

A Work Project, presented as part of the requirements for the Award of a Master's degree in
Finance from the Nova School of Business and Economics.

WHEEL NEXT STEPS

JAIME LUIZ MARTINS FILHO

Work project carried out under the supervision of:

Fernando Anjos

19/01/2023

Abstract

The case study examines the two more traditional possible alternatives for Wheel, a healthcare platform in the United States of America. This case emphasizes debating IPO versus Private Fundraising, bringing divergent opinions from two financial advisors. The company in question just closed the last round in January 2022, therefore, as per usual, the management team is considering its next steps.

Keywords

Private fundraising, IPO, Real Options, Private Companies, Healthcare Saas, Capital Structure

This work used infrastructure and resources funded by Fundação para a Ciência e a Tecnologia (UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, Project 22209), POR Lisboa (LISBOA-01-0145-FEDER-007722 and Social Sciences DataLab, Project 22209) and POR Norte (Social Sciences DataLab, Project 22209).

During the beautiful winter in Austin, Texas, Joana Carvalho, a consultant for private companies, is attending a meeting at Wheel's headquarters, a promising HealthCare company. Wheel's management team invited Mrs. Carvalho to discuss the company's next steps as they just closed their fifth fundraising round with an amount of €132m in Jan 2020 and reached the post-valuation of approximately €903m.

Wheel's management team presents Joana with the company's current capitalization table (captable) that shows Wheel's equity structure. However, due to confidential information, only the round details and investors are disclosed without their ownership percentages (exhibit 1).

Exhibit 1 – Wheel's fundraising journey

Round	Date	Amount (€m)	Post Valuation Money(€m)	Follow-on investors	New investor	Lead	Exit
Series C	19/01/2022	132,2	903	CRV, Lightspeed Ventures, Silverton Partners, Tusk Venture Partners	Coatue Management, Salesforce Ventures, Slow Ventures, Tiger Global Management	Lightspeed Ventures, Tiger Global Management	
Series B	19/05/2021	41,4	211	CRV, Silverton Partners, Tusk Venture Partners	Future Shape, J.P. Morgan, Lightspeed	Lightspeed Ventures	
Series A1	12/08/2020	15,1	38,7	Tusk Venture Capital	AXA Venture Partners, HSCM Ventures, Hudson Structured Capital Management, Juxtapose	-	
Series A	28/01/2020	12,5	52,96	Silverton Partners, Tusk Venture Partners	CRV	CRV	
Seed Rounds	23/07/2019	2	8,61	-	Silverton Partners, Tusk Venture Partners	-	

The big question of the day is whether it would be ideal for the company to raise another private fundraising or do an IPO in the next investment round. Several inquiries will be raised about these two options.

Joana had already imagined this scenario, so she brought two successful IPOs into her material. It is important to reinforce that the examples brought were of IPOs before the pandemic because she justified that during Covid-19 the market did not behave rationally. She has the following companies in the healthcare space in her briefcase: Reata Pharmaceuticals and Orthopediatrics Corp. She believes that this will help her support that the IPO is the best alternative in any case.

She argues that there are six crucial variables to check if a company is ready for the IPO: (1) years until IPO, (2) active patents until IPO, (3) total raised in the IPO, (4) last post-valuation

pre-IPO, (5) increase in revenue in the first year after the IPO, (6) number of investors pre-IPO. Therefore, her idea aims to exemplify that the company is already at the ideal moment for an IPO in terms of these variables.

To Joana's surprise, Wheel's management team also hired an investment bank to hear their side. What will be the company's final decision?

Companies overview

Reata Pharmaceuticals: Founded in 2002, Reata is an American pharmaceutical company that strives to develop groundbreaking medicine for life-threatening diseases, for example, Friedreich's Ataxia, Alport Syndrome, and ADPKD. It focuses on small molecule therapeutics with innovative mechanisms to obtain medication for these diseases, which unfortunately has little to no approved medication at the moment. The company conducted the IPO in 2016.

OrthoPediatrics: Founded in 2006, it is an American company created to aid children who are temporarily or chronically impacted by an orthopedic condition. The company, together with highly rated surgeons, is constantly developing innovative products – such as top-notch plates, fixators, and neuromuscular implants - to be used in surgery or recovery period. The company's IPO was conducted in 2017.

Healthcare sector

According to the Insider Intelligence Report, the United States (US) healthcare sector accounted for over 19% of the US Gross Domestic Product (GDP) in 2020. As the public healthcare system in the US has some critical issues, the private sector is enormous and with constant innovation, continues to grow and find cheaper alternatives.

Moreover, digital healthcare is already a reality in the US Market, and with the addition of the availability of 5G networking, this space will gain more market share. Telehealth is a good

alternative for the following years and generations, as it presents itself as cheaper and mobile. According to the Bipartisan Policy Center and Social Science Research Solutions' study, one-third of the adults in the US made use of a Telehealth consult in 2020 as the Covid-19 pandemic enlightened the crucial role of healthcare trends and innovation. Another report, done by McKinsey, shows that telehealth consultation grew by 38x compared to before the pandemic and that nearly 75% of patients plan to continue virtually for small or all care after the pandemic. Following this trend, this moment opens space for an increasing number of startups and young companies to gain market share, for example, Wheel. In comparison to 2015 - a year in which only 1,191 fundraising deals rounds over €10m occurred in the American healthcare sector - 2021 had a much more significant number (4,029 rounds), according to Pitchbook.

Looking deeper into Wheel

Just five years after its foundation, the company already has more than 330 employees and 14 investors. Looking back to its foundation in 2018 in Texas, US, it aimed to simplify and democratize consultations, using technology in its favor. The company offers Virtual Care technology that allows the user to schedule consultations with a specialist without having to stand by in the waiting room or the necessity of displacement.

The company pursues to create an omnichannel solution, which is more than just an online appointment as it englobes the whole patient's treatment by using a complete platform that englobes the appointment, follow-up care, prescription, and lab orders.

Furthermore, Wheel delivered 1.3 million patient visits in the last year (2021) and predicted that it would triple this number by the end of this year (2022). Also, the company achieved a significant milestone by growing its clinician network by more than 60% year-over-year (YOY) while sustaining a 90% retention rate.

It was also named 2021 Forbes' Next Billion-Dollar Startup and 2022 Forbes' America's Best Startup Employers, as well as being ranked in the Top Digital Health Companies of 2021 by CB Insights.

Wheel' investors

On January 2022, Wheel announced it raised €132m in Series C which was co-led by two prestigious investors, Lightspeed Venture Capital, a former investor, and Tiger Global, a new investor. They were also joined by three new investors - Coatue Management, Salesforce Ventures, and Slow Ventures - and three former investors - CRV, Silverton Partners, and Tusk Venture Partners - and it achieved post-valuation money of €903m. The company disclosed that the amount raised in this round would be used to continue expanding virtual care technology. The sum of all the rounds the company has already raised surpasses €200m.

Before this round, Wheel raised approximately €41m in May 2021 in Series B, led by Lightspeed Venture Capital. The company also made three rounds before, Series A.1, Series A, and the first round - which was the seed round in July 2019.

In addition, the entry of new investors in the last round shows that the company can still grow at a fast pace, and the former investors who continue to invest also believe in it. Wheel's investors can be considered crucial players in bringing credibility to the company.

Company's options

Initial public offering (IPO)

As IPO is the most common and traditional public exit strategy for private investors, the company is considering doing it. After reaching-out other exchanges, not just Nasdaq but for example, the Hong Kong Stock Exchange - which has already attracted important companies such as Prada and Samsonite. However, Wheel understands that their operation is concentrated

in the US and due to Nasdaq's track record for this type of company, it is their best option to maximize the value of the stock. On the other hand, Wheel's management is concerned about the cost of the IPO and the fact that usually, the stock is underpriced which subsequently results in the capital raised not being maximized.

Private fundraising

The significant advantage of this alternative for Wheel is to raise capital by looking for investors that could bring their expertise. In this process, the first step includes the company hiring an advisor to work on the marketing material and search for investors.

The range of investors Wheel could think about in this process is wide: Sovereign Wealth Funds, Family Offices, Venture Capital, Private Equity, Crossovers Funds, Growth Funds, Impact Funds, Corporate Arm Funds, and Industry players, just to name a few; it will depend on which stage the company finds itself in.

For the next round, Wheel's team is leaning toward doing a follow on. Therefore, the company will only approach current investors to do a fast process and avoid these investors' dilution.

Also, the company believes that it is essential to note that this alternative is in a good market momentum, as shown in Pitchbook that between 2015 and 2021, the fundraising in the US Market grew 7.3x. This data speaks in reference to US companies and rounds over €10mm, excluding seed rounds.

Series stage

As mentioned before, each stage attracts different types of investors since it has different purposes and objectives. As for the early stages, the investor's goal is to accelerate business concepts. Therefore, the capital raised will be used to complete research product definition and marketing tests.

In a more advanced round, the product or service is fully developed to start mass production and also cover initial marketing; in consequence, the capital raised will be used to cover CAPEX and initial working capital to start preparing the generation of profit.

Finally, during the next rounds, for the company that is already generating revenues, the capital raised will be typically used in the operating company to expand into new markets and to develop new products. This is also true when looking at an industrial scale.

Variables

In order to advise the IPO, Mrs. Carvalho believes that, since private companies do not disclose all the information like public companies do, there are the most important data to be analyzed: (1) years until IPO, (2) active patents until IPO, (3) total raised in the IPO, (4) last post-valuation pre-IPO, (5) increase in revenue in the first year after the IPO, (6) number of investors pre-IPO.

Investment banking model

The investment banking firm was hired to analyze whether Mrs. Carvalho's statement is true or false. Their study will test the relationship between fundraising characteristics versus the stock's performance multiple one year after the IPO. Basically, the main goal is to test if the study could confirm a correlation between these factors and if so, what is the best moment to do an IPO focusing on achieving the best performance after one year of trading versus IYH. The IYH was the benchmarking chosen, which is an ETF that has exposure to the US healthcare sector and tracks performance in this space.

Visioning eliminating macroeconomic factors that could impact performance, the study compares all stocks in the healthcare space that made an IPO between 2015 and 2017 on Nasdaq which was the same period Joana used, before the pandemic.

In order to be more precise, regarding the correlation between total raised versus stock performance after one year of IPO, the study uses the variables that Mrs. Carvalho mentioned as an explicit control.

The null hypothesis they are using for each variable is that this variable will not affect the stock performance in the first year of the IPO and the alternative hypothesis is that this variable will positively affect the stock performance in the first year after IPO.

Data limits

The variable increase in revenue is compared to the first financial year of the company, not exactly the one year after the IPO but a proxy that brings the components of the idea of growth and future cash flow.

Descriptive Dataset's statistic

The study demonstrates that in comparison with dataset statistics, Wheel is above the median concerning the total amount raised and the number of investors pre-IPO but below in number of Active Patents and years until IPO.

Regression model

$$\text{Mutiples of perfomance}_1 = \beta_0 + \beta \text{ Total amount raised} + \\ \beta \text{ Year until IPO} + \beta \text{ Total IPO} + \beta \text{ Increase in revenue} + \beta \text{ investors pre IPO}$$

$$\text{Mutiples of perfomance}_1 = \beta_0 + \beta \text{Log Total amount raised} + \\ \beta \text{dummy Year until IPO} + \beta \text{ Total IPO} + \beta \text{ Increase in revenue} + \\ \beta \text{ investors pre IPO}$$

The investment banking firm excluded the Last post-valuation money pre-IPO because only 37 companies disclosed their values in their dataset and due to the correlation matrix's results. Hence, without this variable, the dataset contains 57 companies using the preview criteria.

They ran two different regressions, the first one as the multiple of performance_1, and to improve the result, they also ran the multiple of performance_2 using year-specific and natural logarithms for the total amount raised.

Investment Banking conclusion

After doing the model and studying the result, their first conclusion was that in the case of an IPO, this could negatively impact new investors – which joined the company in 2022 - because they will not have time to add their expertise and skills to the company. Also, the investment banking firm argues that for an IPO, it is vital to be aware of the impact of macroeconomic factors on stock performance.

In addition, the advisory explained more about the agency theory and the benefit of private fundraising, and they believe that it is not a good idea to raise money without a plan to use this capital because the management team could lose the discipline to invest in good ideas.

Finally, the investment firm advised first defining a clear plan for the capital raise in terms of the next business step, but for them, private fundraising is the best alternative. Finally, they made themselves available to be their advisor during the process.

Wheel's decisions and next steps

First, the company needs to study deeper the material and regression sent by the investment bank, as well as delve into all the variables and methodology used by them and argue with Mrs. Carvalho concerning the IPO. Wheel also needs to perform thorough research on real options, understand investors' opinions, and double-check with recent investors whether they plan on disinvesting.

The leading learning objective for Wheel's management team is to have a better understanding and discuss in practical circumstances the differences between both options. Therefore, the

most important question that needs to be answered is: would it be best to go for an IPO, as Mrs. Carvalho recommended, or private fundraising, as the Investment banking firm recommended, and why?

Appendix:

Exhibit 2 – Reata’s fundraising journey

Round	Date	Amount (€m)	Post Valuation Money(€m)	Follow-on investors	New investor
Series H	13/07/2011	209,6	2100	-	AbbVie, Hunt Technology Ventures, Saints Capital
Series G	29/09/2009	53,6	178,6	CIC Partners, Novo Holdings	HBM Healthcare Investments
Series F	04/12/2008	25,2	126	CIC Partners, Novo Holdings, Redbird Life Science Partners, StartTech Early Ventures	-
Series E	20/06/2007	18,6	55,9	CIC Partners, Novo Holdings, StartTech Early Ventures	-
Series D	26/06/2006	17,8	52,82	CIC Partners	Novo Holding
Series C	03/11/2004	9,5	28,6	StartTech Early Ventures	AbbVie Ventures, CIC Partners, CPMG, Redbird Life Science Partners
Series B	10/12/2003	4,2	16,7	StartTech Early Ventures	-
Series A	29/01/2003	1,7	9,4	-	Kern Capital, StartTech Early Ventures

Exhibit 3 – OrthoPediatrics’ fundraising journey

Round	Date	Amount (€m)	Post Valuation Money(€m)	Follow-on investors	New investor
Series B	03/06/2014	28,5	66,9	-	Squadron Capital
Early Stage	30/09/2011	7,3	-	Undisclosed	Undisclosed
Early Stage	18/06/2010	0,5	-	Undisclosed	Undisclosed
Early Stage	20/06/2007	8,9	-	Undisclosed	Undisclosed
Angel	01/01/2009	-	-	Ariel Savannah Angel Partners	-
Early Stage	30/04/2007	1	-	-	Elevate Ventures, Northeast Indiana Innovation Center

Exhibit 4: Crucial Wheel investors

AXA Venture Partners: Endowed in 2015, it is a French investor that invests in companies from the seed until the later stage. They hold on to their account over 100 investments throughout the years and over €700m directly invested according to the company’s data.

Coatue Management: Established in 2019, it is an American firm with more than 400 investments over the years with more than 40 exits and over €20bn invested.

Lightspeed Venture Capital: Founded in 2020, in California, US, the firm accounts for over 1,200 investments, they invest worldwide with offices scattered around the world.

Tiger Global Management: Founded in 2001, the firm invests in all stages of the business from series A to pre-IPO stages of a company. They have already invested in more than 30 countries worldwide with more than 1,200 investments.

Exhibit 5: Percentage of average growth after four years in each financial indicator by categories and their description

	Revenues	Staffs	Assets	Intangibles	Costs
Superstars	358%	109%	132%	34%	157%
Visionaries	38%	23%	32%	534%	30%
All-rounders	141%	54%	47%	39%	65%
Commoners	20%	6%	5%	1%	11%
Laggards	-39%	-49%	-24%	-28%	-38%

Superstars: When the company receives investment, achieves a specular growth in revenues, and at the same time more than double the other financial indicators. Only 8% of the company achieved this category.

Visionaries: The most innovative companies, where there was a massive increase in intangibles assets due to their innovation and the other indicator was that it grew at a solid pace. In total, 7% of the companies are ranked in this stage.

All-rounders: Can be defined as balanced, with a good solid pace in all the financial indicators with a total of 19% of the companies.

Commoners: The most common category with 56% of the company, all financial indicators are positive but without excellent metrics.

Laggards: They underperformed after the capital raise and they have negative growth; just 3% of the total companies remained in this position.

Exhibit 6: Top 10 stocks by weight in IYH

Name	Ticker	Weight
UnitedHealth Group Inc	UNH	10,1%
Johnson & Johnson	JNJ	9,2%
Eli Lilly and Co	LLY	5,8%
Pfizer Inc	PFE	5,3%
AbbVie Inc	ABBV	5,1%
Merck & Co Inc	MRK	4,7%
Thermo Fisher Scientific Inc	TMO	4,2%
Danaher Corp	DHR	3,6%
Abbott Laboratories	ABT	3,5%
Bristol-Myers Squibb Co	BMJ	3,2%

Exhibit 7: Variables' statistic

Total raised until IPO - Disclosed		Year until IPO		Active Patents until IPO		Total IPO	
Mean	87,3298	Mean	9,35088	Mean	5,24561	Mean	87,0335
Standard Error	7,42424	Standard Error	0,65057	Standard Error	0,90157	Standard Error	6,55168
Median	86,22	Median	10	Median	4	Median	75
Mode	88,72	Mode	4	Mode	1	Mode	50
Standard Deviation	56,0518	Standard Deviation	4,91169	Standard Deviation	6,80672	Standard Deviation	49,4641
Sample Variance	3141,8	Sample Variance	24,1247	Sample Variance	46,3315	Sample Variance	2446,7
Kurtosis	6,17773	Kurtosis	-0,57402	Kurtosis	10,039	Kurtosis	2,28954
Skewness	1,54802	Skewness	0,3532	Skewness	2,7719	Skewness	1,19546
Range	339,37	Range	21	Range	38	Range	264,35
Minimum	0,85	Minimum	1	Minimum	0	Minimum	7,07
Maximum	340,22	Maximum	22	Maximum	38	Maximum	271,42
Sum	4977,8	Sum	533	Sum	299	Sum	4960,91
Count	57	Count	57	Count	57	Count	57
Confidence Level(95,0%)	14,8725	Confidence Level(95,0%)	1,30325	Confidence Level(95,0%)	1,80607	Confidence Level(95,0%)	13,1246

Increase in Revenue		Last Post valuation pre IPO		Performance- stock		Difference Mult	
Mean	0,44163	Mean	235,35	Mean	0,49342	Mean	4,77877
Standard Error	0,25072	Standard Error	49,5936	Standard Error	0,16584	Standard Error	8,5417
Median	0	Median	184,44	Median	0,06071	Median	0,61068
Mode	0	Mode	#N/A	Mode	#N/A	Mode	#N/A
Standard Deviation	1,89286	Standard Deviation	301,666	Standard Deviation	1,25203	Standard Deviation	64,4884
Sample Variance	3,58291	Sample Variance	91002,5	Sample Variance	1,56758	Sample Variance	4158,75
Kurtosis	6,57574	Kurtosis	26,5415	Kurtosis	9,20465	Kurtosis	19,5979
Skewness	2,18089	Skewness	4,84745	Skewness	2,46366	Skewness	-2,08681
Range	10,5933	Range	1861,13	Range	7,6	Range	579,313
Minimum	-2,8622	Minimum	28,87	Minimum	-1	Minimum	-354,279
Maximum	7,73108	Maximum	1890	Maximum	6,6	Maximum	225,034
Sum	25,1726	Sum	8707,94	Sum	28,1249	Sum	272,39
Count	57	Count	37	Count	57	Count	57
Confidence Level(95,0%)	0,50224	Confidence Level(95,0%)	100,581	Confidence Level(95,0%)	0,33221	Confidence Level(95,0%)	17,1111

Exhibit 8: Matrix correlation

	Total raised until IPO - Disclosed	Year until IPO	Active Patents until IPO	Total IPO	Increase in Revenue	Investors pre ipo	Last Post valuation pre IPO
Total raised until IPO - Disclosed	1						
Year until IPO	0,197244949	1					
Active Patents until IPO	0,377733488	0,358422312	1				
Total IPO	0,216101796	-0,063611028	0,320325559	1			
Increase in Revenue	0,209510255	0,068308535	0,140402458	0,11763524	1		
Investors pre ipo	0,398848861	0,074371405	0,201554682	0,32364436	0,128631838	1	
Last Post valuation pre IPO	0,853487063	0,153250945	0,286038006	0,144612329	0,071694301	0,150747671	1

Exhibit 9: Results for the first regression

Regression Statistics	
Multiple R	0,258370794
R Square	0,066755467
Adjusted R Square	-0,045233877
Standard Error	65,93078831
Observations	57

ANOVA					
	df	SS	MS	F	Significance F
Regression	6	15546,68952	2591,11492	0,596087669	0,731958394
Residual	50	217343,4424	4346,868848		
Total	56	232890,1319			

	Coefficients	Standard Error	t Stat	P-value
Intercept	-25,75213145	27,2723578	-0,944257612	0,349578722
Total raised until IPO - Disclosed	0,044183871	0,198807948	0,222243986	0,825029269
Year until IPO	1,754983921	1,957266745	0,896650354	0,374202511
Active Patents until IPO	-0,423151248	1,51692791	-0,278952774	0,781431627
Total IPO	-0,015356246	0,186779303	-0,082215996	0,934803204
Increase in Revenue	6,6898361	4,707662469	1,421052623	0,161508458
Investors pre Ipo	0,920087162	1,832696357	0,502040155	0,617843051

Exhibit 10: Results for the second regression with year event and log

Regression Statistics	
Multiple R	0,356058041
R Square	0,126777329
Adjusted R Square	-0,018759783
Standard Error	65,09047278
Observations	57

ANOVA					
	df	SS	MS	F	Significance F
Regression	8	29525,18885	3690,648606	0,871099662	0,54718206
Residual	48	203364,9431	4236,769647		
Total	56	232890,1319			

	Coefficients	Standard Error	t Stat	P-value
Intercept	-71,12761205	42,94113643	-1,65639799	0,104164914
Log_Total raised until IPO - Disclosed	49,3820438	28,82149649	1,713375425	0,093096066
2016	-26,36913507	25,88670442	-1,018636233	0,313482654
2017	-0,357909905	21,26587997	-0,016830242	0,986641807
Year until IPO	2,098437501	1,954385917	1,073706827	0,288322304
Active Patents until IPO	-1,045483909	1,510701182	-0,692052089	0,49223892
Total IPO	-0,177160458	0,211219675	-0,838749788	0,405767445
Increase in Revenue	8,03273156	4,830380087	1,662960557	0,102837428
Investors pre Ipo	-0,730805554	1,945339649	-0,375669901	0,708817471

Teaching note

Case synopsis

This case study addresses the dilemma of a management team, and the next step for a company discusses the two main alternatives which would be an IPO or Private fundraising and highlights the company's history and its investors.

Wheel was founded in 2018, and it is an American company that developed a unique telehealth platform that helps clinicians deliver virtual care that can be fast, safe, and personalized for each patient. They are already present in all US states and currently work in more than ten different areas of healthcare. They just closed their fifth fundraising with €132m in Jan 2020, reaching the post valuation of approximately €903m.

To answer the question about the next step, the management team has hired one consultant and one investment bank to help them. The central idea is to present a possible realistic situation for a start-up that has become a mature company and is looking for the next steps.

Learning Objectives, Target, Data, and Limitations

This case study is designed for courses like corporate finance, entrepreneurial finance, venture capital, and private equity due to the exciting discussion it generates regarding capital structure, how to maximize the value of a company, the importance of investors for growth, and the role of private fundraising and IPO.

It is also interesting to discuss both alternatives as the private fundraising market has grown at a good pace recently, however, it still needs to be popularly known due to some deals being undisclosed and therefore not being discussed.

The data gathered was collected using Pitchbook, Bloomberg, and companies' websites. The first step was to use the Bloomberg terminal and check companies that made an IPO in the

healthcare space between 2015 and 2017 on Nasdaq. To eliminate potential selection bias, in order for it to be included in the study, the company needs to be classified as healthcare as the first industry in Pitchbook and Bloomberg. After being selected, the company needs to have at least one fundraising that had disclosed the amount and could not be part of a reverse merger.

Suggested Questions for Classroom Discussion

Each teacher can conduct the discussion in a way that best suits the course's learning objectives. Below is a series of possible discussion inquiries and suggested responses.

1. How can Joana's and the investment banking firm's recommendation have personal motivation? Correlate these alternatives with information asymmetry and agency theory.

For an independent consultant like Joana, an IPO process would be an outstanding achievement in her career and following her personal beliefs, the stock's performance in the first year is crucial, showing that she made a good recommendation. The variables that Joana used to defend her idea, as well as showing only two successful cases, can be seen as biased data. A deeper study and conclusions based on several cases would be necessary to answer the company's questions about its next steps.

On the other hand, the investment banking firm could have their own reasons to advise for a private placement fundraising, as the case study shows that this market is growing a lot and it is crucial to gain experience and mandates to be ranked as a top institution in these activities. Therefore, this could indicate that the firm could be thinking only in its own interest. This exemplifies why it is always important to hear more than one opinion before deciding.

Looking deeper into this discussion about individual reasons, this case shows that in some cases, it is crucial to observe that the interest of one part is sometimes greater than the duty to advise the best path. This opens space for the following discussion on Agency Theory and Information Asymmetry regarding these two alternatives (IPO x Private Fundraising).

Agency theory could be defined as (Eisenhardt, 1989) conflicts of interest that arise from two different groups when the objectives are not aligned and when the risk aversion is not the same. As mentioned by some writers (Admati, Pfleiderer, 1994; Gompers, 1995; Kaplan, Stromberg, 2003, 2004), the venture capital investment financing rounds progress to mitigate the agency theory because these investors have the option to abandon the project if it fails to meet pre-established goal and target. Therefore, this will align the interest between the firm and investors resulting in an efficient investment decision framework that could give rise to a better investment outcome.

Moreover, looking at information asymmetry, Davi (2021) mentions that, typically, young firms in the first stage without extensive financial statements data increase this asymmetry since the firm has the motivation to inflate the results. However, as Nianyun Cai, Wai Lee, and Sharma (2011) stated, private fundraising could mitigate this asymmetry, as the current investors have access to the information and continue to invest showing a positive signal to the market. Also, companies that made a pre-IPO private placement have experienced less underpricing when they did their IPO. Moreover, as the company grows and a future round is needed, the relationship between the company and investor will be stronger resulting in less asymmetrical information.

Nonetheless, during an IPO process, the information asymmetry and agency theory is much higher for the main reason that as there are numerous new investors buying the stocks, the company normally hides the unfortunate news until the IPO is finalized. This could be exemplified by recent IPOs where most of them performed poorly – i.e., Brazil's most recent 45 IPOs had 34 of them with negative results.

2. What are the advantages of going public? What are the costs and risks of being underpriced that the management team is concerned about it? How can the lockup period impact the investor?

An IPO is the first time that shares in a company are sold to public investors and subsequently traded on the stock market (Draho, 2004), therefore by trading the stock, the company will start to have a massive number of different institutional investors (Ibbotson and Ritter 1995).

The significant advantage of the IPO is, in this case, that, finally, Venture Capital and Private Equity Firms could sell their shares and return the capital raised to their investors. Note that they could exit before selling to another investor if they were willing to, but the IPO process is the most traditional and profitable exit. Nonetheless, during the first moment, these funds do not sell the share in an IPO due to a lockup agreement, which is a typical state sealed in the initial investment. The main goal of this instrument is to avoid investors selling all their shares at this first moment because this could signal an adverse action. Usually, an IPO lock-up is typically 90 to 180 days after its occurrence.

For Venture Capital Firms, reputation is essential for the future when they think of the next fund and raising capital (Burker Dominik 2021). This reputation gains validity when they exit by IPO. Another advantage of becoming public is the visibility of the company, which helps on being able to reach new investors quicker, as well as accelerating growth.

However, the IPO process takes a long time, and there are some steps. The first is to choose the underwrite that will work in the process to prepare the company for the IPO, do a roadshow and finally trade to the public for the final price (Burker 2021). Despite the time it takes, an IPO process is expensive for the firm as the management team is concerned. Gleason, Rosenthal, and Wiggins (2005) proved this in their work, showing that the IPO costs 7.2% of the total transaction volume. Also, there are studies, for example, Ghao, Riiter, and Zhu (2013) that

showed that in an IPO the stock is normally underpriced, subsequently the capital raised will not be maximized.

Therefore, Wheel's team is also concerned about the time consumption of the process and not only for its financial cost but for indirect cost – time and underpriced stock.

3. What are the advantages of private fundraising? Explain the advantage of a syndicate and the dilution process. Why is a strategic investor important? And why is it essential to investigate the captable?

The main advantage of private fundraising is the proximity between the company and investors; therefore, unlike the IPO, in this process, the company has a relationship with investors and eventually meetings to discuss guidelines and strategies.

Another advantage of this process is its agility, resulting in a 3 to 5 months duration, considering every step from preparation to closing. In addition, the company does not need to spend time on government rules and guidelines. It basically consists of three simple steps: preparation, round show, and closing. Additionally, it will typically have a lead investor to work together with the company, which brings agility and its reputation.

The company is always looking for strategic partners that can take advantage of the investment with a synergetic and strategic approach. Using strategic investors enables the company to have a partner that can bring expertise and experience in the sector; therefore, in this case, Wheel could maximize its operations through synergies.

Investors like Venture Capital firms prefer to syndicate the round. As mentioned by Lockett and Wright (1999, 2001), it is good to diversify the risk. Following Lerner (1994), Casamatta and Haritchabalet (2007) and Cestone, Lerner, and White's (2006) thoughts, it is good to have a second opinion on deals. Brander, Amit, and Antweiler (2002) firmly believe that each investor brings different skills and expertise that result in synergies. Finally, Lockett and Wright

(2001) support the thought of how crucial it is to build a network for the future and the fact that all investors would do due diligence resulting in a more rigorous process.

Regarding the dilution process, this occurs when the founder sells a part of the ownership to the investor; therefore, round after round, the founder is diluted. However, this needs to be in a healthy range because investors are looking for a founder that needs to be focused on the company, hence the founder needs to have a percentage in the business because if the founder wants to exit in the early stages, it could signal weakness. According to Canary's research, the average round dilution between 2017 and 2021 was 25% in series A, 23% in series B, and 20% in series C, therefore they concluded that by the end of series C, the founder would have approximately 28% of ownership.

The captable is crucial because it shows the equity ownership, employee stock options, and the company journey in each round. It is essential to understand the past, what the company envisions for future rounds and what the company thinks regarding dilution and term sheets.

As mentioned in the dilution part, when an investor is looking for a captable, the investor would like to understand the potential growth by checking if the captable is healthy in terms of founder equity and who are the investors that have more stocks in order to understand the seniority of decisions and voting power, for example.

4. Analyze the variables that Mrs.Carvalho and the investment banking firm used for the regression. Which variables are missing?

1. Years until IPO: The time range before the IPO can affect the total raised by a company as it could show the credentials of the management team and will have a long track record. Could be interpreted as a good sign because the older the company is, the more mature in terms of choice and expertise it will be.

2. Active Patents until IPO: As patents are an intangible asset, this could affect stock performance. Armstrong, Davila, and Foster (2006) indicated that the number of patent applications filed and granted has a positive impact on the pre-money valuation of startups. Therefore, patents could be a signal of innovation and growth to achieve higher future cash flow.
3. Total raised in the IPO: This variable can signal the future plan of the company and could impact the first year's performance.
4. Last post-valuation pre-IPO: The valuation of the company is similar to the stock performance, as the stock tends to perform dependently on the market perception of the valuation.
5. Change in revenue in the first year after the IPO: This variable impacts the dependent variable because the growth in revenue could be associated with cash flow growth that will increase the future valuation resulting in a better performance of the stock.
6. Number of investors pre-IPO: Depending on the investors this could be a good or a negative sign for the market.

As stated before, these variables are not enough to justify an investment, it is crucial to understand the company's financial statements and the strategy for the coming years. To analyze performance, it would be ideal to use financial metrics, for example, revenue forecast growth, revenue per user, profit margin, liquidity ratios, and strategic KPIs.

In the Wheel's case, as it is a Healthcare Software as a Service (SaaS), some specific metrics could be useful: Churn Rate, Customer Lifetime Value, Monthly Recurring Revenue, Customer Retention, and Customer Acquisition Cost.

5. Describe the real options concept and how could it be used in this case.

A critical concept that Wheel's team needs to keep in mind is the real option, which differs from financial options. Real options are more related to business decisions, so the right to adjust the decision when encountering new information. Typically, the traditional real options include taking follow-on investments, waiting, abandoning, or expanding. This concept of option needs to be linked to two crucial conditions. The first being the learning curve, so you will have time to learn about it and to wait for new information. And the most important is the capacity to change or plan depending on this new information. This option is standard for investment in new technology because it can be used as a long shot bet for startups and companies as they have more freedom to innovate.

Another theoretical model states that venture capital financing can learn about the entrepreneurial firm over time (Bergemann, Hege, 1998; Fluck, Garrison, and Myers, 2007), hereafter referred to as the "learning hypothesis". This theory shows that investment rounds can create value by generating a real option for these investors to have the right to abandon the project as the venture capital investor learns and understands more about the firm over time with the new information that is being generated. This hypothesis is a way to discuss the uncertainty that venture capital investors have about the complex information regarding firms and not only soft information (Tian, 2011).

Nanda (2015) also mentioned that using real options could help entrepreneurs as they will have room to evaluate new ideas differently for an all-or-nothing bet. Also, these real options allow the information asymmetry between investors and companies to be reduced, which is a positive sign for the market. Wheel could use this option to understand the investor's feelings and gain more time to show new innovations and information. Therefore, using a decision tree for the new step with the current investor could be a good decision. Usually, when you have the option

to wait, doing it so is the most reasonable decision. As the current world is in a volatile and uncertain moment, the real option is an essential tool that can maximize Wheel's value.

6. Point out an advantage of using ETF.

Exchange-Traded Fund (ETF) is an excellent alternative to diversify the portfolio. It is a type of pooled investment security, such as a basket of stocks or other securities and it is typically used to track a particular index/sector. The main advantages of it are (1) diversification: as an ETF use exposure to a group of securities in just one security; (2) easy to trade: as it could be traded like a stock; (3) lower fees: as typically the management fee is low and only one purchase is needed, so the broker fee is lower as well; and (4) transparency: as the investor knows the securities that are included in the pool. Therefore, an ETF is an excellent option to track a stock performance because you can select only the company's sector, resulting in a standard way to evaluate investment return.

As Preuße (2020) mentioned, the macroeconomic situation impacts IPO activity therefore the economic and business cycle influence the IPO market and the stock fluctuation as well. This being true, using this IYH, the investment banking firm could decrease the effect of the macroeconomic situation and focuses on the sector when looking at stock performance.

7. How to analyze the empirical result? What is the importance of using year event, matrix covariance, and log?

Firstly, the regressions have a low R-square – which is the proportion of the variation in Y that can be explained by the variation in X. Thus, a low R-square means that a low proportion is explained by the dependent variables.

In the first test, the investment banking regression states that all the variables were not significant, and they failed to reject the null hypothesis that states that these variables can explain the stock performance versus the benchmarking one year after the IPO.

In order to improve the R-square, you can include year-specific effects; in this case, they included two other variables to control any year-specific effect that might have influenced the data, allowing to control time-invariant unobserved heterogeneity across observations by using a dummy for the year 2016 and 2017, so the intercept is regarding the year of 2015. Also, the investment banking firm transformed the variable to the total amount raised by using its natural logarithm.

Logarithmic transformation is a convenient method of transforming a highly skewed variable into a more normalized dataset. When modeling variables with non-linear relationships, the chances of producing errors may also be skewed negatively. In theory, the goal is to produce the smallest error possible when making a prediction, while also considering that we should not be overfitting the model. Overfitting occurs when there are too many dependent variables in play that do not have enough generalization of the dataset to make a valid prediction. Using the logarithm of one or more variables improves the fit of the model by transforming the distribution of the features to a more normally shaped bell curve.

The second regression presented better results than the first one by increasing the R-squared by more than 100%. This allowed the bank to reject the null hypothesis and assume the coefficient to adequately represent the true effect of the log total raised on the IPO Performance since the p-value is lower than the significant level. Therefore, the model states that an increase of 1% in the total amount raised can explain an increase of 0.09 in the multiple of performance in the IPO.

The maturity of the company can be measured by the years until IPO, and this coefficient is positive. Furthermore, the same sign of growth in revenue in the first year had a positive sign as expected, as mentioned by Brealy et al. (2012), because the growth in revenue will increase

the cash flow which is one metric for the valuation. However, there is a negative sign for Active patents, total IPO, and number of investors pre-IPO.

The investment bank assumed a confidence level of 90% to be sufficiently high to properly assess the significance of the coefficients. This means that any beta with a p-value higher than 10% cannot be interpreted and one cannot reject the null hypothesis that states that these variables have an explanatory effect on the stock's performance during the first year after the IPO versus the benchmark, except the Log of total raised.

Regarding the correlation matrix, it can be defined as a matrix that shows the correlation between the variables. Therefore, it is reasonable to exclude said variable since there is a sign of multicollinearity (Omitted Variable Bias), which is when the effect of one independent variable on the dependent variable cannot be discerned from the effect of another.

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