YALE CASE DECEMBER 23, 2022

On the Nature of Modeling and Valuation in a Search Fund Acquisition

Why the model matters and how to successfully build one

"All models are wrong. Some are useful."
– George Box, 20th-century British statistician

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After identifying an actionable acquisition candidate, a search fund entrepreneur must turn to performing quantitative analysis on the target. Quantitative analysis, colloquially referred to as modeling, is one of the most important tasks during the due diligence stage as it informs business valuation and educates all buy-side constituents (i.e., searcher, creditors, equity investors) on the current and prospective financial strength of the business. For searchers lacking finance-centered experience (e.g., private equity, investment banking, public accounting), modeling can also be one of the most daunting tasks during due diligence. However, there is good news for such individuals – you do not need to be a modeling whiz to successfully acquire and operate a small business. Any bright, capable MBA student with an understanding of the basics described throughout this case note will be more than equipped to navigate this stage of a search fund acquisition. Furthermore, modeling and valuation are a brief, front-loaded moment in the search fund journey. Although they are a gating mechanism prior to becoming a CEO, the vast majority of the search fund odyssey is running and leading a business – not doing modeling and valuation.

Modeling has many purposes. It will help a searcher and their equity investors formulate an appropriate valuation range. The model will also be used by lenders to determine a suitable level of debt to be used to finance the transaction. Additionally, building a thoughtful model will help a searcher unpack the historical performance of the business and inform key questions to pursue in due diligence. Finally, a thorough model can be invaluable in helping inform strategic priorities for a searcher as they build a post-closing value-creation plan for their future management of the business.

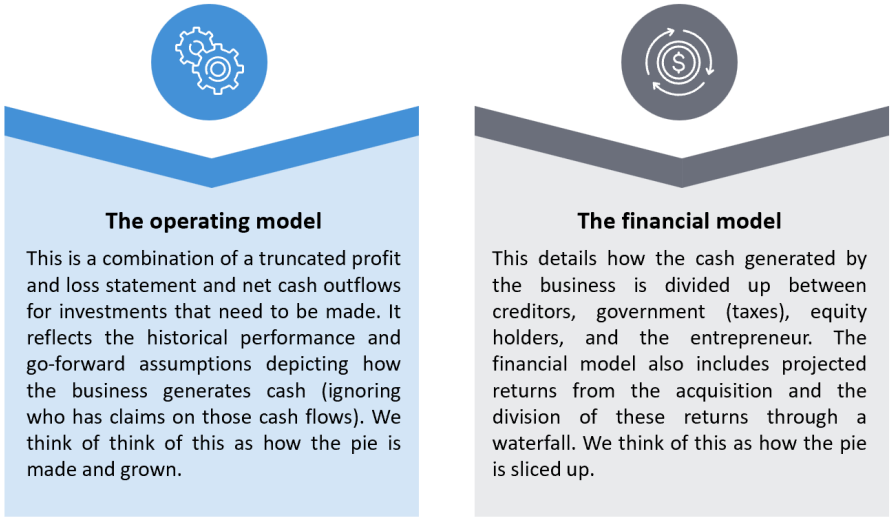
A model utilizes historical data coupled with reasonable go-forward assumptions to establish a range of potential outcomes for the next five to ten years of the business (the operating phase of the search fund journey). Specifically, a coherent model should successfully answer the questions presented in **Figure 1**:

Figure 1: Questions a successful model should answer

1. How much is the business worth?
2. How much debt can the business reasonably support?
3. How does the business make money (i.e., what are the key value drivers)? What has driven these historically, and what are reasonable expectations going forward?
4. What operating levers can be pulled to create the most value for the business?
5. What resources are needed to support the growth of the business?
6. What is a reasonable range of investment return outcomes for the business?
7. When the business is sold, how are the proceeds to be distributed (i.e., what is the returns waterfall)?

In this case note, we will examine the two components that comprise a robust model for analysis, as presented in **Figure 2**:

Figure 2: The operating and financial model definitions



We will also explore a few ways that a search fund entrepreneur can value a target business. These include the following:

- Discounted cash flow analysis

- Valuation ratios, or multiples, from either comparable public companies or precedent transactions (e.g., enterprise value to EBITDA[*])

Finally, after exploring modeling and valuation basics, we will briefly look at some modeling best practices and common mistakes. This will highlight protocols to help ensure consistent modeling methodologies as well as blunders to avoid that can obfuscate the financial outputs.

Valuation and model building are as much art as they are science. There are no precise or definitively correct answers. For example, if a business is estimated to be worth $10 million, it is likely worth somewhere between $9 million and $11 million. When modeling, the goal is to hit the barn and resist the temptation to seek non-existent perfection. We often encourage students to think hard about getting the first digit right – that is often an indication of directional success. Modeling is as much about judgment, assumptions, and understanding historical value drivers as it is about the hard math. MBA students tend to be very good at the math – they are more than capable of discounting a series of numbers in a problem set – but they can struggle with how to forecast the future cash flows that will be discounted in a dynamic model that represents a living business. This is the art – the estimation based on reasonable inputs – of projecting what the business can achieve post-close.

In this case note, we aim to demystify the art of building a model by providing a basic primer that will address the fundamentals of modeling and valuation in a practical manner. However, it is important to note that an entrepreneur will not become proficient in modeling simply by reading this case note. Modeling is a dense, technical, and nuanced topic. Ultimately, it takes many repetitions to gain competency, and we hope that this primer will help guide initial attempts. When modeling, students and aspiring entrepreneurs should resist the temptation to get too engrossed in the model's granularity. Periodically, the model builder should step back, pause, and consider whether the model makes intuitive sense. We can all manufacture models to deliver whatever result we desire by making small tweaks, but the insightful aspiring entrepreneur will engage in periodic gut checks to ascertain the model's tenability. This can loosely be synthesized by asking, "What do I have to believe for this model to work?"

Why modeling and valuation matter in the search fund journey

Building a good model prior to a search acquisition is vital for several reasons (see **Figure 3**). First, and of significant importance for the entrepreneur, the model estimates the earnings potential for the searcher under various growth scenarios. The entrepreneur is betting their professional reputation on their search and typically dedicating five to ten years of their life to the transaction. Thus, they must comprehensively understand what they are getting into and if the transaction represents an attractive opportunity, both financially and professionally, relative to other options. The better able the entrepreneur is to build a model and understand the value drivers of the business, the better they can evaluate the potential for an attractive outcome with the target business. Furthermore, the model will depict what the search fund entrepreneur plans to do with the business that is distinct and different from the exiting owner. This is how the business will grow and create incremental value for the new shareholders and the entrepreneur.

Second, any provider of capital will require a model for evaluating whether to participate in a transaction. Lenders (both for conventional bank loans and SBA 7(a) loans[†]) will use the model to determine the

[*] Earnings before interest, taxes, depreciation, and amortization

[†] An SBA 7(a) is a credit product provided by the U.S. Small Business Administration that can be used in conjunction with a business acquisition. The loan is limited to $5 million and typically requires a personal guarantee. For more information see 7(a) loans (sba.gov).

appropriate amount of debt and terms for the business in a conservative growth scenario. Similar to the entrepreneur, equity investors will use the model to evaluate the risk-adjusted attractiveness of investing in the target transaction relative to other opportunities. A well-built model also allows constituents to appropriately value the business. Based on the model, the entrepreneur and investors can decide if and by how much they can stretch on valuation to secure an attractive business.

The third reason why a good model is vital includes due diligence and operational planning. Building the model is not strictly a numbers exercise in Microsoft Excel. The model is meant to help the entrepreneur unpack the business and improve the due diligence process. Specifically, the model can help the entrepreneur understand exactly how the business makes money and identify additional analysis that needs to be performed to increase their grasp of the business and its operating levers. Furthermore, with this greater understanding of value drivers, the entrepreneur can begin to build an operating plan to achieve the desired operating and economic outcomes efficiently and effectively.

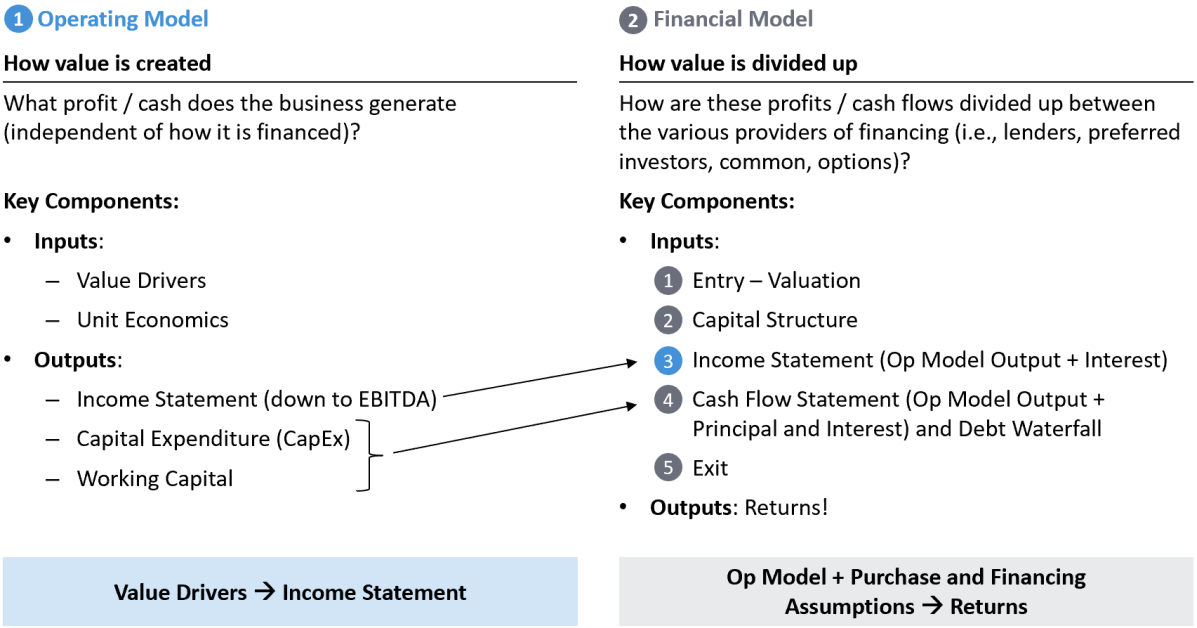
Figure 3: Why modeling matters in search fund acquisitions

Why Model?	Key Questions Answered
Model uses:	
• Search fund entrepreneur	• How much can I earn as the entrepreneur and CEO? • How much debt can the business reasonably bear? • Will I get my money back? What has to go wrong for me not to get it back? What has to go right?
• Lenders • Investors • Valuation	• What will my returns be under a range of reasonable scenarios? • How much should I pay for this business?
• Diligence • Operating levers • Planning	• How does the business make money (what are the key value drivers) and what has driven these historically? • What operating levers can I affect to create the most value for the business? • What resources do I need to support the growth of the business?

Two distinct parts of the search model

When we use the term "model," we are actually referring to two very different yet interrelated components: the operating model and the financial model (see **Figure 4**). The operating model focuses independently on the business at hand. It illustrates how the business generates cash and creates value. Metaphorically, it shows how the pie is made and how it can be grown. Conversely, the financial model looks at the full picture of the transaction, including the entry valuation, the capital structure, and the exit assumptions. It expands on the operating model and illustrates the division of cash flows and value to the various providers of capital. Metaphorically, it shows how the pie is sliced up and shared.

Figure 4: Two distinct parts to a search model



In practical terms, the operating model contains the income statement with the build from revenue down to EBITDA. This build includes a breakdown of all the value drivers (e.g., price and quantity) in the business as well as its unit economics (i.e., revenue and cost of an individual unit). Additionally, the operating model shows two key items from the cash flow statement: capital expenditures, or the investments used to acquire, upgrade, or maintain capital assets (e.g., trucks, equipment, warehouses) and changes in net working capital, or the net change in operating assets and operating liabilities. The operating model does not go all the way down to net income as the line items between EBITDA and net income (i.e., interest, taxes, depreciation, amortization, and net income) do not reflect the intrinsic operating cash flow of the business. Furthermore, the operating model is used to compute the target company's valuation. Entrepreneurs can derive valuation by using a multiple of EBITDA.

The financial model combines the outputs from the operating model with both the proposed capital structure (i.e., debt and equity investors) and transaction parameters (i.e., entry valuation and exit assumptions). It illustrates how and when the future operating cash flows are distributed to the various providers of capital in the transaction, as well as the impact of taxes. The key components of the financial model are the entry valuation, the capital structure, the income statement (derived from the operating model), the cash flow statement, the debt waterfall, and, finally, the exit assumptions. The key outputs of the financial model are the various returns to the capital providers, typically expressed as an internal rate of return (IRR) and multiple of invested capital (MOIC) and the discounted cash flow valuation.

The operating model: how the pie is made and grown

The operating model ties together the revenues and the costs of the business to arrive at operating profit. It illustrates how the business creates value from its core operations, without considering its capital structure. It illuminates how the business generates cash. The operating model should include recent historical results upon which future projections are built. We think of the historical results as looking in the rearview mirror

and the future projections as looking out the windshield. The financial projections must be tied to the historical financials in a rational and logical way. See **Exhibit 1** for more on the operating model.

A typical operating model shows what the business is earning from sales (i.e., revenue), what the business is spending on raw material and labor (i.e., direct costs), what the business is spending on marketing and overhead functions (i.e., indirect costs), and the operating profit, calculated as revenues net of direct and indirect costs. Operating profit in the financial model is popularly referred to as EBITDA (earnings before interest, taxes, depreciation, and amortization) as it excludes interest, taxes, depreciation, and amortization from its calculation. EBITDA is often considered a proxy for the cash flow of the business. However, the two can differ, at times substantially, as discussed later in the financial model section.

Why build a detailed operating model?

Building out a detailed operating model serves several functions, such as (1) helping identify gaps in information and diligence, (2) identifying strengths and weaknesses of the business, (3) supporting effective planning in the domains of key hires and key investments, and (4) informing views on valuation based on the quality of the business and the required work or investment.

A detailed operating model uses a bottom-up methodology to arrive at the headline numbers for revenues and costs. Additionally, it will touch on total addressable market and estimated market share to drive the model build up. This helps the model users understand the underlying levers of the business in sufficient granularity to inform actionable insights. For example, deeply examining revenue patterns in a target company can help ascertain and predict the likelihood of future revenue in the operating model (this is a crucial fact in the modeling process). We can divide a company's revenue into three types: recurring revenue, repeat revenue, and transactional revenue, and it is generally most helpful to model these separately (in both historical and projected periods).

> **Recurring revenue** exists when customers subscribe to receive a product or service over a period of time, the amount of the product and the frequency of the delivery or service being regular and predictable. The customer must take action to stop the product or service from being delivered or rendered. Recurring revenue can be contractual or non-contractual.
>
> **Repeat revenue** is defined as identical customers making the decision to purchase products or services multiple times without the presence of contracts to enforce consumption. There may be behavior or system-switching costs involved, but no contracts or set schedules for delivery or consumption are present. It is the customer's choice whether to purchase, and their action is needed to purchase each time revenue is generated.
>
> **Transactional revenue** is present when customers do not have contracts or switching costs, and there is little predictability and no actuarial pattern of consumption. These are one-time or project revenues.

Businesses can have all or any combination of these revenue streams. For more information on revenue analysis, see our case note On the Nature of Revenue. Some businesses, such as a vendor providing swimming pool construction and maintenance services, may have all three types of revenue. Revenue from new pool construction would qualify as transactional and one-time. Revenue from the sale of chlorine tabs and parts, such as replacing broken filters, can be considered repeat revenue. Contracts for monthly pool cleaning and maintenance would comprise the recurring revenue stream. Since many, if not most, search

fund businesses seek recurring revenue, we will explore why this is and how to best model recurring revenue with precision.

Why are recurring revenue businesses considered superior in search funds?

For search businesses in particular, the value of having a recurring revenue stream cannot be overstated. In a recurring revenue business, new revenues are built on top of the revenues from the previous period (assuming 100% retention and no customer dropout), unlike a one-time revenue business where a business must start from zero in every cycle. It is also much more forgiving on the downside to own and operate a business with a predictable and defensive revenue stream. This dynamic allows the entrepreneur to focus on learning the operations of the business while revenue persistently flows in (as compared to scrambling each period for fresh revenue). Finally, there is greater confidence in modeling revenue forecasts, staffing needs, and other business metrics given the superior stability of these businesses. A recurring revenue business also allows the search fund entrepreneur to have a period to settle into the CEO seat and learn the business as opposed to having to focus all efforts on sales to maintain the current level of the business.

What are the different components of recurring revenue?

There are three main ways in which a recurring revenue business can grow (or lose) revenue. We will decompose these dimensions here.

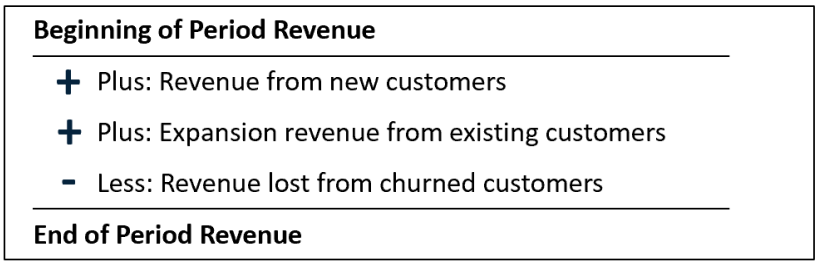
Add new customers. The most straightforward path for increasing revenues is by getting more (new) customers to pay for the products or services of the business. This might require revamping marketing efforts for better targeting of potential customers, expanding outreach, or targeting new geographies.

Sell more to existing customers. This is also referred to as expansion revenue (winning more dollars from legacy customers) and can be achieved by one or more of the following: increasing price (charging more for the same services or products to the same customer base), upselling (selling a more expensive premium offering as compared to a cheaper base offering), and cross-selling (selling a new product or service to an existing customer).

Lose customers. Finally, in most recurring revenue businesses, some attrition, or customer loss (complete customer separation or customers spending less), takes place. This offsets new customers and expansion revenue within an existing customer base.

The above three components of recurring revenue are visually depicted in **Figure 5.**

Figure 5: Breakdown of recurring revenue growth and contraction



How to use an operating model

Building the model from the bottom up based on value drivers requires obtaining data and calculating metrics that can help the search fund entrepreneur understand the business at a granular level. Simply looking at revenue growth year-over-year (see **Figure 6**) does not reveal much about the business outside of providing a directional sense of how revenues are behaving. While a simple model may be used early in the process to develop a quick valuation, it is not sufficient for working through deeper diligence. **Figure 6** is an example of an inferior operating model examining revenue patterns; such models should be avoided.

Figure 6: An overly simplistic operating model with no detail on value drivers

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Revenue	1,500	1,643	1,785	1,948	2,143	2,357	2,593	2,852	3,137	3,451	3,796
% Growth		*9.5%*	*8.6%*	*9.1%*	*10.0%*	*10.0%*	*10.0%*	*10.0%*	*10.0%*	*10.0%*	*10.0%*
EBITDA	180	197	221	244	279	306	337	371	408	449	493
Margin	*12.0%*	*12.0%*	*12.4%*	*12.5%*	*13.0%*	*13.0%*	*13.0%*	*13.0%*	*13.0%*	*13.0%*	*13.0%*
Capex	6	7	9	10	10	10	10	10	10	10	10

Useful business metrics and value drivers are necessary for search fund entrepreneurs to draw meaningful insights about the evaluated business. For example, revenue from new customers can be analyzed to indicate the number of customers added in recent periods and the effectiveness of the sales and marketing efforts of the business. This performance can be compared with the sales and marketing expense and expected yield built into the operating model to ensure they reconcile. Additionally, analyzing expansion revenue informs important diligence questions such as what is driving the observed changes (e.g., price increases, upselling, or cross-selling). As the potential future CEO, the search fund entrepreneur will realize that their go-to-market and product development strategy will be heavily influenced by the insights developed during this exercise. Similarly, customer churn can be used to calculate retention, a proxy of how sticky the business is. For an in-depth look at customer attrition calculations and dynamics, see our case note On the Nature of Customer Attrition and Revenue Analysis. A search fund entrepreneur will want to understand why customers left and what alternative good or service they switched to (e.g., left to a competitor or no longer using the service).

Figure 7 illustrates a more robust and detailed operating model at the revenue level. It reflects the power of business metrics in understanding and analyzing any business. It shows a simplistic operating model that uses business drivers to build up revenues. Such a model lends itself to further analysis by developing metrics such as those shown at the bottom of the table (e.g., new customer growth, expansion, churn, gross retention, and net retention). The three ways to gain (or lose) revenue all flow into gross revenue retention and net revenue retention metrics.

Figure 7: A robust and granular operating model (for a Microsoft Excel version click here)

A Recurring Revenue + B Project Revenue = C Total Revenue

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
A Recurring Revenue:											
Beginning Recurring Revenue	1,500	1,629	1,767	1,922	2,092	2,281	2,487	2,712	2,956	3,223	3,514
1 (+) New Customers	100	112	124	135	147	160	175	191	208	226	247
2 (+) Expansion (Existing)	50	78	58	68	75	82	90	98	106	116	127
3 (-) Churn	(21)	(52)	(27)	(33)	(33)	(36)	(40)	(43)	(47)	(52)	(56)
Ending Recurring Revenue	1,629	1,767	1,922	2,092	2,281	2,487	2,712	2,956	3,223	3,514	3,831
% Growth	*8.6%*	*8.5%*	*8.8%*	*8.8%*	*9.0%*	*9.0%*	*9.0%*	*9.0%*	*9.0%*	*9.0%*	*9.0%*
B Project Revenue	300	305	310	315	342	373	407	443	483	527	575
% Growth		*1.7%*	*1.6%*	*1.6%*	*8.6%*	*9.0%*	*9.0%*	*9.0%*	*9.0%*	*9.0%*	*9.0%*
% of Ending Revenue	*18.4%*	*17.3%*	*16.1%*	*15.1%*	*15.0%*	*15.0%*	*15.0%*	*15.0%*	*15.0%*	*15.0%*	*15.0%*
C Total Revenue	1,929	2,072	2,232	2,407	2,623	2,860	3,118	3,400	3,707	4,041	4,406
% Total Growth		*7.4%*	*7.7%*	*7.8%*	*9.0%*	*9.0%*	*9.0%*	*9.0%*	*9.0%*	*9.0%*	*9.0%*
Metrics											
1 *New Customer Growth (% YOY)*		*12.0%*	*10.7%*	*8.9%*	*9.0%*	*9.0%*	*9.0%*	*9.0%*	*9.0%*	*9.0%*	*9.0%*
2 *Expansion (% of Beginning)*	*3.3%*	*4.8%*	*3.3%*	*3.5%*	*3.6%*	*3.6%*	*3.6%*	*3.6%*	*3.6%*	*3.6%*	*3.6%*
3 *Churn (% of Beginning)*	*(1.4%)*	*(3.2%)*	*(1.5%)*	*(1.7%)*	*(1.6%)*	*(1.6%)*	*(1.6%)*	*(1.6%)*	*(1.6%)*	*(1.6%)*	*(1.6%)*
3 *Gross Retention*	*98.6%*	*96.8%*	*98.5%*	*98.3%*	*98.4%*	*98.4%*	*98.4%*	*98.4%*	*98.4%*	*98.4%*	*98.4%*
Net Retention 2 + 3	*101.9%*	*101.6%*	*101.8%*	*101.8%*	*102.0%*	*102.0%*	*102.0%*	*102.0%*	*102.0%*	*102.0%*	*102.0%*

By examining revenue underpinnings at a granular level, the entrepreneur begins to see patterns and develop insights. For example, facts around revenue retention emerge. Gross revenue retention measures the amount of recurring revenue that the business retains each period after accounting for revenue churn (but not expansion revenue; i.e., it can never be above 100% and ignores revenue from new customers in any period). Net revenue retention, similar to gross retention, also excludes revenue from new customers, but goes further by incorporating expansion revenue. Many good businesses can have net retention rates well in excess of 100%; effectively, the business's ability to increase prices and or upsell and cross-sell to existing customers each year more than offsets its existing customer churn. The following mathematical expressions highlight the relationship.

$$Gross\ revenue\ retention\ rate = \frac{Revenue\ retained\ from\ existing\ customers\ during\ the\ period}{Revenue\ from\ existing\ customers\ at\ the\ beginning\ of\ the\ period} \times 100$$

$$Net\ revenue\ retention\ rate = \frac{\Delta\ (Revenue\ retained + Revenue\ gained\ from\ existing\ customers)\ during\ the\ period}{Revenue\ from\ existing\ customers\ at\ the\ beginning\ of\ the\ period} \times 100$$

A detailed operating model, when used properly, helps a buyer better understand the target business and pose the right questions to the seller during due diligence. From the example in **Figure 7**, in 2018, the business saw higher-than-average rates for expansion revenue (4.8%) and churn (3.2%). These could be linked and explained by a price increase in that year that benefited expansion revenue but hurt churn as some customers rejected the higher pricing. Unpacking the historical financials using this approach can help inform unavailable metrics (e.g., price elasticity of demand). These insights can then inform future strategies on how to run the business. In the above example, the search fund entrepreneur might conclude that increasing pricing by ~5% in the past led to a ~200 bps increase in churn (3.2%, up from 1.4%).

Therefore, as the new owner, they might decide to increase pricing by less than 5% to keep customer churn in check.

Despite the valuable insights that can be drawn from this bottom-up revenue model, it is unlikely to be the way the seller thought about their business in the past. Accordingly, these specific metrics may not be readily available from the seller. Alternatively, the search fund entrepreneur can obtain the underlying data via platforms such as Quickbooks or by asking the seller for the building blocks. For example, to calculate expansion revenue, the searcher can request revenue by customer over the past few years. Then, the searcher can further dive into what is driving growth or decline by customer and what opportunities remain. Additionally, many small businesses operate off cash basis accounting, or the recording of revenue and expenses when cash is received or dispensed, whereas most search fund entrepreneurs are accustomed to working with accrual basis accounting. It is important to recognize how the historical financials are presented in order to properly plan and project into the future (models will nearly always reflect accrual basis accounting).

With the revenue model in hand, the next step is to understand the various costs of the business, notably the cost of goods sold (COGS) and the selling, general, and administrative (SG&A) expenses. COGS, or direct costs, are expenses directly related to producing a product or service, including the cost of materials and direct labor. COGS can be fixed or variable expenses, meaning that these expenses are correlated with revenue (i.e., these expenses are required to generate more revenue). Subtracting COGS from revenue results in gross profit. SG&A expenses, also referred to as indirect costs, are the day-to-day expenses to operate the business that are not directly related to the production of goods and services. These include certain personnel (wages and benefits), rent and utilities, marketing and advertising, finance and accounting, and other overhead expenses of a business. SG&A expenses, like COGS, are a mix of fixed and variable expenses. For example, monthly rent on a shared services (corporate) office will be stable each month regardless of revenue developments. Thus, it is a fixed cost. Conversely, marketing and advertising expenses are more tied to revenue and can be adjusted depending on revenue and cost goals (i.e., increased to drive incremental revenue or decreased to limit costs). One of the most important pieces of the expense build is understanding the makeup of variable versus fixed costs to properly reflect the effect of revenue growth and decline on the profitability of the business. We caution entrepreneurs to not over-rely on the fixed nature of certain costs, as many perceived fixed costs rise in step functions as the business scales. These costs might indeed behave in a temporary fixed nature but might not be permanently fixed. Subtracting SG&A expenses from gross profit results in operating profit. If depreciation and amortization are included in COGS and SG&A, they are added back to operating profit to get EBITDA.

Leveraging financial ratio analysis allows a searcher to quickly analyze and understand expense trends. Start high level with EBITDA margin (EBITDA divided by revenue), looking for how it has trended over time (i.e., have margins expanded, contracted, or remained constant, and why?). To answer why, look one layer deeper at gross margin (gross profit divided by revenue) and SG&A expenses as a percentage of sales. Then, look at the main drivers within each of the general buckets. For example, if looking at a landscaping business with declining gross margins, it would be helpful to analyze direct labor as a percentage of sales over time (i.e., wage increases may be the explanation for the gross margin contraction). When analyzing individual expenses, look at variable expenses as a percentage of sales and fixed expenses as their actual dollar amount. Any future expectations for the business should be consistent with historical results unless there are specific reasons for a change in direction. Like the bottom-up revenue model, a detailed cost model can help to (1) explain the different cost levers of a business, and (2) inform management's action to drive up profitability.

EBITDA from the operating model allows for a multiples valuation. We will explore this topic more fully later in the case note.

The financial model: how the pie is sliced up and shared

The financial model combines the outputs from the operating model with both the proposed capital structure (i.e., debt and equity investors) and transaction parameters (i.e., entry valuation and exit assumptions). It illustrates how and when the future operating cash flows and profits from the operating model are distributed to the various providers of capital and other constituents (i.e., search fund entrepreneur) in the transaction.

While the operating model helps determine the relative strength of the company, the financial model is required to truly assess the relative attractiveness of the transaction as a whole. **Figure 8** depicts a highly simplified version of a financial model (without a waterfall). In Figure 8b we expand on 8a and include taxes, capital expenditures, and working capital changes.

Figure 8a: A basic financial model (for a Microsoft Excel version click here)

Assumptions

Five assumptions drive returns in a simple LBO:

Operating Model

1. EBITDA[1]
2. EBITDA Growth

Financial Model

3. Entry Multiple
6. Debt & Rate
5. Exit Multiple

Financial Model

Assumptions:				x LTM EBITDA	Quantum
EBITDA (Cashflow)	1 $100		Debt 4	2.50x	$250
Purchase Multiple	5.0x 3		Equity	2.50x	250
Purchase Price	**500**		**Total Purchase Price**	**5.0x**	**500**
Interest Rate on Debt	5.0% 4		EBITDA Growth	0.0% 2	

	12/31/20	12/31/21	12/31/22	12/31/23	12/31/24	12/31/25
EBITDA	1 100	100	100	100	100	100
YOY Growth		*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%* 2
Interest Expense		($13)	($13)	($13)	($13)	($13)
Cash Flow to Equity (Pre-Tax)		88	88	88	88	88
Exit:						
Exit EBITDA (2025)						$100
x Exit Multiple						5.0x 5
Enterprise Value						**500**
Less: Debt at Exit						(250)
Equity Value at Exit (Proceeds)						**250**
Equity Cash Flows	(250)	88	88	88	88	88
Plus: Exit Proceeds						250
Total Equity Cash Flow	**(250)**	**88**	**88**	**88**	**88**	**338**
IRR (Equity)	**35.0%**					

(1) For simplicity assumes EBITDA = Cash Flow, i.e., the business has no CapEx, no Working Capital, etc., and no taxes.

Figure 8b: A basic financial model with taxes, capital expenditures, and working capital changes (for a Microsoft Excel version click here)

Assumptions

Operating Model

1. EBITDA
2. EBITDA Growth

Financial Model

Assumptions:				x LTM EBITDA	Quantum
EBITDA	1 $110		Debt	2.50x	$275
Purchase Multiple	5.0x		Equity	2.50x	$275
Purchase Price	**550**		**Total Purchase Price**	**5.0x**	**550**
Interest Rate on Debt	5.0%				

	12/31/22	12/31/23	12/31/24	12/31/25	12/31/26	12/31/27
EBITDA	1 110	116	121	127	134	140
Growth		*5.0%*	*5.0%*	*5.0%*	*5.0%*	*5.0%* 2
Depreciation and Amortization	10	10	11	11	11	11
Operating Income (EBIT)	100	106	110	116	123	129
Interest Expense		(14)	(14)	(14)	(14)	(14)
Earnings Before Taxes (EBT)		92	97	103	109	116
Less: Taxes at 25%		(23)	(24)	(26)	(27)	(29)
Net Income		69	72	77	82	87
Plus: Depreciation and Amortization		10	11	11	11	11
Less: Capital Expenditures		(11)	(11)	(12)	(12)	(13)
Less: Changes in Working Capital		(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Free Cash Flow Before Debt Exstinguishment		68	72	76	80	85
Less: Debt Exstinguishment		0	0	0	0	0
Free Cash Flow to Equity		68	72	76	80	85
Exit:						
Exit EBITDA (2027)						$140
x Exit Multiple						5.0x
Enterprise Value						702
Less: Debt at Exit						(275)
Equity Value at Exit (Proceeds)						427
Equity Cash Flows	(275)	68	72	76	80	85
Plus: Exit Proceeds						427
Total Equity Cash Flow	(275)	68	72	76	80	512
IRR (Equity)	33%					

The key inputs for the financial model include what the entrepreneur is paying in the transaction (i.e., the entry valuation), how they are paying for the transaction (i.e., the capital structure), what growth and future cash flows they expect (i.e., the income statement and the cash flow statement, both of which are derived from the operating model), how much of those future cash flows are distributed to debt holders (i.e., the debt waterfall), what the tax obligations are, and, finally, what the final profits are and how they will be distributed (i.e., the exit assumptions).

The first input, entry valuation, determines how much money is needed to consummate the transaction. The financial model can be very sensitive to the entry multiple, meaning small increases or decreases to the entry valuation during negotiations may have a sizeable impact on future returns. A company with a highly attractive operating model may be an unattractive transaction if the entry valuation is too high. Conversely, a company with an uninspiring operating model may be an attractive transaction at the right price.

The entry valuation then flows into the capital structure for the transaction. The capital structure is typically displayed as the sources and uses (of cash) in a model. The sources of capital are comprised of the various debt and equity providers in the transaction (i.e., the capital structure), and the uses of capital include the purchase price (entry valuation) and any transaction fees. Like entry valuation, the transaction's capital structure can have a significant impact on the deal's attractiveness. The two general inputs for the capital structure are debt and equity financing, which can come in many forms. Debt, colloquially referred to as leverage, is generally less expensive than equity because it sits higher in the capital structure and has a capped priority claim on the company's cash flows as compared to equity holders, who have residual cash flow claims. Thus, appropriately utilizing debt financing can help boost returns (hence the term leverage). However, it is important to understand from the financial model how much debt the company's cash flows can support by calculating and examining debt service requirements and creditor covenants. Determining

the capital structure requires balancing financial returns, risk, and the availability of capital from different sources. The capital structure will feed into the interest expense, debt waterfall, and ownership table (i.e., how the equity profits are distributed).

Next, the income statement is a summary of the operating model (notably revenue and EBITDA) but extends past EBITDA to determine net income. To reach net income, depreciation and amortization (the D and A in EBITDA) are subtracted from EBITDA to reach EBIT. Then, interest (derived from the capital structure) and tax are subtracted to reach net income.

The cash flow statement picks up from the income statement to determine free cash flow. Some items on the income statement do not reflect actual cash expenditures in the period (mainly depreciation, amortization, and non-cash interest) and thus need to be added back to net income. In addition, some cash-bearing items are not incorporated into the income statement (mainly capital expenditures and changes in net working capital) and must be accounted for to determine actual cash flow. Thus, to determine free cash flow, non-cash income statement items are added back to net income and certain off-income statement cash items are subtracted from net income. Once depreciation and amortization are added back to net income, capital expenditures and changes in working capital are subtracted to derive free cash flow before debt extinguishment. Finally, debt extinguishment is subtracted to calculate free cash flow to equity.

We will now consider debt payments more closely. The free cash flow works its way through the debt waterfall. The debt tranches are derived from the capital structure and organized by seniority. There are three main items in the debt waterfall: mandatory principal payments, discretionary principal payments, and interest. First and foremost, all mandatory debt repayments must be paid. This includes both regular principal payments throughout the life of the loan (commonly referred to as amortization) and the remaining principal payment at the expiration of the loan. The remaining free cash flow after satisfying mandatory payments can then be used to pay down additional debt, if desired and allowed. The remaining debt amounts after repayments will determine the interest expense for the next period. The debt waterfall informs many financing and operating decisions. When evaluating debt financing, the amount and timing of mandatory payments are negotiable. For example, it may be advantageous to the search fund entrepreneur to backload mandatory debt repayments to later ownership years to reinvest early cash back into the business for growth or have less focus on debt extinguishment when learning the business. Separately, the search fund entrepreneur may want to strategically pay off relatively expensive debt in early years to limit its effect on financial returns. For example, some forms of debt or preferred equity have compounding growth over time and may have a large effect on the search fund entrepreneur's ultimate profits if not paid off early. The debt waterfall ends with the net new cash and resulting cash balance. It also provides free cash flow to equity, obtained by subtracting principal repayments projected to be made in each year. For guidance on debt in the search fund ecosystem, the cost of debt is the average market cost, which can easily be ascertained by contacting one of several perennial search fund creditors like Live Oak Bank, BankProv, Prides Crossing Capital, and Balance Point Capital.

The last input of the financial model is the exit assumptions, most notably the exit valuation. The reference point for the exit valuation is typically the entry valuation. There are multiple ways to increase the value of the business throughout the ownership period, including growth, quality of revenue (e.g., a greater share of recurring revenue), and risk reduction (e.g., diversification). However, valuation is generally very sensitive to the overall economic environment (i.e., factors outside the search fund entrepreneur's control), so it is important to be conservative when considering exit multiple expansion assumptions. The exit valuation determines the price the business can be sold for, to be distributed to capital providers.

Finally, the outputs of the financial model are the various returns to the providers of capital (internal rate of return or IRR, multiple on invested capital or MOIC) and a discounted cash flow (DCF) valuation

(discussed later). IRR and MOIC are a mix of the distributed cash flow throughout the life of the transaction and the profits generated at a sale or other liquidity event (as determined by the exit valuation). The financial model and outputs are sometimes referred to as a leveraged buyout model or LBO model. The outputted returns, adjusted for risk, for each constituent help them determine whether the transaction is attractive relative to other opportunities. These returns are typically referred to in the form of multiple on invested capital (absolute) and internal rate of return (time-adjusted). MOIC, the absolute return, is calculated as the total amount of profits (including cash flow distributions or interest payments) divided by the invested amount. It is expressed as a multiple (i.e., 0.0x).

$$MOIC\ for\ equity\ investors = \frac{Cash\ flow\ distributions + Exit\ profits}{Invested\ equity}$$

$$MOIC\ for\ debt\ investors = \frac{Interest\ payments + Principal}{Principal}$$

IRR incorporates time into the MOIC calculation. It is expressed as a percentage and represents the average annual return of the investment. A simple formula for IRR, assuming no interim distributions, is MOIC raised to the reciprocal of the number of years in the transaction model (e.g., for a five-year model, raise to the power of 1/5) minus 1. For more complicated situations, the IRR and XIRR formulas in Microsoft Excel are suggested.[‡]

$$IRR = \frac{Exit\ profits}{Invested\ equity}^{\frac{1}{\#\ of\ Years}} - 1$$

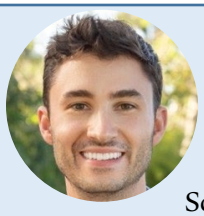
It is important to evaluate both MOIC and IRR and understand what is important to the entrepreneur, investors, and the transaction mechanics. For example, a 3.0x MOIC in five years generates an attractive 24.5% IRR. The same 3.0x MOIC that takes 15 years to generate is only an 7.6% IRR. A 50% IRR in one year is a very attractive IRR but only results in a 1.5x MOIC and may generate only a nominal amount of proceeds for the searcher and investors. Thus, the search fund entrepreneur must balance the two metrics to ensure they are achieving the goals of all constituents. See **Exhibit 2** for a detailed financial model or here for a Microsoft Excel version.

In both the operating and financial models, we encourage students and entrepreneurs to include detailed financial ratio analysis on both a historical and a prospective basis. These data points will help searchers understand historical trends on a granular basis and how those patterns bridge to pro forma projections. For example, if the cash conversion cycle historically has averaged 60 days, and the searcher's future operating model depicts a conversion cycle at 30 days, that compression needs to be understood and based on reality. Although this note is not focused on dissecting or explaining financial ratio analysis, we believe aspiring entrepreneurs should include all or some of the ratios listed in **Figure 9**.

[‡] IRR and MOIC are popular shorthand approaches that effectively assume capital structure remains relatively constant over the investment period.

Figure 9: Illustrative financial ratios to consider in the modeling process[8]

Liquidity	• Cash Ratio = Cash & Cash Equivalents/Current Liabilities • Quick Ratio (Acid-Test Ratio) = (Current Assets +Receivables)/Current Liabilities • Current Ratio = Current Assets/Current Liabilities
Efficiency	• Days Inventory = Inventory/COGS x 365 • Days Receivables= Accounts Receivables/Net Sales x 365 • Days Payables = Accounts Payable/COGS x 365 • Cash Conversion Cycle = Days Inventory + Days Receivables – Days Payable • Asset Turnover Ratio = Revenues/Total Assets • Effective Interest Rate = Interest expenses/Average Financial Debt • Effective Tax Rate = Tax Expenses/EBT
Profitability	• Gross Profit Margin = Gross Profit/Net Sales • EBITDA Margin = EBITDA/Net Sales • Net Profit Margin= Net Income/Net Sales • Return on Assets = (Net Income + Interest)/Average Assets • Return on Equity = Net Income/ Average Equity • Return on Capital Employed = NOPAT/Average Capital Employed
Growth	• Revenue Growth • EBITDA Growth • Net Income Growth • Asset Growth • Equity Growth
Leverage	• Debt/EBITDA • Net Debt/EBITDA = (Debt - Cash & Cash Equivalents)/EBITDA • Interest Coverage Ratio = EBIT/Interest Expense • Debt Service Coverage Ratio = Free Cash Flow to Firm/(Interest + Principal Repayments) • Debt Ratio = Total Liabilities/Total Assets • Debt/Equity = Interest Bearing Debt/Equity
Terms	• Gross Profit = Revenues – Cost of Goods Sold (COGS) • COGS = Cost of Goods Sold • EBITDA = Earnings before Interest, Tax, Depreciation & Amortization • EBIT = Earnings before Interest & Taxes • NOPAT = Net Operating Profit Less Adjusted Taxes = EBIT * (1-tax) • Net Income = EBIT – Interest - Taxes • Net Working Capital = Current Assets – Current Liabilities • Capital Employed = Fixed Assets + Net Working Capital - Cash • CAPEX= Capital Expenditure



Christopher Sykes (MIT Sloan School of Management 2018) launched a search fund, Eagle Rock, after completing his MBA. In May 2020, he acquired Swoogo, a SaaS platform focused on the event management space. Previously, he had worked as a consultant at Accenture and Axia Limited, focusing on marketing, sales, and growth strategy projects for Fortune 500 companies. He holds a Bachelor of Arts in Political Science from Princeton University.

While I was apprehensive about the process at first, building the operating model for Swoogo ended up being very straightforward and helped explain the different cost drivers of the business. First and foremost, it helped me gain an understanding of key metrics such as retention and churn over time, items that are key in assessing the relative attractiveness of businesses (especially for SaaS business models). Second, during the diligence phase, the model helped me identify some areas I would need to focus on in both the short and long term if I were to take over the business.

As an example, the operating model, in combination with market analysis, helped me identify that salaries for key employees such as engineers had not kept up with market rates. I knew that the salary rates were unsustainable and would need to be increased pretty

quickly to support employee retention and attract great talent. Salaries are the primary, and effectively the only, expense for software businesses so this was an item that was essential to get right. This led to two priorities for me. First, I needed to revise the operating model to reflect the higher go-forward wage expense, and second, I needed to actually adjust wages once in the CEO seat. While this exercise created work during the diligence phase, I'm so glad I dug into it because it enabled me to better understand my business and create a plan. I was able to give out raises (back to market) on day one, which helped with a smooth transition and was a quick, but meaningful, win with my new employees. Additionally, the whole exercise left me better equipped to deal with the inflation and wage pressure that I have experienced in the business since.

In short, the model provided a robust analytical framework for analyzing Swoogo's business, proving invaluable as it helped me manage investor expectations, yielded useful insights about the business, and helped shape my actions as the CEO early on.

Valuation techniques and methodology

Valuation aims to estimate the true worth of a business. Although no valuation approach assures pinpoint accuracy, we believe that embracing several valuation methodologies can inform reasonable valuation ranges. We often encourage students and entrepreneurs to think hard about getting the first digit correct but realize there is little assurance of nailing an exact valuation.

There are several well-accepted methodologies used to value a business in the search fund ecosystem. The three most frequently employed valuation methodologies are the analysis of (1) discounted cash flows, (2) comparable companies, and (3) precedent transactions. While valuation is often believed to be an objective exercise rooted in numbers and financials, it also involves notable judgement and discretion, irrespective of the methodology followed. Thus, valuation is as much an art as it is science, and the searcher must be aware that all valuation models are at best an estimate. The discounted cash flow approach to valuation encompasses all of the future changes and added value that the entrepreneur brings to the project and helps an entrepreneur address the key question of whether an acquisition is worth doing or not. When considering comparable and precedent transactions using an EBITDA approach, future changes to the business are not accounted for and the valuation is a spot analysis. This approach is helpful in determining how much might be required to pay for a business (and what the enterprise value might be at exit in the future). Therefore, it is often recommended to use multiple valuation methodologies to triangulate valuation of the business since different approaches to valuation address slightly different questions. We discuss the different valuation methodologies in more detail below.

Discounted cash flow analysis

Discounted cash flow (DCF) analysis estimates the intrinsic value of a business based on its projected cash flows derived from the financial model. It involves the following steps: (1) projecting the future cash flows for the next five to ten years, (2) calculating a terminal value of the business, (3) calculating a discount rate, and (4) discounting the future cash flows and the terminal value back to present to arrive at today's value of the business.

Forecasting cash flows. The financial model is used to project future cash flows to equity for the next five to ten years of the business. A general rule of thumb is to forecast the business until it reaches the point of an anticipated exit. If the entrepreneur and the investors believe the business will be owned for five years, it is appropriate to build a five-year model. If the projected holding period is longer, the model should reflect

the expected investment period. Keep in mind that projections will likely lose accuracy when going farther into the future. It is important to balance projection length with accuracy.

When constructing the financial model for valuation purposes, consider forecasting the future cash flows based on how the business is currently being operated – without all of the contemplated improvements and changes. This as-is value will result in compensating the seller for the work they have done in the past but not the work the searcher intends to do in the future. We encourage aspiring entrepreneurs to layer in proposed changes on a line-by-line basis to isolate each individual initiative and how it will impact the model and valuation. The value that is the result of post-closing initiatives should ideally be claimed by the new owners and not reflected in the valuation for the seller. This implies that the purchase dynamic is not competitive or highly competitive, which is the case (or at least the aspiration) for search fund entrepreneurs. Alternatively, an astute seller might estimate how much value the search fund entrepreneur might create post-close and attempt to claim some of that value creation. This would especially be true if the seller is represented by a sophisticated intermediary who creates a competitive bidding auction.

Terminal value. It is unrealistic to project cash flows for the entirety of the business's future given the uncertainties involved. As a replacement, an estimated terminal value is used to capture the value of the business as a going concern beyond this explicit forecast period. Typically, search fund entrepreneurs use the exit multiple method, which applies a multiple to the appropriate financial metric (e.g., an EBITDA multiple applied to the terminal EBITDA of the business). When evaluating the present value of all future cash flows, examine what percentage of the total present value is comprised of the present value of the terminal value. A valuation that is overweighted to the terminal value (cash in the future) is riskier than a valuation that has more value derived from current period operating cash flows. We prefer businesses with smaller terminal values and larger periodic operating cash flows.

Discount rate. To calculate the present value of the forecasted cash flows and terminal value, a discount rate is used. The appropriate discount rate when calculating the present value of free cash flow is the cost of equity. In the search fund ecosystem, there is no need to calculate Betas, risk-free returns, and equity premiums. For simplicity, a safe assumption when calculating cost of equity for a typical search fund transaction is that the *target* equity return is approximately 30%. When thinking about valuation and returns to equity holders, entrepreneurs should be aware that calculating a net present value of zero with an imputed 30% *target* equity return is acceptable and a value-creating proposition. It is worth noting that the IRR and DCF are based on the same set of cash flows, so they will give consistent answers. IRR minus cost of capital tells us how profitable the investment is per dollar invested, and DCF tells us how much value is created in dollars. Each is useful in its own way.

Putting these three elements together, the DCF method values a business as follows:

$$V_0 = \frac{CF_1}{(1+k)} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \cdots + \frac{CF_{TV}}{(1+k)^T}$$

with V_0 representing the valuation of the firm, CF the forecasted cash flows, k the target rate of return required by equity investors, and TV the terminal value at time T. The DCF model is highly sensitive to key inputs: k and assumptions that go into the calculation of TV (exit multiple method). The high dependency of the DCF model on these key inputs is often touted as its biggest drawback. However, sensitivity analysis (discussed in more detail later) that shows a DCF value for a wide range of assumptions of key inputs is frequently used to overcome this limitation. When calculating the valuation of the firm, it is crucial that the entrepreneur takes into account all of the cash leakages from operating the business. Specifically, taxes, capital expenditures, and changes in working capital must be considered when computing the valuation.

Comparable company analysis

Relative valuation suggests that comparable assets should command comparable valuation. Comparable company analysis estimates the value of an asset by looking at the pricing of comparable assets relative to a common variable like earnings, cash flows, or sales. The choice of the variable depends on the industry and the company's stage. While the majority of search fund deals will focus on the EBITDA metric, sales may be a more appropriate metric in cases where low earnings or EBITDA distort the multiple, rendering it meaningless (e.g., earlier-stage software companies).

The next step involves compiling a list of comparable publicly traded companies (given real-time valuations) that have similar industries, characteristics, and underlying drivers and risks. Public companies, with significantly lower capital costs, will inevitably trade at much higher multiples than search fund target assets – primarily due to their substantially lower cost of equity. We advocate for examining public comparable companies to get a directional sense of indicative valuation. Entrepreneurs should keep in mind that no two companies are identical. Therefore, the searcher must be pragmatic while exercising judgement in identifying comparable companies. Size, growth rate, and profitability are some of the parameters used for this screening. Next, the corresponding ratio (e.g., enterprise value to EBITDA or sales), commonly referred to as a multiple, to the chosen common variable is identified and calculated for each of the chosen comparable companies. When analyzing a list of multiples for the comparable company set, it is important to spot-check the range of multiples to ensure there are no outliers that are not representative of the target business. After scrubbing the data, the resulting median multiple is used to calculate the valuation of the target business as follows:

$$Value_{target} = Median\ trading\ multiple_{comparables} \times Common\ variable_{target}$$

When thinking about EBITDA multiples, we encourage students to internalize what this really means by examining the reciprocal of the multiple. For example, if purchasing a firm for 5x EBITDA, the reciprocal is $1/5$, or 20%. This simply means that on a pre-tax basis, the investment will generate an 20% cash return. With leverage and growth, the potential returns amplify. It helps to think about the cash yield in addition to the EBITDA multiple.

Precedent transaction analysis

This methodology uses the price paid for similar companies in recent market transactions as an indicator of a company's value. For example, if evaluating a home health business, a good benchmark to value the business would be other acquisitions of similar home health businesses. If evaluating a niche business with limited comparables, the analysis may have to be conducted more broadly. For example, for a vertical software business with a niche application, it may make sense to look at other vertical software businesses with niche applications (even if unrelated to the target's application). In some cases, the required information on precedent transactions might not be available publicly, thus limiting the use of this methodology.

The transaction multiples of recent precedent transactions of comparable companies are collated to calculate the median transaction multiple. This median multiple is then multiplied with the appropriate financial metric (earnings, EBITDA, sales, etc.) to arrive at a company's valuation.

$$Value_{target} = Median\ transaction\ multiple_{comparables} \times Financial\ metric_{target}$$

The most important step is choosing relevant companies, as in comparable company analysis. Unlike comparable company analysis, however, the precedent transaction multiples include a takeover premium. As a result, precedent transaction methodology typically results in a higher valuation compared to the

valuation obtained using comparable company analysis. It is important to also look for outliers that are not representative of the target business in this comparable analysis. Entrepreneurs should note that many sellers to search fund entrepreneurs do not demand or get a change of control premium. Businesses with very low single-digit EBITDA do not command premiums to the as-is value of the business. This is one of many reasons why search fund–type assets are exciting opportunities for investors and entrepreneurs.

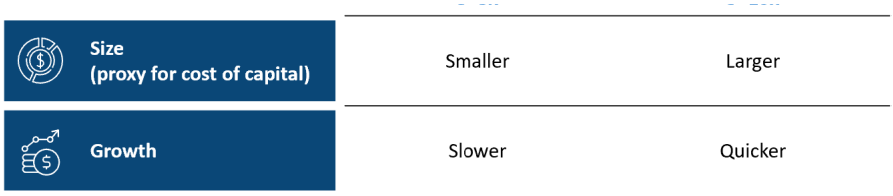
The main challenge of applying traditional valuation techniques to traditional search fund–targeted businesses is size. Typically, public companies are significantly larger than search fund–targeted businesses. Similarly, information on precedent transactions is normally most available for larger transactions. Thus, the search fund entrepreneur must take a discount on the multiples found in these larger companies to adjust for the relative size of the target business.

What drives the multiples valuation of a company?

Several parameters impact the valuation of a company. These include (1) size (proxy for cost of capital), and (2) growth trajectory (past performance and future expectations). While EBITDA multiples are affected mainly by these two factors, other "top line" multiples, such as sales multiples, are also affected by other factors such as profit margin. This is by no means an exhaustive list and is meant to highlight why certain businesses are valued very differently from others. Manufacturing, for example, is usually a capital-intensive, low-margin, and low-growth business while software is a capital-light, high-growth, high-margin business. As a result, companies from different industries can vary widely in their valuation multiples. The same holds true even for companies in the same industry. Differences in market positioning, product pipeline, and quality of management, among other factors, can help explain that variation. Fundamentally, businesses with more persistent cash flows that will grow in the future will warrant higher EBITDA multiples than those that do not have these characteristics. **Figure 10** illustrates why different companies trade at different EBITDA multiples.

We offer a quick note of caution when contemplating EBITDA. EBITDA is the metric of choice in search fund acquisitions. It is often considered a proxy of free cash flow, but this is only true in CapEx[§] light businesses. In companies with significant CapEx, such as "techs in trucks" businesses, trucks (and other equipment) must be replaced regularly and EBITDA and free cash flow quickly diverge. In situations like this, it might be more appropriate to consider EBIT or EBITDA less maintenance CapEx. Furthermore, in companies that have customer attrition, it might be wise to deduct some amount of growth CapEx to derive a steady-state cash flow number to which some multiple is applied. These EBITDA derivatives might approximate what famed investor Warren Buffet calls owner's earnings.

Figure 10: Illustrative reasons why different companies command different EBITDA multiples



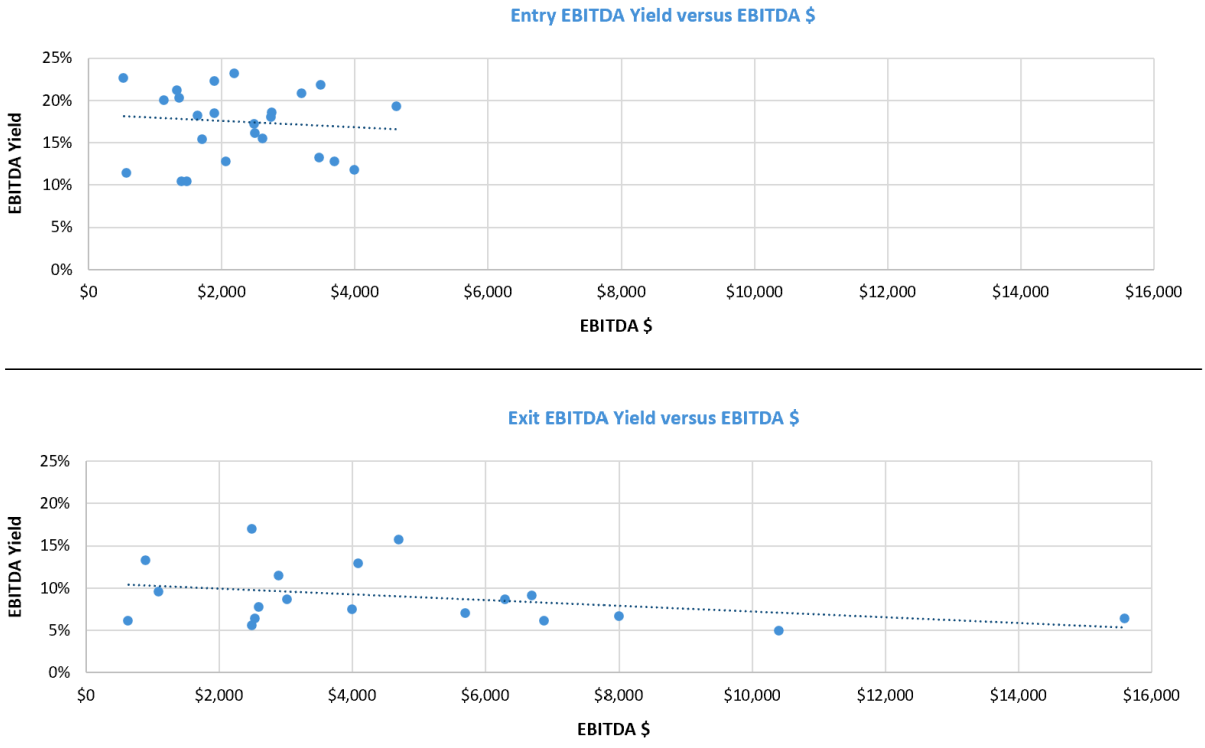
In order to test our thesis about size and EBITDA multiple expansion, we solicited data from Anacapa Partners, a large, well known institutional search fund investor. The investor shared 26 entry and exit data points. With this data we plotted the entry EBITDA yield (EBITDA divided by enterprise value) versus

[§] Capital Expenditures

EBITDA dollars and the exit EBITDA yield versus EBITDA dollars. Think of EBITDA dollars as a measure of firm size. **Figure 10a** depicts the entry and exit EBITDA yields versus EBITDA dollars. As discussed earlier, high (low) yields imply low (high) multiples. Examining the plots, two conclusions can be drawn. First, in both plots, yields decline (multiples increase) with size. This confirms the intuition that size begets multiple expansion because the cost of capital declines with size. Second, the line for exit yields is lower than that for entry yields. That is, holding size constant, exit yields are lower (multiples are higher) than that for entry.

In effect, search fund entrepreneurs create value in two ways. First, they get higher multiples because they grow the firm (EBITDA expansion). Second, holding size constant, they acquire businesses relatively cheaply and sell them at higher valuations. This second source of multiple expansion likely arises because they run their business more professionally than the founders they bought from and because they enlist advisers to create more interest among potential sellers, which boosts selling prices. This reflects Stanford University Graduate School of Business Professor H. Irving Grousbeck's thought process of search fund entrepreneurs buying businesses well, operating businesses well, and selling businesses well. The data below clearly point towards entrepreneurs operating well (exit EBITDAs are greater than entry EBITDAs) as well as buying well and selling well (entry yields are higher than exit yields).

Figure 10a: Entry EBITDA yields versus EBITDA $ and exit EBITDA yields versus EBITDA $



Publications such as the Stanford Graduate School of Business 2022 Search Fund Study: Selected Observations aim to make information on search fund transactions more readily available for entrepreneurs. Transaction multiples over the past 15 years for traditional search funds have ranged from approximately five to seven times EBITDA for businesses with approximately $2 million of EBITDA.[9]

Erin Shuba (Harvard Business School 2020) launched a search fund, Exeter Road Capital, after completing her MBA. Before business school, Shuba served in the Navy as a surface warfare officer onboard USS LAKE ERIE out of Pearl Harbor, HI, and USS GERALD R FORD out of Norfolk, VA. While in the Navy, Shuba learned leadership, ownership, and service fundamentals. Most recently, Shuba worked at McKinsey and Company, advising some of the world's leading companies in operations, digitalization, and pricing.

I am an engineer, naval officer, and consultant by background. I did not have any finance experience when I started to think about a search fund, and the modeling and valuation components of being a searcher were definitely daunting. But when I started to talk to a bunch of investors, my fears abated. Investors made me realize that modeling is not brain surgery; despite not having done it, I absolutely could. Furthermore, investors were willing to be my partners, to coach me, and to provide me with templates and staff resources to get me up to speed. These resources drove my thought process in constructing my cap table. Specifically, I wanted Peterson Partners and WSC & Company in my deal for their resources on modeling and valuation.

My investors push me to go deeper into the whys in my models. This forces me to defend and test my growth assumptions driving valuation and the ultimate waterfall. Building a model with 20% year-over-year growth is not sophisticated, nor is it telling the whole story. You need to drill into the revenue components and really understand the why behind the revenue growth. The same thing is true for projected exit multiples. We constantly talk about the why. This drives valuation.

Inexperience with modeling and valuation does not preclude a search. I am numerically fluent. As an engineer and naval officer, I always worked with large quantities of data; it was just not in the context of financial modeling and valuation. I want to be an amazing operating CEO, and I think that is why my investors backed me. I do not think I will be a world-class modeler, but modeling is just a relatively brief moment in the larger search journey. Being a CEO is much more about leading and managing people, addressing challenges, and exploiting opportunities. Math always matters, but being a CEO is not living in Microsoft Excel. The model will provide me with a roadmap, but being a leader is about executing the plan.

I went to as many Wall Street Prep courses as possible while in business school. I lean into modeling by practicing with brokered deals; I watch YouTube videos on modeling to learn more and hone my skills. This is learnable, and the more I exercise the muscle, the more confident and proficient I am. Modeling and valuation in the search journey should not be perceived as encumbrances, just learning opportunities.

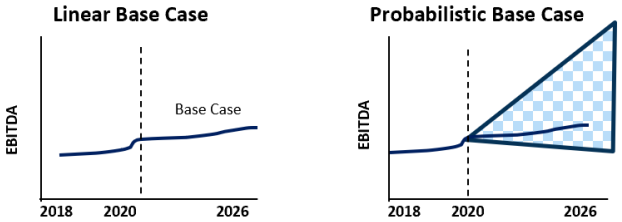
Modeling best practices and common mistakes

Building scenarios – a fan of outcomes versus single outcome base case

A common joke about modeling is that the only thing certain about a model is that it is wrong. There are simply too many factors, inside and outside the business, to predict perfectly what will happen over the next five to seven years. Accordingly, it is important to understand that the purpose of the model is not to

precisely prognosticate the future. Rather, it is to offer a base case or best guess and to understand the range of possible outcomes around that base case as well as the associated ramifications. The modeling process requires a change in mindset from thinking of a business linearly to thinking probabilistically. See **Figure 11** for a comparison of a linear outcome and a probabilistic fan of outcomes.

Figure 11: Linear outcomes versus probabilistic fan of outcomes



The first method of building a probabilistic model is to build multiple scenarios, typically referred to as cases. Common practice is to build a minimum of three scenarios: a base case representing the most likely target outcome (the scenario built during the operating model section), an upside case (a more optimistic scenario), and a downside case (a more pessimistic scenario). While we have acknowledged that the base case will inevitably be incorrect, it is an essential process for two key reasons. First, as mentioned in the operating model section, the process of building the model and base case will help the search fund entrepreneur understand the business and its value drivers. Second, the base case will be required by all equity and debt investors to evaluate the transaction. It will later provide a benchmark for investors and the search fund entrepreneur to track progress throughout the life of the deal (e.g., ahead, behind, or tracking base case). The entrepreneur's base case assumptions should be realistic and defendable, supported by history and specific go-forward initiatives.

The upside and downside cases are more optimistic and pessimistic versions, respectively, of the base case. However, an upside case that is simply an arbitrary increase to base case growth and a downside case that is a corresponding decrease do not provide actionable insights. Rather, these cases should be similarly based on real initiatives and events. For example, an upside case could incorporate additional growth based on more aggressive hiring of sales representatives, a successful price increase, or a higher-than-expected win percentage versus competitors. A downside case could contemplate decreased demand due to market softening (e.g., recession or supply–demand imbalance), cost increases, or a loss of a major customer. Depending on the business and cycle timing, a separate downside case dedicated exclusively to a recession scenario may be warranted. If possible, the effects of these events should be based on historical impacts of similar events. For a recession, look at how the business performed during the last recession. In these downside cases, it is important to specifically evaluate how they flow through the model. Due to fixed costs, a one percent decline in revenue typically leads to a greater than one percent decrease in EBITDA. Upside and downside cases help the search fund entrepreneur to plan future investments (e.g., pursue highest-ROI initiatives), establish operating priorities and manage risk (e.g., strategically de-risk more vulnerable areas of the business), evaluate opportunities (e.g., understand the best and worst outcomes of potential opportunities), and project a range of financial outcomes (i.e., investment returns and losses).

The second way to incorporate probabilistic outcomes into the model is through sensitivity analysis. Sensitivity analysis is most commonly displayed in the form of a sensitivity table, which analyzes two variables at different levels and the associated impact on one output. For example, a common sensitivity analysis looks at various entry and exit valuations and the corresponding effect on IRR (see **Figure 12**). This sensitivity analysis quickly helps the search fund entrepreneur see the overall IRR impact from

relatively small changes in either the entry or exit valuation multiple. Furthermore, with a targeted IRR in mind (e.g., 25 – 30%+ in search fund deals[**]), the sensitivity table illustrates what the search fund entrepreneur must believe in order to reach the targeted IRR (e.g., even if entry valuation creeps up to X during negotiations, as long as the business sells for Y, the targeted IRR is still obtainable). Finally, this specific sensitivity analysis can be a great tool during valuation negotiations with the seller, as the table gives immediate feedback regarding the specific impact of different valuation levels. Similar sensitivity analyses can apply to operating metrics (e.g., growth and margin expansion or compression) as well. A good rule of thumb is to focus on sensitizing each of the largest value drivers in the model (sensitivity analysis is also a good way to identify the true value drivers).

Figure 12: Sensitivity tables – IRR at different entry and exit valuations and IRR at different EBITDA growth and exit valuations[††]

Balancing the financial and operational

It is very easy to input a 15% annual organic growth into a model. However, achieving 15% organic growth over five years is incredibly difficult. It is essential for the search fund entrepreneur to match the model with the operating plan and support growth with specific initiatives. During diligence, the sell-side will likely mention several things that they have not fully exploited (e.g., sales and marketing spend) and how the search fund entrepreneur can focus on those areas to drive accelerated growth. While these things may generally be true, it is important to take them a level deeper and understand the specific effort needed. For example, if the sales team needs to be built out, think through the specific hires, salaries (including commission), and expected productivity (likely in line with current productivity) of the sales team additions. In this way, the model will include justifiable increases to both the revenue and sales and marketing expense line items. This will later help with the hiring and quota-establishing processes.

Another item that is easily modeled is operating leverage. Operating leverage occurs when revenue growth outpaces the growth of expenses (typically fixed expenses) in a business, leading to profit margin expansion. Margin expansion is an amazing driver of value if achieved. It is a double dose of fortune with more revenue and a greater conversion of revenue to profit. However, absent specific justification, it is likely unreasonable to assume that a business could be doubled without meaningful addition to its fixed cost base. Again, it is essential to granularly think through the investments and cost additions needed to reach different milestones in the business and incorporate them into the model. Additionally, keep in mind for the downside cases that operating leverage works both ways. Revenue declines will similarly outpace cost declines due to fixed costs, leading to a double whammy on profitability.

Balance between detail and big picture

During the modeling process, search fund entrepreneurs may find themselves deep in the weeds attempting to adjust each underlying variable to the most accurate level. It is easy to become enthralled by the model after dozens of hours of work and to develop a deep sense of ownership over ensuring its perfection. However, it is important to remember two things: (1) the model is inevitably wrong, and (2) more detailed does not mean more accurate. As mentioned previously, given the number of outside factors involved in a

[**] To clarify, search fund investors typically *target* 30%+ equity returns for their investments. This does not imply a cost of equity as is traditionally conceived in a WACC calculation. Thus, if search fund investors reach their targeted return, they are delighted with the outcome. This implies that IRRs in the 25–30% range can coexist when *targeted* equity returns are 30%.

[††] CAGR is compound annual growth rate.

business, it is impossible to perfectly predict performance over a five-year period. The search fund entrepreneur must not metaphorically miss the forest for the trees and must keep in mind the larger-picture goals of the model, which requires a balance of detail with the big picture.

While evaluating changes and additions, the searcher should ask themselves the following: (1) does this detail increase my understanding of the business, or (2) does this allow the model to objectively be more accurate. For example, say a business has two products. One could break down the revenue line to revenue by product, with individualized projections for each product. If both products are similar and have very similar demand patterns, this is likely unnecessary and does not fulfill either of the above questions. However, if one product is a legacy product expecting slow declines and the other is a new product with rapid growth, it is likely important to model them separately. Simpler is typically the preferred approach. The broad rule of thumb is for the search fund entrepreneur to make sure they can describe the model and conclusions at both the high level and the detailed level. See **Exhibits 3 and 4** for further modeling best practices and common modeling mistakes.

Conclusion

Quantitative analysis is one of the most important processes in a search fund transaction and, for many, it is simultaneously one of the most daunting tasks. However, we have some good news: MBA students are more than equipped to navigate this step. Modeling requires an understanding of the underlying principles (provided in this case note) combined with actual repetitions and practice to gain a true proficiency. An abundance of search fund entrepreneurs from various non-finance career paths have successfully completed this process and produced exceptional outcomes.

The two distinct, yet interrelated models – the operating model (how the pie is made) and the financial model (how the pie is sliced up and shared) – help the entrepreneur understand the earnings potential of the transaction, identify potential waterfall returns to capital providers and the entrepreneur, and inform due diligence and operational planning. Various aspects of these models will serve as building blocks for initiatives and progress tracking (e.g., key performance indicators) throughout the life of the deal. Valuation, commonly estimated via the analysis of discounted cash flows, comparable companies, and precedent transactions, is as much an art as a science. It is best to triangulate to a reasonable valuation using multiple techniques.

We hope that this modeling and valuation primer provides you with the confidence to successfully navigate the quantitative analysis processes of a search fund transaction. Do not let modeling and valuation stand between you and a highly successful and fulfilling career as a search entrepreneur and small business CEO.

Good luck with your modeling and valuation!

Exhibit 1: Operating model – how the business makes money

The key question the operating model answers is: How does the business generate cash flow (excluding debt, interest and other financing decisions)?

What is the operating model?	Why not just take a high-level swag at the revenue growth and margins?
• Inputs: – "Value drivers" of the business • Recurring revenue components • Price x Quantity (can be unit economics) – Varies widely by industry and business model! • Operating Model Outputs: – The summary Income Statement (P&L), and – Key cash flow items (CapEx and net working capital)	• To identify gaps in diligence and what additional information you need from the seller • To identify the strengths and weaknesses of the business and to identify areas of improvement – Is churn a problem? – Is attracting new customers the issue? • To support effective planning – E.g., for key hires, key investments, etc. in your first year as CEO • To inform your views on valuation of the business

Value Drivers → Income Statement

Exhibit 2: Financial model – how value is allocated

The financial model takes the operating model and determines how these profits / cash flows are divided up between the various providers of financing:

- Lenders
- Sellers
- Investors
- Common equity
- Optionholders, etc.

Key Components:

- **Inputs:**
  1. Entry – Valuation
  2. Capital Structure
  3. Income Statement (Op Model + Interest)
  4. Cash Flow Statement (Op Model + Principal & Interest) & Debt Waterfall
  5. Exit
- **Outputs:** Returns!

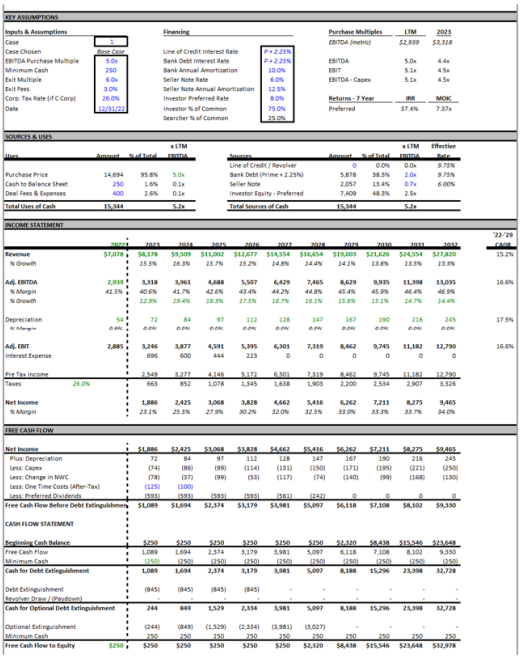


Exhibit 3: Modeling best practices

- **Keep it simple: simple and approximately correct is much better than complex and wrong**
  - Don't build circular references into your models
  - Don't link to outside data sources (but reference your data)
  - Be careful of too many embedded IF statements
- **Follow basic modeling hygiene**
  - Blue font - hardcode, inputs
  - Green font - links to other cells (usually on separate tabs)
  - **Black** font - calculated value or formula
  - Red font - reminder to go back and fix something (shouldn't be in the final version)
- **Once you have the model up and running, ask yourself before you make any changes what should happen**
  - Name the IRR cell as "IRR," then look at changes in IRR after every model change. Otherwise use naming cells sparingly (IRR, case, etc.)
  - Save down different versions of the model approximately every 30 minutes, especially before a major change that "breaks" the plumbing (i.e., in file name - Search Model 20210325 v1.1, then Search Model 20210325 v1.2, ...v1.3...)
- **Lay out the math neatly and sequentially and try to avoid too many operations in a single cell**
  - Ideally, someone should be able to print a model on paper and follow it using a calculator. This way, it is easier to catch mistakes and follow the logic

Exhibit 4: Most common search modeling mistakes

"Commercial / Financial" Mistakes

- **Working capital** "in addition to" the purchase price
- **No minimum cash on balance sheet**
- **Revenue growth**
  - Double digit revenue growth is hard!
  - "They haven't historically invested in marketing" doesn't automatically = 14% annual growth for the next 7 years...
- **Operating leverage**
  - Harder in reality than in Excel!
  - If margins expand, have good reasons and support.
  - Remember, operating leverage cuts both ways in downturns
- **CapEx**
  - Every seller ever has 100 reasons why the CapEx in the last few years was "non-recurring."
  - CapEx will likely be higher going forward.
- **Mismatches** between your operating plan and what's in the model P&L
  - E.g., Seller spent nothing on sales & marketing, plan to accelerate revenue, but no sales and marketing spend in model
- **Downside cases** are simplistic haircuts to the Base Case... Understand and worry about the downside!
  - Past performance in recessions, impact of loss of largest customer, etc.

"Mechanical" Mistakes aka "Busts"

- **Signs switched**: inadvertently flipped negative / positive signs in cash flow statement / debt balance
- **Stub period** mistakes
- **Mis-links** (across tabs and within financial model)
- **Subtotal / Total SUM** mistakes
- **Hard coded numbers** embedded in a formula in a cell
- **Embedded IF statements** – hard to audit logic
  - Toggle through any settings to check that all outputs make sense.
- "Busts" are most often **identified in sensitivity tables** – always double check these to make sure they make sense.

- Go slow.
- Don't use templates "blindly" – really try to understand the intuition and logic.
- Error check the model by stress testing with very high / low values - e.g., put 0 in for the margins to see that negative cash flow is working properly.

Exhibit 5: Additional resources

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Endnotes

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