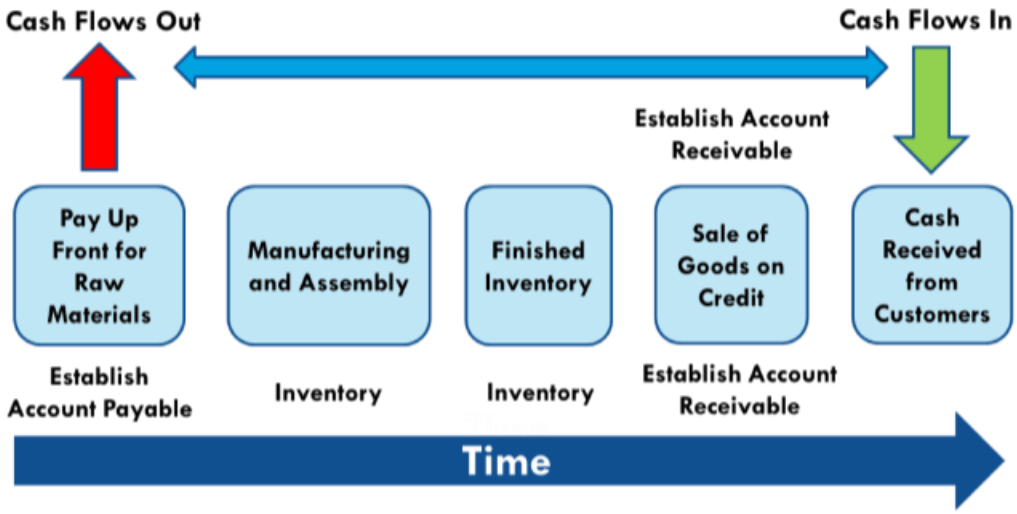

Figure 9.8 *Cash flow cycle for startups. Suppliers are reluctant to offer generous credit terms, and customers push for generous terms for themselves.*

The time between cash flowing out to purchase raw materials and cash flowing in from customers can easily be 3–6 months. For example, a complex robotic system produced at small scale may require weeks to assemble. If the company pays for components up front, takes 60 days to build and sell the product, and then receives payment from the customers on 60-day payment terms, there is a full 120 days between cash expense for COGS and cash receipt from revenue. If the COGS are small compared with revenue (i.e., a high gross margin), this is manageable. But when COGS comprises a significant percentage of the sale price (i.e., low gross margin), this is really hard to navigate.

Can't I Just Grow Faster?

It's a somewhat counterintuitive point, but in general, the faster a company grows, the more cash it consumes. This is critical for hardware startups to understand. You have to spend cash today for products you'll sell in the future. The faster you grow, the more products you'll sell in the future. The more products you sell in the future, the more cash you have to spend now. Figure 9.9 provides a simple example assuming that suppliers must be paid up front, customers pay 90 days after receiving the product, and units are manufactured and assembled in the same month they are sold.

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Assumptions		Monthly Growth	Month Ending	1/31/2019	2/28/2019	3/31/2019	4/30/2019	5/31/2019	6/30/2019
Price per Unit:	$1,000	10%	Units Sold	10	11	13	15	17	19
COGS per Unit:	$500		Revenue	$10,000	$11,000	$13,000	$15,000	$17,000	$19,000
			Cash Received from Past Sales	$0	$0	$0	$10,000	$11,000	$13,000
Day Sales Outstanding	90		Cash Required for Currnet Period Sales	($5,000)	($5,500)	($6,500)	($7,500)	($8,500)	($9,500)
Days Payables Outstanding	0		Cash Surplus / Deficit	($5,000)	($5,500)	($6,500)	$2,500	$2,500	$3,500
		20%	Units Sold	10	12	15	18	22	27
			Revenue	$10,000	$12,000	$15,000	$18,000	$22,000	$27,000
			Cash Received from Past Sales	$0	$0	$0	$10,000	$12,000	$15,000
			Cash Required for Currnet Period Sales	($5,000)	($6,000)	($7,500)	($9,000)	($11,000)	($13,500)
			Cash Surplus / Deficit	($5,000)	($6,000)	($7,500)	$1,000	$1,000	$1,500
		30%	Units Sold	10	13	17	23	30	39
			Revenue	$10,000	$13,000	$17,000	$23,000	$30,000	$39,000
			Cash Received from Past Sales	$0	$0	$0	$10,000	$13,000	$17,000
			Cash Required for Currnet Period Sales	($5,000)	($6,500)	($8,500)	($11,500)	($15,000)	($19,500)
			Cash Surplus / Deficit	($5,000)	($6,500)	($8,500)	($1,500)	($2,000)	($2,500)
		40%	Units Sold	10	14	20	28	40	56
			Revenue	$10,000	$14,000	$20,000	$28,000	$40,000	$56,000
			Cash Received from Past Sales	$0	$0	$0	$10,000	$14,000	$20,000
			Cash Required for Currnet Period Sales	($5,000)	($7,000)	($10,000)	($14,000)	($20,000)	($28,000)
			Cash Surplus / Deficit	($5,000)	($7,000)	($10,000)	($4,000)	($6,000)	($8,000)
		50%	Units Sold	10	15	23	35	53	80
			Revenue	$10,000	$15,000	$23,000	$35,000	$53,000	$80,000
			Cash Received from Past Sales	$0	$0	$0	$10,000	$15,000	$23,000
			Cash Required for Currnet Period Sales	($5,000)	($7,500)	($11,500)	($17,500)	($26,500)	($40,000)
			Cash Surplus / Deficit	($5,000)	($7,500)	($11,500)	($7,500)	($11,500)	($17,000)

Figure 9.9 *The faster a company grows, the more cash it consumes.*

Conclusion

As you work through your business model and build your financial model, it's important to remember the key drivers of cash flow.

- **Payment terms from suppliers.** These payment terms dictate your accounts payable. The longer you can wait to pay your suppliers, the better, because you can receive goods/services to enable you to move your business forward before parting with cash.

- **Inventory policy.** It's important to maintain *some* inventory so that you don't face a situation where you can't serve a customer who wants to buy from you. However, inventory consumes cash, and holding too much inventory creates significant challenges.

- **Payment terms with customers.** These payment terms dictate your accounts receivable. The faster you can receive payment from customers, the better. It's often worth offering a discount for early payment to incentivize your customers to pay early and improve your cash flow. Getting customers to pay up front for transactions or pay in advance for annual subscriptions is optimal.

- **Gross margins.** Your gross margin is the difference between revenue and COGS. The greater the gross margin, the better is your cash position and the faster you can grow.

  Consider two companies: Company A and Company B. Company A sells a product for $500 that it produces for $250. For each unit the company sells, it generates enough cash to produce two new units. Company B sells an identical product for $500, but it produces its product for $50 instead of $250. Each unit sold by Company B generates enough cash to produce 10 new units. All other

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things being equal, Company B can grow much faster than Company A without requiring outside investment.

Now that we understand the importance of cash flow and have an intuition for the levers that control it, we're ready to tackle the cash flow statement. Chapter 10 walks you through creating a cash flow forecast. The cash flow forecast requires no new assumptions and derives from the income statement and balance sheet models we've already built.

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Chapter 10

Cash Flow Statement

The cash flow statement is the most critical of the three financial statements in our model. Figure 10.1 shows a typical cash flow statement.

Cash Flow Statement	
Year	**2019**
Beginning Cash Balance	$0
Net Income	($716,835)
Change in Cash from Operations	$284,742
Change in Cash from Investing Activities	($8,000)
Change in Cash from Financing Activities	$500,000
Net Cash Burn / Generation	$59,906
Ending Cash Balance	$59,906

Figure 10.1 *Generic cash flow statement.*

It's often easiest to build the cash flow statement indirectly, which is why we're tackling it last. If you're unfamiliar with cash flow statements, review Appendix 3. Now that we've built income statement and balance sheet models, creating the cash flow statement is easy. We simply combine elements of the balance sheet and income statement.

Figure 10.2 shows an example cash flow model that we'll build throughout this chapter.

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Cash Flow Assumptions		Cash Flow Statement			
		Month Ending	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
Beginning Cash Balance	$0	Beginning Cash Balance	$0	$258,979	$443,321
		Net Income	($56,725)	($54,068)	($68,669)
		Cash Flow from Operations			
		+ Depreciation	$0	$208	$208
		+ Non-Cash Interest	$877	$1,863	$2,973
Beginning Accounts Receivable	$0	- Changes in Accounts Receivable	($4,500)	($4,410)	($4,322)
Beginning Inventory	$0	- Changes in Inventory	$0	$0	$0
Beginning Accounts Payable	$0	+ Changes in Accounts Payable	$61,903	($13,002)	$17,794
Beginning Deferred Revenue	$0	+ Changes in Deferred Revenue	$7,425	$6,750	$6,075
		Cash Flow from Investing Activities			
		- Capital Expenditures	$0	($3,000)	$0
		+ Disposal of PP&E Assets	$0	$0	$0
		Cash Flow from Financing Activities			
Beginning Debt Financing	$0	+ Debt Financing	$250,000	$250,000	$0
Beginning SAFE Financing	$0	+ SAFE Financing	$0	$0	$0
Beginning Equity Financing	$0	+ Equity Financing	$0	$0	$0
		Net Cash Burn / Generation	$258,979	$184,342	($45,940)
		Ending Cash Balance	$258,979	$443,321	$397,380

Figure 10.2 *Example layout for statement of cash flows.*

Beginning Cash Balance

The *beginning cash balance* represents the amount of cash in the bank at the beginning of a given period. The remainder of the statement tallies the sources and uses of cash to determine whether the company burns or generates cash and calculates an ending cash balance.

Beginning cash balance for the first period of your model is the money you actually have in the bank at the time of building. For the remaining periods,

Current Period Beginning Cash Balance = Previous Period Ending Cash Balance

Figure 10.3 illustrates this.

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Cash Flow Assumptions		Cash Flow Statement			
		Month Ending	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
Beginning Cash Balance	$0	Beginning Cash Balance	$0	$258,979	$443,321
		Net Income	($56,725)	($54,068)	($68,669)
		Cash Flow from Operations			
		+ Depreciation	$0	$208	$208
		+ Non-Cash Interest	$877	$1,863	$2,973
Beginning Accounts Receivable	$0	- Changes in Accounts Receivable	($4,500)	($4,410)	($4,322)
Beginning Inventory	$0	- Changes in Inventory	$0	$0	$0
Beginning Accounts Payable	$0	+ Changes in Accounts Payable	$61,903	($13,002)	$17,794
Beginning Deferred Revenue	$0	+ Changes in Deferred Revenue	$7,425	$6,750	$6,075
		Cash Flow from Investing Activities			
		- Capital Expenditures	$0	($3,000)	$0
		+ Disposal of PP&E Assets	$0	$0	$0
		Cash Flow from Financing Activities			
Beginning Debt Financing	$0	+ Debt Financing	$250,000	$250,000	$0
Beginning SAFE Financing	$0	+ SAFE Financing	$0	$0	$0
Beginning Equity Financing	$0	+ Equity Financing	$0	$0	$0
		Net Cash Burn / Generation	$258,979	$184,342	($45,940)
		Ending Cash Balance	$258,979	$443,321	$397,380

Figure 10.3 *Beginning cash balance equals previous month's ending cash balance.*

Cash Flow from Operations

Cash flow from operations captures the cash generated (or burned) by commercial activities (i.e., building and selling products to customers, paying employees, etc.) Think of cash flow from operations as the cash equivalent of the income statement. We begin with net income from the income statement and make several adjustments—discussed in detail below—to represent the flow of cash in and out of the business.

Recall from our discussion in Chapter 9 that the income statement overlooks timing effects that are important to understanding cash flow. The adjustments below move from an income statement perspective to an accurate cash flow perspective. Specifically, we adjust for items that affect cash flow but don't appear on the income statement, including changes in accounts receivable, inventory, accounts payable, and deferred revenue:

$$\textit{Cash Flow from Operations} = \textit{Net Income} - \Delta\ \textit{Accounts Receivable} - \Delta\ \textit{Inventory} + \Delta\ \textit{Accounts Payable} + \Delta\ \textit{Deferred Revenue} + \Delta\ \textit{Depreciation} + \Delta\ \textit{Noncash Interest Expense}$$

where Δ represents a change in value between two periods. These values come directly from the model balance sheet.

Net Income

Net income is simply the net income for the period reported on your income statement model.

Change in Accounts Receivable

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As discussed in prior chapters, accounts receivable represents money owed by customers. It's critical to remember that we're interested in the *change* in accounts receivable rather than the absolute level of accounts receivable:

Δ Accounts Receivable = Current Period Accounts Receivable – Previous Period Accounts Receivable

The change in accounts receivable comes directly from the model balance sheet in Chapter 8. Figure 10.4 provides an example.

Assumptions		**Month Ending**	**1/31/2019**	**2/28/2019**	**3/31/2019**
Days Receivables Outstanding	30	Accounts Receivable	$4,500	$8,910	$13,232
Beginning Accounts Receivable	$0	- Changes in Accounts Receivable	$4,500	$4,410	$4,322

Figure 10.4 *Modeling changes in accounts receivable for cash flow model.*

The logic behind this adjustment is straightforward. The revenue line on the income statement—and hence net income—ignores the timing of when we receive cash from customers. The income statement can reflect income even though we haven't received cash.

When customers have received goods or services but haven't paid, the amount they owe appears in accounts receivable. An *increase* in accounts receivable means more money owed by customers. Thus the cash flow into the business is less than the net income implied by the income statement. Conversely, a *decrease* in accounts receivable means that some customers paid their outstanding bills, representing a positive effect on cash flow.

Change in Inventory

As with changes in accounts receivable, we need to adjust for the *change* in inventory, not the absolute level:

Δ Inventory = Current Period Inventory – Previous Period Inventory

The change in inventory comes directly from the model balance sheet from Chapter 8. Figure 10.5 provides an example. We've been building a model for a software company, so in this case, there is no inventory.

Assumptions		**Month Ending**	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
Days Inventory Outstanding	0	Inventory	$0	$0	$0
Beginning Inventory	$0	- Changes in Inventory	$0	$0	$0

Figure 10.5 *Modeling changes in inventory for cash flow model.*

Recall that COGS on the income statement only considers the cost of products sold to customers during a given period. However, as discussed previously, we often build more product than we sell in order to maintain an inventory. The inventory account on the balance sheet increases when we buy or produce additional inventory. The value of the inventory account decreases when we sell products to customers.

Thus an *increase* in inventory reduces cash balance because we spent money to produce additional inventory that we haven't sold yet.

Changes in Accounts Payable

At the risk of belaboring the point, it's critical that the adjustment is the *change* in accounts payable and not the absolute level of accounts payable:

Δ Accounts Payable = Current Period Accounts Payable – Previous Period Accounts Payable

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The change in accounts payable comes directly from the model balance sheet in Chapter 8. Figure 10.6 provides an example.

Assumptions		Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
Days Payables Outstanding	60	Accounts Payable	$61,903	$48,901	$66,695
Beginning Accounts Payable	$0	+ Changes in Accounts Payable	$61,903	($13,002)	$17,794

Figure 10.6 *Modeling changes in accounts payable for cash flow model.*

The income statement recognizes expenses when they are incurred, not necessarily when they are paid. Accounts payable increases when we have received goods or services from a supplier but haven't paid yet. Payables decrease when we pay suppliers. An increase in payables represents a source of cash because you've received goods or services but haven't had to part with cash. It's like a loan from the supplier. Conversely, a decrease in payables represents a use of cash because your company paid cash to its suppliers.

Changes in Deferred Revenue

Note: I often ignore deferred revenue in startup financial models because it simplifies the model and provides a more conservative estimate of cash position. If you choose to model deferred revenue.

$$\Delta \text{ Deferred Revenue} = \text{Current Period Deferred Revenue} - \text{Previous Period Deferred Revenue}$$

Deferred revenue represents customer prepayments, as discussed in Chapter 8. If a customer pays an annual contract upfront, but revenue is recognized on a monthly basis, the company has received more cash than suggested by the income statement. An increase in deferred revenue means prepayments and an increase in cash. A decrease in deferred revenue means that revenue from previously prepaid contracts is recognized. You received no new cash even though the income statement reflects income.

The change in deferred revenue comes directly from the model balance sheet in Chapter 8. Figure 10.7 provides an example.

Assumptions		Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
% of Annual Contracts:	15%	Deferred Revenue	$7,425	$14,175	$20,250
Beginning Deferred Revenue:	$0	+ Changes in Deferred Revenue	$7,425	$6,750	$6,075

Figure 10.7 *Modeling changes in deferred revenue for cash flow model.*

Add Depreciation

Depreciation expense represents the degradation of pieces of equipment and other hard assets over time. As discussed in prior chapters, depreciation is a noncash expense. You may include a depreciation expense on the income statement, but the depreciation expense bears no relationship to the timing of cash spent to acquire property, plant, and equipment (PP&E) assets.

As noted previously, for startup financial models, I often treat all equipment purchases as expenses to avoid having to deal with depreciation. However, if we include depreciation expense in the income statement, we have to make adjustments. Because it is a noncash expense, we add depreciation to net income because we recognized an expense on the income statement, but no cash actually left the business. We simply add the depreciation expense from the income statement we created in Chapter 6.

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Add Noncash Interest Expense

As mentioned in prior chapters, convertible notes often accrue interest but don't require a cash payment. This interest accrual appears as an expense on the income statement, but no cash leaves the business. Thus we add noncash interest from the income statement we created in Chapter 6 to net income to get a more accurate representation of cash flow.

Cash Flow from Investment Activities

The terminology is confusing, but in accounting jargon, *investment activities* do *not* refer to money raised from investors. Rather, they are the company's investments in capital expenditures such as buildings, durable equipment, and other PP&E.

Capital Expenditures

Remember that capital expenditures don't appear on the income statement. But they do require cash and affect cash flow. As noted previously, for startup financial models, I often treat all capital expenditures as expenses to simplify the model. However, if we include capital expenditures on the balance sheet, it's important to capture their effect on cash flow.

The easiest way to incorporate these cash flows into your model is to subtract the difference in *gross* PP&E from your model balance sheet. By *gross*, I mean *before* making any deductions for depreciation. This comes from the model balance sheet in Chapter 8.

$$\text{Capital Expenditures} = \Delta\ \text{PP\&E} = \max(\text{Current Period Gross PP\&E} - \text{Previous Period Gross PP\&E}, 0)$$

Figure 10.8 provides an example.

Cash Flow from Investing Activities			
Month Ending	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
Property Plant & Equipment	$0	$3,000	$3,000
- Accumulated Depreciation	$0	($208)	($417)
Net PPE	$0	$2,792	$2,583

Figure 10.8 *Modeling capital expenditures for cash flow model.*

An increase in gross PP&E means that you purchased additional PP&E assets, which requires cash and reduces your cash balance. A decrease in gross PP&E means that you sold or retired PP&E assets. The effects on cash are discussed in the next section.

Disposal of PP&E Assets

Sometimes companies generate cash by selling PP&E assets. This isn't a core part of the company's business, so we don't consider it an operating cash flow. Rather, we reflect it under *cash flow from investment activities*. Recall the schedule of capital expenditures that we created back in Chapter 6, shown in Figure 10.9.

Investment Activities (Capital Expenditures)						
Item	**Purchase Amount**	**Purchase Date**	**Salvage Value**	**Useful Life (Months)**	**Monthly Depreciation**	**Disposal Date**
3D Printer	$3,000	2/15/2019	$500	12	($208.33)	2/15/2020
3D Printer #2	$5,000	4/15/2019	$750	20	($212.50)	12/15/2020
Month Ending	1/31/2019	2/28/2019	3/31/2019	4/30/2019	5/31/2019	6/30/2019
Depreciation Expense	$0	($208)	($208)	($421)	($421)	($421)

Figure 10.9 *Schedule of capital expenditures.*

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We assumed a salvage value for each piece of equipment. This means the price at which we'll sell each piece of equipment at the end of its useful life. For instance, we assume that we'll sell a 3D printer for $500 on February 15, 2020, and we'll sell 3D printer number 2 for $750 on April 15, 2021. To estimate the proceeds from the disposal of PP&E assets, we can use Excel's sumifs function:

Disposal of PP&E Assets = sumifs(Salvage Value, Disposal Date, "<="&Model Date, Disposal Date, ">"& eomonth(Model Date, -1))

Cash Flow from Financing Activities

Cash flow from financing activities captures cash received from (or paid to) investors. For a seed-stage company, this is usually an increase in cash, where investors provide cash to the company.

Recall that the common stock, preferred stock, and additional paid-in capital portions of your balance sheet capture cash that flows into the company from investors. Thus an increase in those accounts on the balance sheet means an increase in cash from investors:

Cash Flow from Financing Activities = Δ (Common Stock + Preferred Stock + Additional Paid-in Capital)
= (Current Period Common Stock + Preferred Stock + Additional Paid-in Capital) – (Previous Period Common Stock + Preferred Stock + Additional Paid-in Capital)

Figure 10.10 illustrates this.

Assumptions		Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019
		Long-term Liabilities			
		Long-term Debt	$250,000	$250,000	$500,000
		Long-term Accrued Interest Payable	$877	$2,411	$4,562
		Equity			
		Common Stock	$0	$0	$0
		Preferred Stock	$0	$0	$0
		Additional Paid-in Capital	$0	$0	$0
Beginning Debt Financing	$0	+ Debt Financing	$250,000	$0	$250,000
Beginning SAFE Financing	$0	+ SAFE Financing	$0	$0	$0
Beginning Equity Financing	$0	+ Equity Financing	$0	$0	$0

Figure 10.10 *Modeling cash flow from financing activities for cash flow model.*

Ending Cash Balance

We began the cash flow statement with the starting cash balance and worked through all the adjustments for cash flowing into and out of the business. Given this, it's simple to calculate the ending cash balance:

Ending Cash Balance = Beginning Cash Balance + Cash Flow from Operations + Cash Flow from Investment Activities + Cash Flow from Financing Activities

In extended form,

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Ending Cash Balance = Beginning Cash Balance + Net Income – Δ Accounts Receivable – Δ Inventory + Δ Accounts Payable + Δ Deferred Revenue + Depreciation + Noncash Interest – max(Δ PP&E, 0) + Δ (Common Stock + Preferred Stock + Additional Paid-in Capital)

As discussed previously, the ending cash balance for the current period becomes the starting cash balance for the next period, which cascades through the model. Note that the ending cash balance for a given month should match the cash balance for the balance sheet for that month.

Recall from Chapter 8 that we ignored the cash balance on our balance sheet. We can now reference the ending cash balance on the cash flow statement to fill in the balance sheet. The ending cash balance on the cash flow statement for a given period equals the cash balance on the balance sheet for the same period. Figure 10.11 provides an example.

Cash Flow Statement			
Month Ending	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
Ending Cash Balance	$258,979	$443,321	$397,380
Balance Sheet			
Month Ending	**1/31/2019**	**2/28/2019**	**3/31/2019**
Cash (from Cash Flow Statement)	$258,979	$443,321	$397,380

Figure 10.11 *Ending cash balance from cash flow model matches ending cash balance from balance sheet model.*

Conclusion

We've now completed our monthly model that includes an income statement, balance sheet, and cash flow statement. Now that we have a functional model, we'll spend the next few chapters exploring how to use it. There are two primary purposes for a model: raising money and managing your business. We begin with the former.

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Chapter 11

Using Your Model

Now that we've built a model, it's important to understand how to use it effectively. Let's break it into two broad categories: internal (i.e., managing your company and external (i.e., sharing with investors)). I'll offer a few suggestions that I've found to be helpful.

Internal Use

A model is an invaluable tool for making business decisions, estimating financing needs, and tracking the performance of your business.

Decision Making

As discussed earlier in this book, a model provides a low-risk way to explore and test business decisions. If you're considering a change in pricing, a new sales channel, a new product extension, a restructuring of your customer support efforts, etc., you can test the effects of each of these decisions on your model. Simply change your assumptions or modify the model and examine the output. It can be very enlightening. I've seen companies drop a possibly disastrous new product line extension because they recognized, after modeling several scenarios, that it would cost a lot and contribute minimally. Be sure to save a new version before making major changes.

Financial Planning

It's critical to understand how much cash you have in the bank and how much you need to achieve specific commercial milestones.

Most startups require multiple rounds of funding to reach profitability. Start by selecting the metrics you'll need to hit to raise the next round of funding. If you're raising a seed round, understand what you'll need to accomplish to raise a Series A. Then take the minimum cash balance in your model between now and when you estimate achieving the milestones. This tells you the minimum amount you need to raise to hit the milestones if everything goes according to plan.

Caveat: Things rarely go according to plan. I recommend raising up to 50% more than your budget suggests so that you have some flexibility.

While I recommend sizing your round based on achieving milestones, it's also important to consider time. Many first-time entrepreneurs underestimate how much time and effort fund-raising requires. I don't recommend raising a round of funding that will last for less than 18 months or you'll too great a proportion of your time fund-raising and severely hinder your growth.

Figure 11.1 provides an example.

Cash Flow Statement

Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019	30-Apr-2019	31-May-2019	30-Jun-2019	31-Jul-2019	31-Aug-2019	30-Sep-2019	31-Oct-2019
Ending MRR	$4,500	$8,910	$13,232	$17,467	$21,618	$25,685	$34,172	$42,488	$50,639	$63,126
Beginning Cash Balance	$0	$8,979	($56,679)	($102,620)	($183,779)	($242,359)	($294,787)	($338,296)	($409,982)	($455,755)
Net Cash Burn / Generation	$8,979	($65,658)	($45,940)	($81,159)	($58,580)	($52,428)	($43,508)	($71,686)	($45,773)	($7,510)
Ending Cash Balance	$8,979	($56,679)	($102,620)	($183,779)	($242,359)	($294,787)	($338,296)	($409,982)	($455,755)	($463,265)

Figure 11.1 *Simplified cash flow forecast for determining investment needs.*

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Suppose that you've determined that you need to reach at least $50K of monthly recurring revenue (MRR) in order to raise the next round of funding. Figure 11.1 shows $50K MRR in September. At that time, the company has a *negative* cash balance of $455,755. This means that you must raise at least $455,755 to fund the company through that timeline. However, as discussed previously, things don't always go according to plan, and fund-raising takes time, so it's best to build in a margin of safety. Applying a 50% buffer suggests raising roughly $700K.

Performance Tracking

Circumstances can change quickly. It's important to monitor your actual monthly performance to understand your cash position and whether you need to raise additional money to achieve milestones. It's also important to compare actual performance with expected performance on a regular basis to understand whether actual performance has deviated and what actions you can take to improve it.

At the beginning, your model probably won't provide accurate predictions. The goal is for your model and reality to converge over time so that your model accurately predicts what will happen next month or next quarter.

Suggested Process

For all three of the cases described earlier, it's important to make the model to track reality as closely as possible. This involves updating the model regularly to calibrate expected performance with actual performance. I recommend the following process for updating and revising your model:

- Maintain a rolling 12-month forecast. For example, begin with January–December 2019. As each month passes, extend the forecast by one month so that you're always looking 12 months into the future. In February 2019, the model extends to January 2020.

- At the beginning of the year, save a "gold standard" copy of your model to serve as a budget for the year. Do not alter this model. We'll refer to this as the *budget model*. Save a second copy called the *working model* to update throughout the year.

- At the end of each month, compare your actual performance with the predicted performance from the budget model, and try to understand why they differ. It is particularly important to compare your projected cash balance with actual cash balance to ensure that you have adequate runway. Figure 11.2 provides an example for a software business.

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Month Ending - 1/31/2019				
Category	**Budget**	**Actual**	**Variance**	**Variance (%)**
Sales Headcount (If Start Date < Month Ending Date) Hiring Plan Tab	1	1	0	0%
Productive Reps (Start Date < Month Ending Date - Time to Productivity)	1	1	0	0%
Units Sold (Productive Reps x Units Sold per Productive Rep)	2	1	-1	-50%
New MRR (Units Sold x Price)	$4,500	$2,000	($2,500)	-56%
Beginning MRR	$0	$0	$0	--
New MRR	$4,500	$2,000	($2,500)	-56%
Churn MRR (Monthly Churn x Beginning MRR)	$0	$0	$0	--
Ending MRR	$4,500	$2,000	($2,500)	-56%
Revenue	$4,500	$2,000	($2,500)	-56%
Hosting Expense (Hosting Expense per User x Users)	($100)	($115)	($15)	15%
Customer Support Headcount	1	1	0	0%
Customer Support Expense (Customer Support Headcount x Salary)	($3,333)	($3,333)	$0	0%
Total COGS (Hosting Expense + Customer Support Expense)	($3,433)	($3,448)	($15)	0%
Gross Profit (Revenue - Total COGS)	$1,067	($1,448)	($2,515)	-236%

Figure 11.2 *Comparison of budgeted and actual performance. Note: The income statement was truncated at the gross profit line in order to fit the image on one page. The analysis should be conducted for the full income statement, balance sheet, and cash flow statement.*

- Update the assumptions in your working model so that the predictions from the working model match the actual results as closely as possible. This helps to refine the assumptions. Figures 11.3 and 11.4 provide an example

		Month Ending - 1/31/2019	**1/31/2019**	**1/31/2019**
		Category	Actual	Model
		Sales Headcount (If Start Date < Month Ending Date) **Hiring Plan Tab**	1	1
Time to Productivity (Days)	90	Productive Reps (Start Date < Month Ending Date - Time to Productivity)	1	1
Units sold per Productive Rep	2	Units Sold (Productive Reps x Units Sold per Productive Rep)	1	2
Price / Month	$2,250	New MRR (Units Sold x Price)	$2,000	$4,500
		Beginning MRR	$0	$0
		New MRR	$2,000	$4,500
Monthly Churn	2.0%	Churn MRR (Monthly Churn x Beginning MRR)	$0	$0
		Ending MRR	$2,000	$4,500
		Revenue	$2,000	$4,500
Hosting Expense per User	$100.00	Hosting Expense (Hosting Expense per User x Users)	($115)	($100)
Customers per Customer Support Rep	25	Customer Support Headcount	1	1
Customer Support Salary (Monthly)	$3,333.33	Customer Support Expense (Customer Support Headcount x Salary)	($3,333)	($3,333)
		Total COGS (Hosting Expense + Customer Support Expense)	($3,448)	($3,433)
		Gross Profit (Revenue - Total COGS)	($1,448)	($1,183)

Figure 11.3 *Begin with original assumptions from model.*

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Assumptions		Month Ending - 1/31/2019	1/31/2019	1/31/2019
		Category	Actual	Model
		Sales Headcount (If Start Date < Month Ending Date) **Hiring Plan Tab**	1	1
Time to Productivity (Days)	90	Productive Reps (Start Date < Month Ending Date - Time to Productivity)	1	1
Units sold per Productive Rep	1	Units Sold (Productive Reps x Units Sold per Productive Rep)	1	1
Price / Month	$2,000	New MRR (Units Sold x Price)	$2,000	$2,000
		Beginning MRR	$0	$0
		New MRR	$2,000	$2,000
Monthly Churn	2.0%	Churn MRR (Monthly Churn x Beginning MRR)	$0	$0
		Ending MRR	$2,000	$2,000
		Revenue	$2,000	$2,000
Hosting Expense per User	$115.00	Hosting Expense (Hosting Expense per User x Users)	($115)	($100)
Customers per Customer Support Rep	25	Customer Support Headcount	1	1
Customer Support Salary (Monthly)	$3,333.33	Customer Support Expense (Customer Support Headcount x Salary)	($3,333)	($3,333)
		Total COGS (Hosting Expense + Customer Support Expense)	($3,448)	($3,433)
		Gross Profit (Revenue - Total COGS)	($1,448)	($1,433)

Figure 11.4 *Update assumptions to reconcile actual performance with model performance. The updated assumptions are shaded in blue.*

- Updating assumptions won't make your working model match your actual results exactly. In the preceding example, we probably don't want to update our assumptions around hosting costs based on a single user.

- After you match the model and actual performance as closely as possible by making reasonable updates to your assumptions, hard code the actual results into your working model. The purpose is to revise your working model for all future months based on past actual performance so that you have the most updated and accurate representation of reality.

- Review the revised forecast from your working model to determine whether your current cash position is adequate to achieve required milestones and whether any major changes in strategic direction are warranted.

- Repeat this process monthly. Over time, your working model will become more predictive of actual performance, and your assumptions will align better with reality. *Note*: you typically only create a budget annually, while you update the rolling forecast on a monthly basis.

External Use

Pitch Decks and Executive Summaries

Investors like to see financial projections as part of a pitch deck or executive summary. The goal is to calibrate expectations. Investors want to understand whether your goals and expectations for the business align with theirs. If your projections show only modest growth or, conversely, have outrageously optimistic expectations, investors will likely decline to invest.

In a first contact with investors, they're simply trying to determine whether it's worth their time to dig deeper. They don't have the time or desire to dig into a detailed financial model during a first meeting. Thus a simple high-level

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summary is adequate for a pitch deck or executive summary. You'll spend time reviewing a detailed model with them later in due diligence.

I recommend creating a simple annual or quarterly summary of the monthly models we've built through the first 10 chapters of this book. There are two ways to approach creating an annual summary. The simplest way is to maintain the same category/account headings as your monthly model but present them in an annual form rather than a monthly form; that is, the model has the same number of rows as your monthly model, with the same row headings, but a smaller number of columns. We'll call this the *detailed roll-up*. Figure 11.5 provides an example.

Income Statement			
Year	**2019**	**2020**	**2021**
Sales Headcount (If Start Date < Month Ending Date)	3	3	3
Productive Reps (Start Date < Month Ending Date - Time to Productivity)	3	3	3
Units Sold (Productive Reps x Units Sold per Productive Rep)	42	72	72
New MRR (Units Sold x Price)	$94,500	$162,000	$162,000
Beginning MRR	$0	$87,356	$213,866
New MRR	$94,500	$162,000	$162,000
Churn MRR (Monthly Churn x Beginning MRR)	($7,144)	($35,490)	($62,726)
Ending MRR	$87,356	$213,866	$313,140
Revenue	$444,556	$1,901,014	$3,235,552
Hosting Expense (Hosting Expense per User x Users)	($19,758)	($84,489)	($143,802)
Customer Support Headcount	2	4	6
Customer Support Expense (Customer Support Headcount x Salary)	($50,000)	($130,000)	($213,333)
Total COGS (Hosting Expense + Customer Support Expense)	($69,758)	($214,489)	($357,136)
Gross Profit (Revenue - Total COGS)	$374,798	$1,686,524	$2,878,416
Gross Margin % (Gross Profit / Revenue)	84%	89%	89%

Figure 11.5 *Detailed annual summary. Note: This figure only includes the revenue and COGS sections of the income statement in order to fit on one page. You should build an annual summary for the full income statement, balance sheet, and cash flow statement.*

The second approach aggregates the rows into high-level categories. In other words, this summary has fewer columns and fewer rows. For instance, sum all the SG&A expenses that were broken out individually in the monthly model into a single row labeled "SG&A." Or sum all personnel expenses (salaries, commissions, payroll tax, etc.) into a single row labeled "Personnel." We'll call this the *summarized roll-up*. Figure 11.6 provides an example.

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Income Statement			
Year	**2019**	**2020**	**2021**
Revenue	$444,556	$1,901,014	$3,235,552
COGS	($69,758)	($214,489)	($357,136)
Gross Profit	$374,798	$1,686,524	$2,878,416
Gross Margin %	84%	89%	89%
SG&A Expenses	($1,020,920)	($1,379,833)	($1,499,667)
Operating Income	($646,123)	$306,692	$1,378,749
Interest Expense	($32,082)	($35,096)	($3,301)
Income Taxes	$0	($118,231)	($482,562)
Depreciation Expense	($4,204)	($2,546)	$0
Amortization Expense	$0	$0	$0
Net Income	($682,409)	$150,819	$892,886
Net Income Margin	-154%	8%	28%
SG&A Headount	2	2	2
Customer Support Headcount	2	4	6
Total Headcount	11	14	16

Figure 11.6 *Simplified annual summary.*

We'll explore how to create both types of summaries in the following sections.

Income Statement

Recall that the income statement summarizes activities over a given time period. It follows that the annual income statement is simply the sum of the 12 monthly income statements within a given year.

Detailed Roll-up

Creating the detailed roll-up is a simple process that requires a couple of steps:

- Create a new tab for the detailed roll-up. Let's label this tab "Detailed Roll-up."

- Insert an additional row under your monthly column headers, and list the year (or year and quarter, i.e., "Q3 2018") associated with the given month, as shown in Figure 11.7. *Note:* You can generate the year automatically using Excel's Year function with the monthly date as an argument:

  Year = year(Model Date)

Month Ending	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
Year	2019	2019	2019

Figure 11.7 *Adding a row of years to the model.*

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- Also introduce a new row below the month ending dates labeled "Month," as shown in Figure 11.8. Apply Excel's month function to the dates in your model. This function returns a number from 1 to 12 where each number corresponds to a month: January = 1, February = 2, March = 3, etc.

  Month = month(Model Date)

Month Ending	**31-Jan-2019**	**28-Feb-2019**	**31-Mar-2019**
Year	2019	2019	2019
Month	1	2	3

Figure 11.8 *Adding a row of months to the model.*

- In the first column of your new, currently empty "Detailed Roll-up" tab, reference the first row heading from your monthly model, and drag the formula down all the rows. Now you have a dynamic reference to your monthly model in case you choose to change any row headings in the future.

- Add column headings for each of the quarters or years of interest.

- Use Excel's sumifs function to sum the values in each row of interest across the months associated with that year. For most items including revenue and expenses, the annual summary is simply the sum of those same items over the course of the year:

  Annual Data = sumifs (Monthly Data, Model Year, Year)

  However, for "moment in time" items such as year-ending headcount or ending MRR, we want to take the value for the last month of the year (or quarter) rather than summing over the entire year. For an annual summary,

  Annual Data = sumifs(Monthly Data, Model Year, Year, Model Month, 12)

Summarized Roll-up

- Begin by creating the detailed roll-up described in the preceding section.

- Next, create a new column next to each row heading, and add your summary label. For instance, label all SG&A expenses as "SG&A Expense" or all items related to COGS as "COGS." Figure 11.9 provides an example.

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Year	Category	2019	2020	2021
SG&A Expenses				
Total SG&A Salaries	SG&A Expenses	($525,833)	($730,000)	($750,000)
Salary Increases	SG&A Expenses	$0	($31,500)	($69,000)
Total SG&A Salaries		($525,833)	($761,500)	($819,000)
Payroll Taxes ([Customer Support Salaries + Total SG&A Salaries] x Payroll Tax %)	SG&A Expenses	($44,051)	($68,200)	($78,974)
Insurance Benefits Expense (Total Headcount x Benefits per Employee)	SG&A Expenses	($37,100)	($54,950)	($64,400)
401(k) Match	SG&A Expenses	($23,033)	($35,660)	($41,293)
Onboarding Expense (New Employees x Onboarding Expense per Employee)	SG&A Expenses	($18,000)	($9,000)	($6,000)
Office Supplies (Total Headcount x Office Supplies per Employee)	SG&A Expenses	($5,300)	($7,850)	($9,200)
Subscriptions (Total Headcount x Subscriptions per Employee)	SG&A Expenses	($31,800)	($47,100)	($55,200)
Rent (Based on Total Headcount & Real Estate Prices) See Rent Tab	SG&A Expenses	($53,000)	($60,000)	($60,000)
Sales Commissions	SG&A Expenses	($113,400)	($194,400)	($194,400)
Advertising	SG&A Expenses	($60,000)	($60,000)	($60,000)
Travel & Trade Shows (Baseline + Specific Trade Shows) See Trade Shows Tab	SG&A Expenses	($30,000)	($6,000)	($6,000)
Payment Processing	SG&A Expenses	($10,003)	($42,773)	($72,800)
Insurance	SG&A Expenses	($2,400)	($2,400)	($2,400)
Legal (Baseline + Specific Transaction) See Legal Expenses Tab	SG&A Expenses	($55,000)	($18,000)	($18,000)
Accounting / Bookkeeping	SG&A Expenses	($6,000)	($6,000)	($6,000)
Contractors & Consultants	SG&A Expenses	($6,000)	($6,000)	($6,000)
Total SG&A Expenses (Sum of SG&A Expenses)		($1,020,920)	($1,379,833)	($1,499,667)
Operating Income (Gross Profit - SG&A Expenses)	Operating Income	($646,123)	$306,692	$1,378,749
Operating Margin (Operating Income / Revenue)		-211.4%	-7.0%	26.4%

Figure 11.9 *Detailed roll-up with categories for use in summarized roll-up. Note: This figure only includes the SG&A expense portion of the income statement in order to produce a legible image.*

- On the same tab or a new tab, list your summarized category row labels.

- Again, use the sumifs function, but apply it to the columns for each year to sum the accounts associated with a given label (e.g., Sales & Marketing):

Summarized Category = sumifs(Annual Data, Category Label, Summarized Category)

Note: An equivalent process is to first produce a monthly model using the summarized row labels and then create an annual summary of that monthly model following the full roll-up procedure. There are ways to produce this in a single step using Excel's Match and Index functions, but the ease of coding the method described above far outweighs the additional space required. Figure 11.10 provides an example of the output.

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Income Statement			
Year	**2019**	**2020**	**2021**
Revenue	$444,556	$1,901,014	$3,235,552
COGS	($69,758)	($214,489)	($357,136)
Gross Profit	$374,798	$1,686,524	$2,878,416
Gross Margin %	84%	89%	89%
SG&A Expenses	($1,020,920)	($1,379,833)	($1,499,667)
Operating Income	($646,123)	$306,692	$1,378,749
Interest Expense	($32,082)	($35,096)	($3,301)
Income Taxes	$0	($118,231)	($482,562)
Depreciation Expense	($4,204)	($2,546)	$0
Amortization Expense	$0	$0	$0
Net Income	($682,409)	$150,819	$892,886
Net Income Margin	-154%	8%	28%
SG&A Headount	2	2	2
Customer Support Headcount	2	4	6
Total Headcount	11	14	16

Figure 11.10 *Summarized roll-up.*

Balance Sheet

Remember that the balance sheet is a snapshot of a point in time rather than a summary of activity over a period. This means that the approach for creating an annual (or quarterly) roll-up differs slightly from that for the income statement.

Detailed Roll-up

To create an annual balance sheet, simply maintain the same row headers as the monthly balance sheets and reference the data from December (i.e., month 12) of each year. The balance sheet for the last month of the year is identical to the annual balance sheet. The same logic applies to a quarterly summary. The Q1 balance and March balance sheets are identical. The Q2 and June balance sheets are also identical, etc.

We can apply the same logic and formulas that we applied to items such as ending MRR, ending headcount, etc. in our income statement model. For an annual summary,

Annual Data = sumifs(Monthly Data, Model Year, Year, Model Month, 12)

Summarized Roll-up

To generate a summarized balance sheet—which is less common and less useful than a summarized income statement—follow the same logic using subcategories and sumifs statements from the preceding income statement description.

Cash Flow Statement

The cash flow statement contains both balance sheet items (i.e., moment-in-time items) and income statement items (i.e., period-of-time items), so the approach for summarizing a statement of cash flows combines the two methods just described.

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Beginning cash balance for an annual summary equals the beginning cash balance at the start of the year; that is, the January beginning cash balance from the monthly statements is the beginning cash balance for the year. In the case of a quarterly summary, the Q1 beginning cash balance equals the January beginning cash balance, and the Q2 beginning cash balance equals the April beginning cash balance. For an annual summary,

Annual Beginning Cash = sumifs(Monthly Beginning Cash, Model Year, Year, Model Month, 1)

Treat the various adjustments to cash flow the same way you treat income statement items.

The ending cash balance for an annual statement doesn't provide enough information. The model could show a negative cash balance at some time during the year that becomes positive by year end. A negative cash balance means that you ran out of cash. Taking only the year-end cash balance ignores this possibility. Thus, when we're summarizing a cash flow statement, it's important to add an additional item: the minimum cash balance during the period. Figure 11.11 provides an example.

Cash Flow Statement

Month Ending	31-Jan-2019	28-Feb-2019	31-Mar-2019	30-Apr-2019	31-May-2019	30-Jun-2019	31-Jul-2019	31-Aug-2019	30-Sep-2019	31-Oct-2019	30-Nov-2019	31-Dec-2019
Beginning Cash Balance	$0	$258,979	$443,321	$397,380	$316,221	$257,641	$205,213	$161,704	$90,018	$44,245	$1,036,735	$958,357
Net Cash Burn / Generation	$258,979	$184,342	($45,940)	($81,159)	($58,580)	($52,428)	($43,508)	($71,686)	($45,773)	$992,490	($78,378)	($15,780)
Ending Cash Balance	$258,979	$443,321	$397,380	$316,221	$257,641	$205,213	$161,704	$90,018	$44,245	$1,036,735	$958,357	$942,577
Minimum Cash Balance	$44,245											

Figure 11.11 *Determining minimum cash balance for a given period.*

The minimum cash balance in 2019 is *negative* $44,245 in September, right before the company raised an additional round of financing. Apply Excel's min function to the row of ending cash balances for each month:

Minimum Cash Balance = min(Ending Cash Balance)

KPI Summary

In addition to summarizing the three financial statements, it's a good idea to build a dashboard that summarizes *key performance indicators* (KPIs) for your business. This allows investors to quickly understand the performance of the business at a high level.

A detailed prescription of KPIs for different types of businesses is beyond the scope of this book. You can find resources online, talk to your investors and mentors, review Securities and Exchange Commission (SEC) filings for similar public companies, talk to CEOs operating similar businesses, etc. to identify the metrics you should be tracking. For the purposes of making this discussion concrete, I'll discuss a few common SaaS metrics: *customer acquisition cost* (CAC) and *lifetime value* (LTV).

CAC is a measure of how much it costs to acquire a new customer. It accounts for *all* costs associated with acquiring customers, including paid advertising; salaries, benefits, and overhead associated with sales and marketing personnel; trade shows; etc. For a given period,

CAC = Total Sales & Marketing Expenses/Number of New Customers Acquired

It's helpful to think of total sales and marketing expense as the sum of two categories: direct sales and marketing expenses and headcount-driven sales and marketing expense. The direct expenses are such things as paid advertising, trade shows, and salaries for sales and marketing personnel. The headcount-driven expenses are the portions of expenses such as software subscriptions, benefits, and office supplies allocated to sales and marketing personnel.

In this book, we'll build a KPI dashboard that summarizes indicators on an annual basis. Categorize the expense line items on the detailed annual summary we built earlier. Insert a column labeled "KPI Category," and label all direct

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sales and marketing expenses on the income statement as "Sales & Marketing" and all headcount-driven expenses as "Headcount Driven," as shown Figure 11.12.

Income Statement				
Year	**KPI Category**	**2019**	**2020**	**2021**
SG&A Expenses				
Technical		($199,167)	($220,000)	($220,000)
Sales	Sales & Marketing	($168,750)	($225,000)	($225,000)
Marketing	Sales & Marketing	($37,917)	($165,000)	($185,000)
Operations		($120,000)	($120,000)	($120,000)
Total SG&A Salaries		($525,833)	($730,000)	($750,000)
Salary Increases		$0	($31,500)	($69,000)
Total SG&A Salaries		($525,833)	($761,500)	($819,000)
Payroll Taxes ([Customer Support Salaries + Total SG&A Salaries] x Payroll Tax %)		($44,051)	($68,200)	($78,974)
Insurance Benefits Expense (Total Headcount x Benefits per Employee)	Headcount Driven	($37,100)	($54,950)	($64,400)
401(k) Match		($23,033)	($35,660)	($41,293)
Onboarding Expense (New Employees x Onboarding Expense per Employee)	Headcount Driven	($18,000)	($9,000)	($6,000)
Office Supplies (Total Headcount x Office Supplies per Employee)	Headcount Driven	($5,300)	($7,850)	($9,200)
Subscriptions (Total Headcount x Subscriptions per Employee)	Headcount Driven	($31,800)	($47,100)	($55,200)
Rent (Based on Total Headcount & Real Estate Prices) See Rent Tab		($53,000)	($60,000)	($60,000)
Sales Commissions	Sales & Marketing	($113,400)	($194,400)	($194,400)
Advertising	Sales & Marketing	($60,000)	($60,000)	($60,000)
Travel & Trade Shows (Baseline + Specific Trade Shows) See Trade Shows Tab	Sales & Marketing	($30,000)	($6,000)	($6,000)
Payment Processing		($10,003)	($42,773)	($72,800)
Insurance		($2,400)	($2,400)	($2,400)
Legal (Baseline + Specific Transaction) See Legal Expenses Tab		($55,000)	($18,000)	($18,000)
Accounting / Bookkeeping		($6,000)	($6,000)	($6,000)
Contractors & Consultants		($6,000)	($6,000)	($6,000)
Total SG&A Expenses (Sum of SG&A Expenses)		($1,020,920)	($1,379,833)	($1,499,667)
Operating Income (Gross Profit - SG&A Expenses)		($646,123)	$306,692	$1,378,749

Figure 11.12 *Tagging expenses to calculate total sales and marketing expense.*

After tagging the expenses, we can calculate the two components:

Direct Sales & Marketing Expense = sumifs(Expenses, KPI Category, "Sales & Marketing")

Headcount-Driven Sales & Marketing Expense = sumifs(Expenses, KPI Category, "Headcount Driven") x (Sales & Marketing Headcount/Total Headcount)

Then

Total Sales & Marketing Expense = Direct Sales & Marketing Expense + Headcount-Driven Sales & Marketing Expense

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Figure 11.13 provides an example of the KPI dashboard walking through the steps of calculating CAC.

Month Ending	**2019**	**2020**	**2021**
Sales & Marketing Compensation (Salaries + Benefits)	($230,743)	($435,435)	($457,765)
Other Direct Sales & Marketing Expenses	($410,067)	($650,400)	($670,400)
Headcount Driven Expenses	($115,233)	($154,560)	($176,093)
Total Headcount	11	14	16
Sales & Marketing Headcount	4	5	5
Proportion Sales & Marketing Headcuont	36.4%	35.7%	31.3%
Sales & Marketing Allocation of Headcount Driven Expense	($41,903)	($55,200)	($55,029)
Total Sales & Marketing Expense	($682,713)	($1,141,035)	($1,183,194)
New Customers Acquired	42	72	72
CAC (Total Sales & Marketing / New Customers)	($16,255)	($15,848)	($16,433)

Figure 11.13 *Detailed calculation for CAC.*

LTV measures how much economic value you derive from a typical customer over the lifetime of that relationship. This means the total gross profit generated over the lifetime of the subscription. However, this presents a problem because we don't know how long a customer will subscribe. We can estimate this using the churn rate as a proxy. Specifically,

LTV = (Average MRR × Gross Margin %)/Churn Rate

We can estimate average values for each of these from the detailed annual summary. Gross margin % appears directly in the summary, and churn rate was an assumption in our model. Remember, these assumptions should be updated based on actual performance on a monthly basis.

Average MRR = New MRR for Year/Number of New Customers for Year

Figure 11.14 illustrates an example of this calculation.

Month Ending	**2019**	**2020**	**2021**
Average MRR (New MRR / # of New Customers)	$2,250	$2,250	$2,250
Gross Margin %	84%	89%	89%
Churn	2.0%	2.0%	2.0%
LTV (Average MRR x Gross Margin % / Churn)	$94,847	$99,807	$100,082

Figure 11.14 *Calculation of LTV in KPI dashboard.*

The absolute values of CAC and LTV vary widely from business to business. Thus an important metric is the ratio between the two. The higher the ratio, the better, because it means that you can acquire customers inexpensively and extract a lot of value from them. A good minimum benchmark is an LTV/CAC ratio of 3×.

When sharing with investors, you can show only the high-level metrics in your KPI dashboard, but should have the details available. Figure 11.15 shows the final version of the KPI dashboard built throughout this section, ready to share with investors.

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Month Ending	2019	2020	2021
CAC (Total Sales & Marketing / New Customers)	($16,255)	($15,848)	($16,433)
LTV (Average MRR x Gross Margin % / Churn)	$94,847	$99,807	$100,082
LTV / CAC	5.8X	6.3X	6.1X

Figure 11.15 *Completed KPI dashboard.*

Due Diligence

Most investors who are seriously considering an investment in your business will want to review a financial model to understand your assumptions around scaling the business. If you've followed along with this book, your model should be robust and user friendly so that a potential investor can clearly understand your assumptions and test the impact of those assumptions as he or she desires. You're 90% of the way there.

Whenever possible, it's best to avoid simply emailing your model to a potential investor as a document. It's too easy for them to poke holes in it without the proper context. Rather, it's best to request a call or meeting to walk them through the model to answer questions. As an investor, I like this method, although I do typically request a copy of the model in advance so that I can review it first. It's too hard to fully understand someone's model (and make sure that it's coded properly) in real time. So it's okay to send it ahead, but it's best to do so in conjunction with scheduling a meeting to review the model.

Conclusion

We've covered a lot in the preceding 11 chapters. If you followed along, you've learned how to build a robust, user-friendly set of financing models including an income statement, balance sheet, and cash flow statement. We've also discussed how to use the models that you've built.

Financial modeling is a complicated topic, and I can't help but feel that I've barely scratched the surface. Unfortunately, I think it would be impossible to write (or read) a completely exhaustive book on the topic. I made my best effort to cover the key points to build your first set of financial projections. I sincerely hope that you found this guide valuable. For more content on financial modeling and startup finance, check out my blog at www.medium.com/@dlishego.

If you have any questions, concerns, suggestions, or feedback, don't hesitate to contact me. I plan to revise this guide periodically and want to make it as valuable as possible.

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If you found this guide valuable, please share with friends or on social media.

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Appendix 1

Income Statement

This is the first of three appendices to review the three basic financial statements—income statement, balance sheet, and statement of cash flows—that form the foundation of your model.

The income statement summarizes the commercial activities of your business over a period of time. It displays the sales to customers within that time and all the costs associated with delivering the product and managing the business. Figure A1.1 shows the basic format of an income statement. The remainder of this appendix describes each line in detail. I'll use the example of a lemonade stand—a simple business everyone understands—to illustrate the concepts.

Income Statement		
	Year Ending December 31, 2018	
Revenue	$1,000	Units Sold x Price
Cost of Goods Sold	($250)	Units Sold x Cost per Unit
Gross Profit	$750	Revenue - Cost of Goods Sold
SG&A Expense	($1,500)	Sum of Overhead Expenses
EBITDA	($750)	Gross Profit - SG&A Expense
Interest Expense	($400)	Debt Principal x Interest Rate
Depreciation Expense	($100)	Varies
Amortization Expense	$0	Varies
Taxable Income	($1,250)	EBITDA - Interest Expense - Depreciation Expense - Amortization Expense
Income Tax Expense	$0	Taxable Income x Tax Rate
Net Income	($1,250)	Taxable Income - Income Tax Expense

Figure A1.1 *Basic income statement format.*

Revenue

Revenue is income generated by selling a product to customers. Simply stated,

Revenue = Units Sold × Price per Unit

Revenue appears on the income statement when the customer receives goods (or services) and you are reasonably certain to receive payment. You should recognize revenue on a monthly basis for SaaS and other subscription-based business models.

If your lemonade stand charges $1.00 per cup and sells 1,000 cups over the course of a year, revenue is $1,000 ($1.00 per cup × 1,000 cups).

Cost of Goods Sold (COGS)

Cost of goods sold (COGS), encompasses all the direct expenses associated with supplying your product. These are the unavoidable costs you must incur to provide your product or service. Even if you run a one-person business and sell your product directly to customers, you still incur COGS to make the product.

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In the case of the lemonade stand, the COGS is the total of the costs of lemons, sugar, water, and cups. You can't supply lemonade without buying those things. If these materials cost $0.25 per cup of lemonade and you sell 1,000 cups, your COGS is $250 ($0.25 per cup × 1,000 cups).

Gross Profit

Gross profit is the difference between revenue and COGS:

Gross Profit = Revenue – COGS

Suppose that your lemonade stand charges $1.00 for a cup of lemonade, and it costs you $0.25 to provide each cup. Your gross profit for each glass of lemonade is $0.75 ($1.00 – $0.25). Because we assumed that 1,000 cups were sold, total gross profit for the business is $750 ($0.75 per cup × 1,000 cups).

It is also helpful to express gross margin as a percentage:

Gross Margin % = (Revenue – COGS)/Revenue

In the lemonade stand example, your gross margin percentage is 75% [($1.00 – $0.25)/$1.00].

Whether expressed in terms of dollars or percentage, the higher the gross margin, the better. So far the only expense we've considered is COGS, but businesses also incur overhead expenses, often called *selling, general, and administrative (SG&A) expenses*, associated with promoting, supporting, and distributing their products. A high gross profit margin means more dollars available per unit sold to pay for SG&A expenses. Let's turn our attention to SG&A expense.

SG&A Expense

As mentioned earlier, most expenses other than COGS are considered to be SG&A) expenses. These expenses are necessary for promoting, supporting, and distributing the product. Typical SG&A expenses include employee salaries, rent, paid advertising, employee benefits, insurance, etc. As a rule of thumb, any expense that isn't completely necessary to produce the product is an SG&A expense.

Revisiting the lemonade stand example, suppose that you live on a quiet street that lacks adequate traffic to drive lemonade sales. You build a website and pay for advertising to promote your stand. You also purchase a QuickBooks subscription to track your finances. These are your SG&A expenses. You could supply lemonade without them, but they are integral to your business. In the lemonade stand example, assume that these items cost $1,500.

Operating Income

Earnings before interest, taxes, depreciation, and amortization (EBITDA) is also sometimes called *operating income*. It provides a sense of the profitability of the commercial operations of the company before considering interest, income tax, depreciation, and amortization expenses. Each of these expenses is described in detail below.

Operating Income = Gross Margin – SG&A Expenses

= Revenue – COGS – SG&A Expense

It is also helpful to express Operating Income as a percentage of revenue:

Operating Margin % = Operating Income/Revenue

= (Revenue – COGS – SG&A Expense)/Revenue

In our lemonade stand example, Operating Income is –$750 ($1,000 – $250 – $1,500).

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As noted earlier, your business may incur expenses related to interest payments on debt, income taxes, depreciation of assets, and amortization of intangible assets. However, these expenses relate to how you finance your company and treat certain items for tax purposes. They're not relevant to the core business—selling lemonade.

Interest Expense

When you finance a company with debt, you incur *interest expenses*. Startups are unlikely to incur debt that requires regular cash interest payments. However, interest that accrues on convertible notes is still considered an interest expense and appears on the income statement.

Suppose that your lemonade stand borrows $5,000 with an 8% annual interest rate. This equates to $400 ($5,000 × 0.08) accrued interest each year. Thus the lemonade stand incurs a $400 interest expense annually.

Depreciation

The value of physical assets deteriorates over time. *Depreciation* attempts to quantify the amount of deterioration that occurred in a given period.

Depreciation is not an exact science, and there are several different methods associated with calculating it. A detailed discussion of depreciation methods is beyond the scope of this book, but a brief description of *straight-line depreciation*, the simplest method, illustrates the concept.

Straight-line depreciation simply takes the initial value of the equipment, subtracts the salvage value at the end of its useful life, and divides by the number of years of useful life.

Depreciation = (Purchase Amount – Salvage Value)/Useful Life

Suppose that you purchase a $500 citrus juicer for your lemonade stand. It will last for 5 years, at which time you'll replace it. If the $500 juicer is worthless after 5 years, depreciation expense is $100 per year [($500 – $0)/5]. If you can sell the used juicer on eBay for $50 after 5 years, then depreciation expense is $90 per year [($500 – $50)/5].

Most startups—particularly software companies—don't own many physical assets, and it's easier to treat purchases as expenses rather than worrying about depreciation. For example, if a software startup purchases a $2,000 laptop, it's easier to recognize a $2,000 expense immediately rather than accounting for depreciation and spreading the expense over several years. I generally ignore depreciation expense throughout this book.

Amortization

Amortization is an even more nebulous concept than depreciation. It relates to the deterioration of the value of intangible assets such as patents, trademarks, and other useful but nonphysical assets. Businesses only record amortization expenses for intangible assets that they purchased from another entity. Otherwise, it is difficult to determine an objective value. If you developed intellectual property in-house, accounting principles don't permit recognizing an amortization expense. Given the nebulous nature of amortization and unlikely applicability, I've chosen to ignore it.

Income Tax Expense

If your company is structured as an LLC or S-Corp, you're not required to pay corporate income taxes, and thus income tax expense is zero. However, if you're structured as a C-Corp, which most investors prefer, you are responsible for paying corporate income taxes.

Income Tax Expense = Taxable Income × Tax Rate

where

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Taxable Income = Operating Income – Interest Expense – Depreciation Expense – Amortization Expense
= Revenue – COGS – SG&A Expense – Interest Expense – Depreciation Expense
– Amortization Expense

The U.S. Tax Code is insanely complicated, so it's difficult to provide any general prescriptions here. However, here are a few general points to keep in mind.

Companies are only required to pay taxes on positive earnings. If you're losing money, which will likely be the case for the first several years, income tax expense is zero. Furthermore, losses can be carried forward into future years to offset positive earnings in the future. We'll largely ignore income tax expense throughout this book. In our lemonade stand example, taxable income is –$1,250 ($1,000 – $250 – $1,500 – $400 – $100), so we incur no income tax.

Net Income

Net income is the bottom line on the income statement. It provides a measure of the profitability of the business after considering all operating and nonoperating expenses:

Net Income = Operating Income – Interest – Income Tax – Depreciation – Amortization

Stated fully,

Net Income = Revenue – COGS – SG&A Expense – Interest Expense – Depreciation Expense
– Amortization Expense – Income Tax Expense

It is also helpful to express net income as a percentage of revenue:

Net Income % = Net Income/Revenue = (Revenue – COGS – SG&A Expense – Interest Expense
– Depreciation Expense – Amortization Expense – Income Tax Expense)/Revenue

Whether expressed in absolute dollar terms or percentage terms, we want net income to be as large as possible. In the lemonade stand example, net income is negative, which is not sustainable. The lemonade stand must reduce expenses, increase sales, or both to produce a positive net income. The net result is the income statement shown in Figure A1.1

Conclusion

This appendix featured a simplified income statement for a simple business to illustrate basic concepts. Significantly more detail is provided in the models presented throughout the main body of this book. Note that in the models we'll be building throughout this book, we'll largely ignore income tax, depreciation, and amortization and concern ourselves primarily with revenue, COGS, SG&A expense, and interest expense.

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Appendix 2

Balance Sheet

While the income statement (summarized in Appendix 1) summarizes the commercial activities of a business over a given *period*, the balance sheet, by contrast, provides a snapshot of the financial position of the company at a given *moment in time*.

The balance sheet contains three categories of accounts:

- Assets
- Liabilities
- Equity

Total assets must equal total liabilities plus total equity:

Assets = Liabilities + Equity

They must *balance*. If total assets don't equal total liabilities plus total equity, something is wrong.

Consider assets as the things your business owns. Liabilities and equity are sources of money for purchasing those things. It follows logically that assets must equal liabilities plus equity. If assets exceed liabilities plus equity, you got things for free. Conversely, if liabilities plus equity exceeds assets, you spent money but received nothing in return.

A sample balance sheet is shown in Figure A2.1

Balance Sheet		
Assets	**31-Dec-18**	**Description**
Cash	$13,586	Cash in the bank
Accounts Receivable	$20	IOU's from customers
Inventory	$4	Value of raw materials, work-in-progress, and finished goods
Property, Plant & Equipment (PP&E)	$540	Purchase price of hard assets (equipment, buildings, etc.)
- Accumulated Depreciation	($100)	Cumulative depreciation recorded for PP&E assets
Total Assets	$14,050	Sum of all asset accounts above
Liabilities		
Accounts Payable	$200	IOUs to suppliers
Deferred Revenue	$100	Amount prepaid by customers before product / service delivered
Short-term Debt	$0	Debt maturing within 12 months
Long-term Debt	$5,000	Debt maturing beyond 12 months
Total Liabilities	$5,300	Sum of all liability accounts above
Equity		
Common Stock	$10,000	Amount invested for common stock
Preferred Stock	$0	Amount invested for preferred stock
Additional Paid-in Capital	$0	Amount invested for SAFEs and other atypical securities
Retained Earnings	($1,250)	Cumulative net income since the company's inception
Total Equity	$8,750	Sum of all equity accounts above
Total Liabilities + Equity	$14,050	

Figure A2.1 *Generic balance sheet layout.*

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The remainder of this appendix explores each category and its associated accounts in more detail. I'll continue to use the example of a lemonade stand, introduced in Appendix 1 because it's a simple business that's useful for illustrating these concepts.

Assets

As mentioned earlier, *assets* are the things the company owns. The most common asset categories are described next.

Cash

Cash is money in the bank or easily marketable securities. Generally, this means money in a savings, checking, or money-market account that is readily accessible.

Accounts Receivable

In many businesses, customers buy goods and services on credit, so they receive the product or service before they pay for it. *Accounts receivable* is the money owed by such customers. You can think of accounts receivable as IOUs from customers. For a given level of revenue, a low value for accounts receivable is better than a high value because it means that customers are paying promptly.

Suppose that a school bus carrying a softball team stopped at our lemonade stand and bought 20 cups of lemonade for $1.00 per cup. The coach agreed to pay next week. We incurred $20 in accounts receivable ($1.00 per cup × 20 cups).

Inventory

Inventory is only relevant for companies that produce a physical product. Inventory comes in three forms:

- Raw materials
- Work-in-progress
- Finished goods

Companies producing a physical product must purchase raw materials to build their product. For a complex product, such companies likely will have an assortment of partially built product (work-in-progress). Finally, companies typically maintain an inventory of finish goods that can be sold to customers. Each of these types of inventory—raw materials, work-in-progress, and finished goods—is an asset.

In our lemonade stand example from Appendix 1, lemons, sugar, water, and ice are our raw materials. Suppose that we mix the lemon juice, water, and sugar together in a pitcher but wait until someone makes a purchase to add the ice. The lemon-water-sugar mixture is work-in-progress inventory. If we need $3.50 worth of ingredients plus $0.50 for labor to create the pitcher of lemonade, our inventory value is $4.00.

Property, Plant, and Equipment

Property, plant, and equipment (PPE or PP&E) is the value of physical assets that you don't sell to customers. Examples of PP&E assets are such things as computers, office furniture, manufacturing equipment, etc.

Suppose that we purchase a citrus juicer to squeeze the lemons ($500), a cooler for ice ($30), and a pitcher for our work-in-progress ($10) just described. Each of these purchases is a PP&E asset. They're important for running the business, but we don't sell them to customers. The total value of our PP&E assets is $540 ($500 + $30 + $10).

The balance sheet typically lists the *gross* value of PP&E assets as well as the total accumulated depreciation. The gross value is the sum of the original purchase prices of all your PP&E assets. Accumulated depreciation is the cumulative sum of depreciation expenses (discussed in Appendix 1).

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In our running lemonade stand example, assume that we only record a depreciation expense for the citrus juicer. We are recording a $100 depreciation expense each year for the next 5 years. Because we've only recorded this expense for one year, accumulated depreciation is $100.

As discussed in Appendix 1, most seed-stage startups don't have much in the way of PP&E assets. To make our lives easier, we'll ignore PP&E assets and depreciation throughout most of this book

Liabilities

Liabilities are obligations to pay another party at some time in the future. They are a source of funds because you received goods or services now but don't have to pay until later.

Accounts Payable

Accounts payable is the corollary to accounts receivable: IOUs you have given to suppliers. Suppose that we purchased the citrus juicer described earlier on an installment plan so that we received the juicer but have the luxury of paying it off over the course of several months. The money owed on the juicer appears in accounts payable. Suppose that we've paid $300 of the $500 purchase price for the juicer. Then the value of accounts payable is $200 ($500 - $300).

Deferred Revenue

While many customers receive the product or service before paying, as discussed earlier under "Accounts Receivable," other customers may prepay for goods or services. This is particularly relevant to SaaS businesses, where customers may pay upfront for a 1-year or multiyear contract, whereas revenue is recognized on a monthly basis. Deferred revenue represents the amount of cash you've received minus the revenue that you've recognized for that contract. The balance of this account decreases over time as you recognize revenue. You recognize 1/12 of the payment each month until the end of the annual deal has been fulfilled.

In our lemonade stand example, suppose that a neighbor pays $100 for unlimited refills for the next 12 months. We received $100 in cash but have not held up your end of the bargain until you've supplied lemonade for the year. Deferred revenue begins at $100 and decreases by $8.33 ($100/12) each month as we recognize revenue.

I often ignore deferred revenue in seed-stage models because it simplifies the model and presents a more conservative estimate of cash balance. We will ignore deferred revenue throughout most of this book.

Short-Term Debt

Short-term debt is any debt—including convertible debt—that matures within the next 12 months. We distinguish it from *long-term debt*—debt that matures more than 12 months in the future—because short-term debt has an imminent effect on cash flow: you have to repay it soon! A debt due 6 months from now has much more obvious consequences in the near term than a debt due in 3 years.

Long-Term Debt

Long-term debt is any debt—including convertible debt—that matures more than 12 months in the future. Eventually, long-term debt becomes short-term debt as time marches closer to the maturity date.

In Appendix 1, we assumed that we borrowed $5,000 with an 8% interest rate to finance our lemonade stand. Let's assume that the debt matures in 3 years. We'll record $5,000 under long-term debt.

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Equity

Common Stock

The common stock account on the balance sheet quantifies the amount of money the company has received in exchange for selling its common stock. Suppose that we sold 10% of the common stock of our business to Lisa, a local investor, for $10,000. The common stock account on our balance sheet reflects $10,000.

Note: I'm taking a few liberties with accounting standards here, but for the purposes of modeling, what I describe here is sufficient.

Preferred Stock

The mechanics for preferred stock investments are identical to those for common stock. The primary difference is that the preferred stock account records sales of preferred stock, typically to investors.

Assuming that we haven't issued any preferred stock for our lemonade stand, the preferred stock account balance is zero.

Additional Paid-in Capital

Additional paid-in capital records investments or cash infusions that don't fall into any of the categories described earlier (i.e., debt, common stock, preferred stock). Investments using the SAFE structure popularized by Y Combinator appear under additional paid-in capital.

Assuming that we haven't issued any SAFEs for our lemonade stand, the additional paid-in capital account balance is zero.

Retained Earnings

Retained earnings is the cumulative sum of net income since the company's inception. In the early years, retained earnings will be negative because the company isn't profitable yet. Even after the company is profitable, retained earnings may be negative for several years because profits must offset the early years of losses before retained earnings are positive.

Current Period Retained Earnings = Prior Period Retained Earnings + Current Period Net Income

Let's assume that the lemonade stand has only been around for 1 year. In Appendix 1, we calculated net income of –$1,250. Thus retained earnings equals –$1,250. If our lemonade stand generates positive net income of $500 next year, retained earnings will be –$750 (–$1,250 + $500).

Conclusion

Note that total assets equals total liabilities plus equity in our sample balance sheet.

Now that we understand the balance sheet and income statement, it's time to address the cash flow statement. The cash flow statement is the most important financial statement for an early-stage company.

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Appendix 3

Cash Flow Statement

The cash flow statement is the most important financial statement for a startup company. Like the income statement, it summarizes activity over a time period. The statement of cash flows considers *all cash* flowing into and out of the business, not just operating activities.

Cash flow statements are typically presented indirectly. We start with the income statement and make adjustments using balance sheet accounts to accurately reflect the flow of cash into and out of the business.

A typical cash flow statement appears in Figure A3.1.

Cash Flow Statement		
Period Ending	**31-Dec-18**	**Description**
Beginning Cash Balance	$0	Cash at the start of the period. Must match balance sheet cash balance from prior period.
Cash Flow from Operations		
Net Income	($1,250)	Net income for the period from the income statement
- Changes in Accounts Receivable	($20)	Changes in accounts receivable from balance sheet. An increase acts as a use of cash.
- Changes in Inventory	($4)	Changes in inventory from balance sheet. An increase acts as a use of cash.
+ Changes in Accounts Payable	$200	Changes in accounts payable from balance sheet. An increase acts as a source of cash.
+ Changes in Deferred Revenue	$100	Changes in deferred revenue from balance sheet. An increase acts as a source of cash.
+ Depreciation	$100	Depreciation expense from the income statement. Add because it's a non-cash expense.
+ Noncash Interest Expense	$0	Interest expense from income statement. Add because it's a non-cash expense.
Cash Flow from Investing Activities		
- Investment in PP&E Assets	($540)	Amount spent to acquire new PP&E assets.
+ Disposal of PP&E Assets	$0	Amount receive from selling PP&E assets.
Cash Flow from Financing Activities		
+ New Convertible Note Investments	$5,000	Amount raised via convertible note investments during the period
+ New Equity Investments	$10,000	Amount raised via equity investments during the period
+ New SAFE Investments	$0	Amount raised via SAFE investments during the period
Ending Cash Balance	$13,586	Cash balance at the end of the period. Must match balance sheet.

Figure A3.1 *Generic format for a cash flow statement.*

The statement categorizes cash flows into three buckets:

- *Cash flow from operations.* These are the cash inflows and outflows associated with the commercial activities of the business, such as payments from customers, payments to suppliers and service providers, payments to employees, etc.

- *Cash flow from investment activity.* These are the cash inflows and outflows associated with buying and selling long-term assets that don't appear on the income statement, such as equipment, property, furniture, etc.

- *Cash flow from financing activities.* These are the cash inflows or outflows associated with financing the business, such as cash received from investors or cash paid out in dividends.

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The following sections describe the components of a cash flow statement.

Beginning Cash Balance

The *beginning cash balance* is the amount of cash in the bank at the beginning of the period.

Cash Flow from Operations

Net Income

Net income for the period comes directly from the income statement. The cash flow statement begins with net income and adjusts for changes in cash balance that the income statement doesn't capture.

Subtract Changes in Accounts Receivable

The first adjustment to net income is to subtract the period-to-period *change in accounts receivable*. Remember, the balance sheet is a snapshot of the company's financial position at a given moment in time, so we're interested in the *change* in receivables rather than the absolute level.

The logic behind the adjustment is straightforward. Suppose that accounts receivable increases from $10,000 in January to $15,000 in February. The *change* in accounts receivable is $5,000 ($15,000 – $10,000). This change represents an additional $5,000 in cash that hasn't been collected from customers yet. We subtract this $5,000 from net income because the income statement treated this $5,000 as income even though we haven't received cash yet.

Conversely, if receivables decreased from $10,000 to $5,000, the change is –$5,000, which increases cash. You received cash from customers that wasn't reflected in the income statement.

Subtract Changes in Inventory

Next, subtract the *change in inventory*. The logic behind the adjustment for changes in inventory level is similar to that discussed for accounts receivable. An increase in inventory level means consumption of cash—we had to pay to create that inventory—and a reduction in cash balance. Reduction in inventory means that we sold more than we produced.

Add Changes in Accounts Payable

Changes in accounts payable have the opposite effect of changes in accounts receivable. Thus we add changes in accounts payable to adjust net income for cash.

Suppose that accounts payable increased from $10,000 to $15,000. The $5,000 change in accounts payable represents an advance from suppliers. We received goods or services but haven't paid cash yet.

Conversely, a decrease in accounts payable represents payment of outstanding payables, which requires spending cash.

Add Depreciation

Recall that *depreciation* is an expense related to the gradual degradation of long-lived property, plant, and equipment (PP&E) assets. When we purchase PP&E assets, we spend cash to acquire them but recognize depreciation over their useful lifetimes. In other words, depreciation essentially assumes that we received the PP&E assets for free and pay for them slowly over their useful lives. In reality, you normally provide cash to purchase the assets long before the asset is fully depreciated on your balance sheet. An example will help illustrate this point.

Appendix 2 cited the purchase of a $500 citrus juicer as an example of depreciation. In that example, the juicer had a useful life of 5 years, so a depreciation expense of $100 appeared on the income statement each year. In reality, $500 in cash was spent in the first year to acquire the juicer.

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Depreciation is an "imaginary" expense, so we add it back to the net income. By adding back depreciation, we undo the imaginary expense that doesn't represent a real cash expenditure. When we get to cash flows from investment activities, we'll subtract the *real* cash flows associated with acquiring PP&E assets.

Note that software businesses, particularly at the seed stage, rarely have significant PP&E assets, and it can be easier to treat all PP&E purchases as expenses to simplify the accounting process.

Add Changes in Deferred Revenue

An increase in *deferred revenue* means that you receive additional prepayments from customers for revenue that hasn't yet been recognized. This means an increase in cash compared with what is reflected by the income statement.

Add Noncash Interest Expense

Interest from debt appears as an expense on the income statement regardless of whether it is paid in cash or accrued. Most convertible notes accrue interest, but do not require cash payments. So the interest appears on the income statement but doesn't actually affect the company's cash balance. It's necessary to add this expense back to reconcile the company's cash position.

The net effect of the adjustments just described is the change in cash from operations.

Change in Cash from Operations = – Change in Accounts Receivable – Change in Inventory
+ Change in Accounts Payable + Depreciation + Change in Deferred Revenue + Noncash Interest Expense

Cash Flow from Investment Activities

The terminology *cash flow from investment activities* can be confusing. It doesn't refer to cash received from investors. Rather, it refers to the company's investments in equipment and other long-lived assets.

As covered in the discussion of balance sheets in Appendix 2, long-lived assets such as equipment, buildings, furniture, computers, etc. are called *capital expenditures* and appear on the balance sheet under an account called *property, plant, and equipment* (PP&E). These purchases are considered assets rather than expenses, so they don't appear on the income statement. However, they require cash. You have to pay for equipment, computers, etc. Thus we adjust the income statement to adequately capture the cash position.

Cash flow from investment activities comes from the change in gross (i.e., before depreciation) PP&E from the balance sheet. An increase in gross PP&E means that the company spent more cash on assets. Companies can also generate cash by selling PP&E assets. A decrease in gross PP&E assets indicates that the company sold or retired some assets. Cash spent to acquire new PP&E assets typically outweighs cash received from selling them.

The net effect of these adjustments is the *change in cash from investment activities*.

Cash Flow from Financing Activities

Cash flow from financing activities refers to cash received from investors or paid to investors. At this stage, you're unlikely to pay dividends or cash interest payments, so we'll focus on cash *from* investors.

If the company raises money in the form of equity investment, convertible notes, or SAFEs, the amount of cash received from investors appears under cash flow from financing activities.

Note that cash flows from financing activities usually increase cash balance. Determine cash flow from financing activities by adding the changes in the short-term debt, long-term debt, common stock, preferred stock, and additional paid-in capital accounts from the balance sheet. For example, an increase in the preferred stock account from one period to the next means that the company received additional investments in exchange for preferred stock.

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The net effect of these changes is the *change in cash from financing activities*.

Ending Cash Balance

We began with cash balance and introduced adjustments to that cash balance. The *ending cash balance* is simply the sum of the adjustments discussed herein:

Ending Cash Balance = Beginning Cash Balance + Change in Cash from Operations + Change in Cash from Investing Activities + Change in Cash from Financing Activities

In longer form,

Ending Cash Balance = Beginning Cash Balance + Net Income – Change in Accounts Receivable – Change in Inventory + Change in Accounts Payable + Depreciation + Change in Deferred Revenue + Noncash Interest Expense – Capital Expenditures (i.e., cash spent to acquire PP&E assets) + Disposal of PP&E Assets (i.e., cash received from selling PP&E assets) + Cash from Investors

Conclusion

As evidenced throughout this appendix, the income statement and cash flow statement may be very similar for a seed-stage SaaS company that has no inventory, receives regular monthly payments from customers, and has few PP&E assets. But the differences *can* be dramatic, and it's important to understand how to read a cash flow statement.

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Appendix 4

Advanced Modeling Techniques

The model developed throughout the body of this book used only simple functions to avoid overwhelming readers with limited exposure to Excel. This appendix introduces a few advanced modeling techniques to make models more realistic and robust.

Sales Funnel for Direct Sales

In Chapter 2, we alluded to building an explicit sales funnel as the company matures. This is important as you gather better data and can more accurately forecast growth. Eventually, you'll use a customer resource management (CRM) tool such as Salesforce to manage your funnel, but in the intermediate stages of growth, you may model your funnel using Excel. A common way to model is using a probability-weighted funnel, as shown in Figure A4.1, in which we represent the value of potential customer contracts and the probability that we'll close them.

Prospect	Total Contract Value	Duration (Months)	Probability	Estimated Close Date	Expected Value	Expected MRR	Close Month	Contract End Date
BrookeSoft	$50,000	24	90%	2/15/2019	$45,000	$1,875	2/28/2019	2/15/2021
H.G. Enterprises	$30,000	12	80%	3/15/2019	$24,000	$2,000	3/31/2019	3/15/2020
Grace Corp.	$25,000	12	60%	4/15/2019	$15,000	$1,250	4/30/2019	4/15/2020
Boxer Inc.	$100,000	36	50%	5/15/2019	$50,000	$1,389	5/31/2019	5/15/2022

Month Ending	1/31/2019	2/28/2019	3/31/2019	4/30/2019	5/31/2019	6/30/2019
Bookings	$0	$45,000	$24,000	$15,000	$50,000	$0
MRR	$0	$1,875	$3,875	$5,125	$6,514	$6,514

Figure A4.1 *Probability-weighted sales funnel.*

This example makes assumptions around potential contract values, durations, timing, and probability of closing. In this example, we assumed a SaaS business. For a given contract,

Expected Value = Total Contract Value × Probability

Expected MRR = Expected Value/Duration

Close Month = eomonth(Estimated Close Date)

Contract End Date = date(year(Estimated Close Date),month(Estimated Close Date) + Duration, day(Estimated Close Date)

Using this information, it's simple to calculate bookings and revenue. We covered revenue in Chapter 2, but *bookings* is a new term. Bookings represent the total signed contract value. For example, we expect to sign a $50,000 contract with BrookeSoft with 90% probability, so the model reflects a $45,000 booking ($50,000 × 0.90). Although we booked the contract, we recognize revenue monthly over the life of the contract. Bookings provide a leading indicator of revenue. In the BrookeSoft example, with a $45,000 booking for a 24-month contract, we recognize $1,875 ($45,000/24) as revenue each month.

To model this,

Bookings = sumifs(Expected Value, Close Month, Model Date)

MRR = sumifs(Expected MRR, Close Month, "<="&Model Date, Contract End Date, ">"&Model Date)

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Sales and Business Development Productivity Ramps

In Chapter 2 on customer acquisition models, we modeled a "ramp-up" period for new sales and business development hires. We assumed that new reps aren't immediately productive but require time to learn and acclimate before closing deals. Our assumption was binary. Before a specified time, they don't close any sales. After that time, they are fully productive. This is a simple and conservative way to model, but not necessarily realistic. We may want to model a gradual ramp-up for new reps, which is a more realistic scenario. Below we explore a few different methods.

Linear Ramp

This method assumes that new reps get a little bit better each day. For example, if the ramp to full efficiency is 90 days, a new sales or business development rep gets 1/90th better each day until he or she reaches full efficiency. This is relatively straightforward to code. Figure A4.2 provides an example.

Title	Start Date
Sales Rep #1	30-Sep-2018
Sales Rep #2	15-Apr-2019
Sales Rep #3	15-Jul-2019
Sales Rep #4	15-Aug-2019

Ramp Time (Days)	90

Month Ending	1/31/2019	2/28/2019	3/31/2019	4/30/2019	5/31/2019	6/30/2019
Fully Productive Reps	1.0	1.0	1.0	1.0	1.0	1.0
Partially Productive Reps	0.0	0.0	0.0	0.2	0.5	0.8
Total Sales Rep Equivalent	1.0	1.0	1.0	1.2	1.5	1.8

Figure A4.2 *Example of linear productivity ramp for sales and business development reps.*

Fully Productive Reps = countifs(Hire Date, "<="&Model Date – Ramp Time)

Partially Productive Reps = (countifs(Hire Date, ">"&Model Date – Ramp Time, Hire Date, "<="&Model Date) × Model Date – sumifs(Hire Date, Hire Date, ">"&Model Date – Ramp Time, Hire Date, "<="&Model Date))/Ramp Time

Total Productive Reps = Fully Productive Reps + Partially Productive Reps

In plain English, reps who have been employed for the full ramp time are 100% productive. Reps who have been employed for less than the full ramp time are partially productive such that the productivity for a given rep is given by the number of days since the rep was hired divided by the ramp time. We can round the number of units sold to the nearest whole number to avoid modeling fractional units.

Explicit Ramp

This method is more complicated to model but works well when you believe that the learning curve for new reps is nonlinear. You can explicitly forecast how long it takes a rep to reach full productivity, for example, 10% in the first 30 days, 30% after 60 days, and then 100% productivity after 90 days.

This is more complicated to code than the previous example. Figure A4.3 provides an example.

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Title	Start Date
Sales Rep #1	30-Sep-2018
Sales Rep #2	15-Apr-2019
Sales Rep #3	15-Jul-2019
Sales Rep #4	15-Aug-2019

Efficiency Ramp

Days Since Hire	Total Efficiency	Incremental Efficiency
30	10%	10%
60	30%	20%
90	100%	70%

Month Ending	1/31/2019	2/28/2019	3/31/2019	4/30/2019	5/31/2019	6/30/2019
Total Sales Rep Equivalents	1.0	1.0	1.0	1.0	1.1	1.3

Figure A4.3 *Explicit productivity rep for sales and business development reps*

The calculation uses the incremental efficiency for each period, where incremental efficiency is given by the change in efficiency between two time periods. The formula for total sales rep equivalents is

> *Total Sales Rep Equivalents = Incremental Efficiency 1 × countifs(Hire Date, "<="&Model Date – Days #1) + Incremental Efficiency #2 × countifs(Hire Date, "<="&Model Date – Days #2) + Incremental Efficiency #3 × countifs(Hire Date, "<="&Model Date – Days #3)*

In the example above, Days #1 = 30, Days #2 = 60, and Days #3 = 90.

Cost of Goods Sold (COGS)

In Chapter 3, we learned how to estimate cost of goods sold (COGS). Our simple model assumed that COGS were fixed and don't change over time. In reality, COGS often decrease as the company increases its production volumes and learns more efficient ways to manufacture its product. We can model decreases in COGS in a few different ways.

Fixed Periodic Decrease

One option for modeling decreases in COGS is to assume a fixed periodic decrease on a monthly or annual basis. Figure A4.4 provides an example assuming a monthly decrease subject to a minimum value.

Assumptions	
Price	$1,000
Starting COGS	$500
Monthly Decrease	5%
Minimum COGS	$400

Month Ending	1/31/2019	2/28/2019	3/31/2019	4/30/2019	5/31/2019	6/30/2019
Units Sold	100	120	144	173	207	249
Price per Unit	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
COGS per Unit	$500	$475	$451	$429	$407	$400
Revenue	$100,000	$120,000	$144,000	$172,800	$207,360	$248,832
COGS	($50,000)	($57,000)	($64,980)	($74,077)	($84,448)	($99,533)
Gross Profit	$50,000	$63,000	$79,020	$98,723	$122,912	$149,299

Figure A4.4 *Monthly decrease in COGS subject to a minimum value.*

This example assumes that COGS begins at $500 per unit and decreases 5% per month until hitting a minimum value of $400. The formula in Excel is

> *COGS per Unit = min(Prior Month COGS per Unit × (1 – Monthly Decrease), Minimum COGS)*

This model is simple to code, but doesn't explain what drives the decrease in COGS.

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Explicit Forecast

If you have a firm understanding of how COGS relates to sales volume, you can build an explicit forecast. For instance, contract manufacturers often can provide accurate quotes based on order volumes. Figure A4.5 provides an example.

Assumptions	
Price	$1,000

Monthly Sales (Units)	COGS
100	$500
200	$400

Month Ending	1/31/2019	2/28/2019	3/31/2019	4/30/2019	5/31/2019	6/30/2019
Units Sold	100	120	144	173	207	249
Price per Unit	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
COGS per Unit	$500	$500	$500	$500	$400	$400
Revenue	$100,000	$120,000	$144,000	$172,800	$207,360	$248,832
COGS	($50,000)	($60,000)	($72,000)	($86,400)	($82,944)	($99,533)
Gross Profit	$50,000	$60,000	$72,000	$86,400	$124,416	$149,299

Figure A4.5 *Explicit COGS forecast.*

In this figure, we assume that COGS is $500 per unit when we sell 100 units per month and $400 per unit when we sell 200 units per month. We can represent this using Excel's vlookup function:

COGS per Unit = vlookup(Units Sold, Table of Monthly Sales & COGS, 2, TRUE)

This compares the units sold from the model with the assumptions around COGS as a function of units sold and assigns the closest value of COGS. When fewer than 200 units are sold in a given month, the model assigns $500 for COGS. When more than 200 units are sold, the model assigns $400 for COGS. We can make this table as detailed and granular as we want.

Hiring Plan

Dynamic Hire Dates

As described in Chapter 4, if we want to make our hiring plan more robust, we can code our model so that commercial or funding milestones trigger the hiring of specific roles.

Fund-Raising Triggers

Using a fund-raising trigger, we only reflect the salary expense for a given role if the model date is past the proposed hire date *and* meets the fund-raising trigger. Figure A4.6 provides an example.

Sales Headcount

Title	Start Date	Salary	Funding Hurdle
Sales Rep #1	30-Sep-2018	$75,000	$0
Sales Rep #2	15-Apr-2019	$75,000	$0
Sales Rep #3	15-Jul-2019	$75,000	$500,000
Sales Rep #4	15-Aug-2019	$75,000	$500,000

Other Headcount

Title	Start Date	Salary	Funding Hurdle
CEO (Existing)	1/1/2018	$60,000	$0
CTO (Existing)	1/1/2018	$60,000	$0
COO (Existing)	1/1/2018	$60,000	$0
UI / UX Designer	2/15/2019	$70,000	$0
Back-end Developer	3/15/2019	$90,000	$500,000
Marketing Associate	6/1/2019	$65,000	$1,000,000

Month Ending	1/31/2019	2/28/2019	3/31/2019	4/30/2019	5/31/2019	6/30/2019
Convertible Note Investment					$500,000	
Cumulative Funding	$0	$0	$0	$0	$500,000	$500,000
Sales Rep #1	($6,250)	($6,250)	($6,250)	($6,250)	($6,250)	($6,250)
Sales Rep #2	$0	$0	$0	($6,250)	($6,250)	($6,250)
Sales Rep #3	$0	$0	$0	$0	$0	$0
Sales Rep #4	$0	$0	$0	$0	$0	$0
CEO (Existing)	($5,000)	($5,000)	($5,000)	($5,000)	($5,000)	($5,000)
CTO (Existing)	($5,000)	($5,000)	($5,000)	($5,000)	($5,000)	($5,000)
COO (Existing)	($5,000)	($5,000)	($5,000)	($5,000)	($5,000)	($5,000)
UI / UX Designer	$0	($5,833)	($5,833)	($5,833)	($5,833)	($5,833)
Back-end Developer	$0	$0	$0	$0	($7,500)	($7,500)
Marketing Associate	$0	$0	$0	$0	$0	$0

Figure A4.6 *Dynamic hiring plan based on fund-raising trigger.*

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In this example, each position is modeled explicitly because it's easier to show the logic. For a given position,

Salary Expense = if(AND(Hire Date <= Model Date, Cumulative Funding >= Funding Hurdle), – Salary / 12, 0)

Note that both the date and funding conditions must be met. The target hire date for the back-end developer was March 2019, but the person individual isn't until May due to insufficient funding.

If you prefer to capture the entire salary expense in one line,

Total Salary Expense = –sumifs(Salary, Hire Date, "<="&Model Date, Funding Hurdle, "<="&Cumulative Funding)/12

Commercial Traction Triggers

Using a fund-raising trigger, we only reflect the salary expense for a given role if the model date is past the proposed hire date *and* meets the traction trigger. Figure A4.7 provides an example using MRR as a trigger.

Sales Headcount

Title	Start Date	Salary	MRR Hurdle
Sales Rep #1	30-Sep-2018	$75,000	$0
Sales Rep #2	15-Apr-2019	$75,000	$0
Sales Rep #3	15-Jul-2019	$75,000	$25,000
Sales Rep #4	15-Aug-2019	$75,000	$25,000

Other Headcount

Title	Start Date	Salary	MRR Hurdle
CEO (Existing)	1/1/2018	$60,000	$0
CTO (Existing)	1/1/2018	$60,000	$0
COO (Existing)	1/1/2018	$60,000	$0
UI / UX Designer	2/15/2019	$70,000	$10,000
Back-end Developer	3/15/2019	$90,000	$20,000
Marketing Associate	6/1/2019	$65,000	$20,000

Month Ending	1/31/2019	2/28/2019	3/31/2019	4/30/2019	5/31/2019	6/30/2019
Ending MRR	$5,000	$9,925	$14,776	$24,554	$34,186	$43,673
Sales Rep #1	($6,250)	($6,250)	($6,250)	($6,250)	($6,250)	($6,250)
Sales Rep #2	$0	$0	$0	($6,250)	($6,250)	($6,250)
Sales Rep #3	$0	$0	$0	$0	$0	$0
Sales Rep #4	$0	$0	$0	$0	$0	$0
CEO (Existing)	($5,000)	($5,000)	($5,000)	($5,000)	($5,000)	($5,000)
CTO (Existing)	($5,000)	($5,000)	($5,000)	($5,000)	($5,000)	($5,000)
COO (Existing)	($5,000)	($5,000)	($5,000)	($5,000)	($5,000)	($5,000)
UI / UX Designer	$0	$0	($5,833)	($5,833)	($5,833)	($5,833)
Back-end Developer	$0	$0	$0	($7,500)	($7,500)	($7,500)
Marketing Associate	$0	$0	$0	$0	$0	($5,417)

Figure A4.7 *Dynamic hiring plan based on revenue trigger*

The logic and modeling correlate with those for the funding trigger described earlier. Note that both the date and traction conditions must be met. The target hire date for the UI/UX Designer was February 2019, but the person isn't hired until March because of insufficient traction.

Salary Expense = if(AND(Hire Date <= Model Date, MRR >= MRR Hurdle, – Salary/12, 0)

If you prefer to capture the entire salary expense in one line,

Total Salary Expense = –sumifs(Salary, Hire Date, "<="&Model Date, MRR Hurdle, "<="&MRR)/12

Salary Increases

The model we built in Chapter 4 assumes a generic percentage salary increase for all employees as of January 1 of each year. In reality, salary increases may vary from role to role and could be prorated based on the time of service (i.e., an employee hired 3 months ago won't receive the same percentage raise as one who's work for the company for years).

Individual Increases

Coding individual salary increases allows granularity for different types of positions that may have different target raises or incentive structures. The coding is identical to that for a blanket increase, but it is applied to each individual employee, as shown in Figure A4.8.

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Salary Expense = Prior Month Salary Expense + if(month(Model Date) = 1, Salary Increase × Prior Month Salary Expense, 0)

Sales Headcount

Title	Category	Start Date	Salary	Salary Increase	Month Ending	11/30/2019	12/31/2019	1/31/2020	2/29/2020
Sales Rep #1	Sales	30-Sep-2018	$75,000	5%	Sales Rep #1	($6,250)	($6,250)	($6,563)	($6,563)
Sales Rep #2	Sales	15-Apr-2019	$75,000	5%	Sales Rep #2	($6,250)	($6,250)	($6,563)	($6,563)
Sales Rep #3	Sales	15-Jul-2019	$75,000	5%	Sales Rep #3	($6,250)	($6,250)	($6,563)	($6,563)
Sales Rep #4	Sales	15-Aug-2019	$75,000	6%	Sales Rep #4	($6,250)	($6,250)	($6,625)	($6,625)

Other Headcount

Title	Category	Start Date	Salary						
CEO (Existing)	Executive	1/1/2018	$60,000	10%	CEO (Existing)	($5,000)	($5,000)	($5,500)	($5,500)
CTO (Existing)	Executive	1/1/2018	$60,000	10%	CTO (Existing)	($5,000)	($5,000)	($5,500)	($5,500)
COO (Existing)	Executive	1/1/2018	$60,000	10%	COO (Existing)	($5,000)	($5,000)	($5,500)	($5,500)
UI / UX Designer	Technical	2/15/2019	$70,000	5%	UI / UX Designer	($5,833)	($5,833)	($6,125)	($6,125)
Back-end Developer	Technical	3/15/2019	$90,000	5%	Back-end Developer	($7,500)	($7,500)	($7,875)	($7,875)
Marketing Associate	Marketing	6/1/2019	$65,000	5%	Marketing Associate	($5,417)	($5,417)	($5,688)	($5,688)

Figure A4.8 *Individual salary increases.*

Prorated Increases

As mentioned previously, a newly hired employee may not receive the same raise as one who has been with the company for a long time. One way to capture this is by prorating salary increases based on time of service. A prorated increase reduces the salary increase for employees who recently joined the company.

Salary Expense = Prior Month Salary Expense + if(month(Model Date) = 1, Salary Increase × min(1, (Model Date – Hire Date)/365) × Prior Month Salary Expense, 0)

Figure A4.9 provides an example.

Sales Headcount

Title	Category	Start Date	Salary	Salary Increase	Month Ending	11/30/2019	12/31/2019	1/31/2020	2/29/2020
Sales Rep #1	Sales	30-Sep-2018	$75,000	5%	Sales Rep #1	($6,250)	($6,250)	($6,563)	($6,563)
Sales Rep #2	Sales	15-Apr-2019	$75,000	5%	Sales Rep #2	($6,250)	($6,250)	($6,499)	($6,499)
Sales Rep #3	Sales	15-Jul-2019	$75,000	5%	Sales Rep #3	($6,250)	($6,250)	($6,421)	($6,421)
Sales Rep #4	Sales	15-Aug-2019	$75,000	6%	Sales Rep #4	($6,250)	($6,250)	($6,424)	($6,424)

Other Headcount

Title	Category	Start Date	Salary						
CEO (Existing)	Executive	1/1/2018	$60,000	10%	CEO (Existing)	($5,000)	($5,000)	($5,500)	($5,500)
CTO (Existing)	Executive	1/1/2018	$60,000	10%	CTO (Existing)	($5,000)	($5,000)	($5,500)	($5,500)
COO (Existing)	Executive	1/1/2018	$60,000	10%	COO (Existing)	($5,000)	($5,000)	($5,500)	($5,500)
UI / UX Designer	Technical	2/15/2019	$70,000	5%	UI / UX Designer	($5,833)	($5,833)	($6,113)	($6,113)
Back-end Developer	Technical	3/15/2019	$90,000	5%	Back-end Developer	($7,500)	($7,500)	($7,831)	($7,831)
Marketing Associate	Marketing	6/1/2019	$65,000	5%	Marketing Associate	($5,417)	($5,417)	($5,598)	($5,598)

Figure A4.9 *Prorated salary increases.*

Note that that employees hired after January 1, 2019, don't receive a full salary increase. For example, rather than a 5% raise, the marketing associate receives a 3.3% raise ([January 31, 2020 – June, 1 2019)/365 × 5%).

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Accounts Payable and Accounts Receivable

In Chapter 8, we learned how to model accounts payable and accounts receivable. We mentioned that the techniques employed were an adequate first approximation but not very accurate when the company is growing fast and/or takes a long time to collect its receivables or pay its payables.

The best method to model payables and receivables more accurately is to use Excel's sumifs function. First, make an assumption about days sales outstanding (DSO) or days payables outstanding (DPO) as we did in Chapter 8. Recall that this is an estimate of how long it takes you to collect receivables or pay accounts payable. Then

Accounts Receivable = sumifs(Revenue, Month Ending, "<="& Model Date, Month Ending, ">"&eomonth(Model Date, – DSO/Days per Month)

Accounts Payable = sumifs(Nonpayroll Expenses, Month Ending, "<="& Model Date, Month Ending, ">"&eomonth(Model Date, – DPO/Days per Month)

where *Days per Month* represents an assumption around the number of days in a month. 30 days is a safe assumption.

This method works well for even multiples of 30 days, but it's not capable of handling fractional months. If the term DSO / Days per Month in the formula above is not a whole number, the formula will crash. We need to introduce a rounding function in the formula above to round "DSO / Days per Month" down to the nearest whole number. We must also introduce a correction term to account for the additional fractional month's revenue (or expense).

Accounts Receivable = sumifs(Revenue, Month Ending, "<="&Model Date, Month Ending, ">"&eomonth(Model Date, -rounddown(DSO / Days per Month,0)) + Correction for Fractional Month

The rounddown function accomplishes the rounding described above. To correct for the additional fractional month's revenue, we introduce the following term:

Correction for Fractional Month = sumifs(Revenue, Month Ending, eomonth(Model Date, -rounddown(DSO / Days per Month,0)) x mod(DSO, Days per Month) / Days per Month

Combining all of these terms we get:

Accounts Receivable = sumifs(Revenue, Month Ending, "<="&Model Date, Month Ending, ">"&eomonth(Model Date, -rounddown(DSO / Days per Month,0)) + sumifs(Revenue, Month Ending, eomonth(Model Date, -rounddown(DSO / Days per Month,0)) x mod(DSO, Days per Month) / Days per Month

Inventory

We also covered how to model inventory in Chapter 8, where I introduced a simple approach. Unfortunately, modeling inventory in Excel can be painful. If you have complex inventory management with multiple products, changing COGS, etc., you'll need something more than Excel to manage it properly. Nonetheless, the following section introduces a simple option to add a layer of complexity to inventory forecast.

Reorder Point as Months of Forecast Sales

In this model, we need to make assumptions around the reorder point and reorder quantity. I structured both in terms of months of forecast sales. Suppose we want to maintain at least 2 months of forecast sales in our inventory. When the inventory falls below this point, we order enough inventory to satisfy 5 months of projected sales.

Figure A4.10 provides a simple example assuming that COGS are static.

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Assumptions		Month Ending	1/31/2019	2/28/2019	3/31/2019	4/30/2019	5/31/2019	6/30/2019
		Beginning Units	1,000	900	775	619	2,425	2,181
Reorder Point (Months Sales)	2	Units Sold	100	125	156	195	244	305
Reorder Quantity (Months Sales)	5	New Units	0	0	0	2,001	0	0
		Ending Units	900	775	619	2,425	2,181	1,876
		Beginning Inventory	$500,000	$550,000	$612,500	$690,500	$1,788,500	$1,910,500
COGS	$500	COGS	$50,000	$62,500	$78,000	$97,500	$122,000	$152,500
		New Inventory	$0	$0	$0	$1,000,500	$0	$0
		Ending Inventory	$550,000	$612,500	$690,500	$1,788,500	$1,910,500	$2,063,000

Figure A4.10 *Example inventory model with static COGS.*

In this example, we start with an assumption around beginning units of inventory, and we take units sold from our revenue forecast. Then

Units Ordered = if(Beginning Units – Units Sold < sumifs(Units Sold, Month Ending, "<="&eomonth(Model Date, Reorder Point), Month Ending, ">"&Model Date, sumifs(Units Sold, Month Ending,"<="&eomonth(Model Date, Reorder Quantity), Month Ending, ">"&, Model Date), 0)

Ending Units = Beginning Units – Units Sold + Units Ordered

The one month's ending units become the next month's beginning units. We can translate the unit calculations into dollar amounts by multiplying everything by COGS.

We can add an additional wrinkle to this model if we believe that COGS will change over time. Figure A4.11 provides an example.

Assumptions		Month Ending	1/31/2019	2/28/2019	3/31/2019	4/30/2019	5/31/2019	6/30/2019
		Beginning Units	1,000	900	775	619	424	2,681
Reorder Point (Months Sales)	2	Units Sold	-100	-125	-156	-195	-244	-305
Reorder Quantity (Months Sales)	5	Units Ordered	0	0	0	0	2,501	0
		Ending Units	900	775	619	424	2,681	2,376
COGS								
Order Size (> Than)	Cost	Beginning Inventory	$500,000	$450,000	$387,500	$309,500	$212,000	$1,340,500
1	$500	COGS	($50,000)	($62,500)	($78,000)	($97,500)	($122,000)	($152,500)
3,000	$350	New Inventory	$0	$0	$0	$0	$1,250,500	$0
10,000	$250	Ending Inventory	$450,000	$387,500	$309,500	$212,000	$1,340,500	$1,188,000

Figure A4.11 *Example inventory model with dynamic COGS.*

The unit calculations are identical to the preceding example, but not COGS change over time, so translating units to dollar amounts isn't as straightforward. This might make my accountant friends cringe, but for the sake of a seed-stage model, I'm going to use a "blended" value of COGS instead of LIFO or FIFO inventory policies. LIFO and FIFO mean "last in, first out" and "first in, first out," respectively, and represent generally accepted accounting principles (GAAP) for inventory. They're a little bit painful to model in Excel, so I'm making a simplification.

In our simplified model,

New Inventory = iferror(vlookup(Units Ordered, Table of Order Sizes & Costs, 2, TRUE), 0)

COGS = Units Sold × (Beginning Inventory/Beginning Units)

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Appendix 5

Expense Checklist

One of the most common mistakes in financial models is underestimating expenses. Sometimes this comes in the form of neglecting entire expense categories and sometimes in the form of underestimating the magnitude of expenses. The expense checklist that follows is a reference to guide your thinking and make sure that you're not forgetting any major expense categories.

Note: This list is not exhaustive—there is a huge variety of different expense categories that apply to different types of businesses. Rather, the list is meant to provide some general guidelines for the types of expenses that most businesses incur. Also note that not every expense on this list applies to every business, so it's important to use discretion to understand which ones are most relevant.

If you want some suggestions for your specific industry, it's helpful to read through the quarterly financials for publicly traded companies in your industry. Look for the company's "Investor Relations" website > SEC Filings > Form 10-Q > Part 1. FINANCIAL INFORMATION > Item 1: Financial Statements.

Cost of Goods Sold

- Product site hosting
- Customer support/customer success expense (salaries, benefits, overhead, etc.)
- Raw materials (including taxes, duties, and freight to receive them)
- Manufacturing and assembly (labor, etc.)

Personnel-Related Expenses

- Salaries
- Payroll taxes
    - Social Security
    - Medicare
    - FUTA
    - State Unemployment Tax
- Furniture and equipment for new hires (computer, desk, chair, etc.)
- Payroll provider expense (ADP, Paychex, etc.)
- Software subscriptions (Hubspot, Ansys, Slack, etc.)
- Employee benefits
    - Health, vision, and dental insurance
    - Retirement plan

Sales and Marketing Expenses

- Travel expenses (flights, hotels, meals, rental cars, etc.)
- Trade show registration fees
- Merchandise (T-shirts, tradeshow booths, brochures, miscellaneous swag, etc.)
- Sales commissions
- Paid advertising
- Business cards
- General marketing website

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Inventory and Other Product-Related Expenses

- Fixed manufacturing costs (i.e., molds for injection molding)
- Warehousing
- Delivery expense for delivering goods to customers

Facilities Costs

- Rent
- Utilities (if applicable)
- Office supplies and equipment
- Snacks and coffee

Payment Processing and Royalties

- Payment processing fees
- Royalties (i.e., selling apps in iOS/Google Play stores)
- Royalties due for any licensed intellectual property

Professional Services

Accounting

- Bookkeeping
- Tax returns
- Audit expenses (if applicable)

Insurance

- General liability insurance
- D&O insurance
- Key person insurance
- Workers compensation insurance
- Property and casualty insurance

Legal

- Investment documents
- Contracts and other documents

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Appendix 6

Useful Resources

Compensation Data

AngelList provides cash and equity compensation information for a variety of different positions.

Comparably provides cash and equity compensation details.

Glassdoor requires an account and focuses more on large companies but can be a useful supplemental data point when trying to understand how big companies pay for certain executive and technical positions.

Payscale offers a portal for employers and one for job seekers. Each provides detailed compensation data to help benchmark.

Employee Benefits

Zenefits Small Business Benchmark Report provides information on health insurance premium costs, employer contributions, the types of health plans offered, etc.

Payroll and Taxes

IRS Business Taxes provides a variety of guides and information for businesses to understand the various tax liabilities. While this is helpful info, I'd strongly recommend outsourcing payroll and working with an experienced accountant to ensure that you're paying all taxes properly.

Fund-Raising Data

Crunchbase is Wikipedia for investment information: a free database that anyone can update. It captures a significant amount of financing activity. The veracity of some of the data is questionable, but it is a comprehensive database.

Pitchbook/NVCA Venture Monitor is the current "gold standard" for venture capital investment data. Note that Pitchbook also publishes useful reports on valuations, mergers and acquisitions, and more on a regular basis.

CB Insights/PWC MoneyTree is similar to the Pitchbook/NVCA Venture Monitor. It is a quarterly publication that summarizes major trends, deals, and exits.

SaaS Metrics/Benchmarking

KBCM Technology Group Private SaaS Company Survey is an annual SaaS survey providing a detailed overview of company performance, broken down by revenue ranges, across a variety of metrics such as sales efficiency, revenue per FTE, and more.

OpenView Partners SaaS Benchmarks Report provides a survey of over 300 enterprise SaaS companies.

SaaS Metrics 2.0: A Guide to Measuring and Improving What Matters is an authoritative guide to important SaaS metrics and how to measure them. It was created by David Skok, a VC at Matrix Partners.

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