

Evaluation of Scaling Success

April 2021



Scale-Up Scores

Eventually, firms looking for investment dollars, for a buyer, or interested in going public will be rated on objective criteria. Those objective criteria will include their current revenue base, growth rate, profitability, use of capital and many other factors to determine whether they are worthy of investment. While that may happen at some distant time in the future, it would be very useful if firms could figure out whether they are on track for such a successful financing result or exit. One big question for any firm with external shareholders should be are they on a track that will enable them to raise more capital, to sell out or to IPO? Effectively, firms should, at any time be able to determine whether they are scaling effectively.

To enable firms to be able to judge their progress at scaling, we have created a Scale-Up Score. This score measures a firm's rate of capital acquisition, size and growth rate and most importantly, it compares these statistics against thousands of other firms that have gone before them, who have successfully raised capital, become Unicorns, been sold and gone public.

The first chart shown shows the four Canadian companies that have gone public recently along with their Scale-Up Scores.

Recent Public Offerings

	Financial Velocity	Employees Now	Average Employee Growth	Scale-Up Score
Vendasta	4.4	479	29%	30.0
Dialogue	17.7	431	48%	48.1
Thinkific	2.4	253	82%	38.4
Farmer's Edge	28.7	412	-4%	41.1

The next chart shows the Scale-Up Scores for the top firms on Canada's Narwhal List. The Narwhal List was developed to focus attention on the private Canadian technology companies best poised to become world class firms. The list uses three metrics to identify leading firms. These metrics are Financial Velocity, Growth and Firm Size. From publicly available data we have created a Scale-Up Score which rates a firm's ability to scale to world-class at any stage of its development. Research in over 1,000 companies indicates that a Scale-Up Score of over 25 is critical to enable a firm to continue its trajectory to becoming world-class. This list is created annually and this is the list for January 2021.

Canada's Narwhal List

Rank	Company	Founded	Total Funding (\$US)	Scale-Up Score	City
1	ApplyBoard	2015	178,312,957	87.9	Waterloo
2	Symend	2016	53,175,000	82.2	Calgary
3	Hootsuite	2008	299,900,000	71.7	Vancouver
4	Wealthsimple	2014	289,635,381	69.9	Toronto
5	CSI Solar	2001	260,000,000	67.1	Guelph
6	GeoTab	2000	0	60.7	Oakville
7	PointClickCare	1995	229,978,522	60.4	Mississauga
8	Talent.com (Neuvoo)	2011	51,400,000	54.4	Montreal
9	MedChart	2015	5,470,000	53.2	Toronto
10	1Password	2005	200,000,000	52.3	Toronto

The Narwhal List in its entirety along with scores for all leading companies in Canada can be seen at:

<https://narwhalproject.org/narwhal-list/>

A full explanation of the Narwhal List and a report for 2021 can be found at:

<https://narwhalproject.org/wp-content/uploads/2021/03/The-Narwhal-List-2021.pdf>

Scale-Up Score Development

To assess firms scaling ability, we have used publicly available data so that any firm anywhere can be rated in the same way. Having publicly available data means that the rating work can be updated quarterly or even monthly. The same format can be used though to rate firms using privately available data and to make the process more accurate, firms are encouraged to do so. The methods used to rate firms have to tie into those criteria that are used by investors, or purchasers and be well aligned to their criteria for evaluation. For this reason, we have used statistics relating to growth capital and size as follows:

1. Employee growth as measured by the increase in the number of employees over the last two years. While the use of revenue growth rates would be preferable, as a proxy, for the purpose of this analysis, we have used LinkedIn data on employment growth.
2. The company's Financial Velocity which equals the total amount of cash raised divided by the number of years in existence. For the purpose of this analysis, we have used Crunchbase data.
3. The company's size as measured by the number of employees. This is available from LinkedIn.

From this data, an aggregate Scale-Up Score has been developed. This should not be seen as a measurement of potential but a measurement of how well the firm is scaling or growing at the point in time it is measured. Coming to a conclusion that a firm has "High Potential" is an exercise in frustration. Venture capitalists who do this for a living only get it right one out a hundred times. Every firm has high potential if they do the right things. The key is to be able to tell them whether or not they are doing the right things, how are they progressing at scaling. In this way, by using a scaling score, one can rate a firm against its peers on an objective and thoroughly dispassionate basis without the politics of potential getting in the way of a useful discussion.

This data can be used in a number of ways:

- To quickly assess firms in a portfolio
- To compare firms to each other.
- To assess a firm's progress over time.

The point of this work is to be able to initiate conversation about a firm's success at scaling and to enable them to take strategic action to either get on a better path towards success or improve their results.

Conclusion

To test the process and develop a cut-off level that indicated success at scaling, samples were taken from data on over 1,000 companies that received a Seed, Series A and Series B round as well as data from over 200 Unicorns and over 100 companies that have had an IPO in the last seven years. We have concluded that a firm at any stage with a Scale-Up Score of above 25 is one that is on the path to becoming a Unicorn or going public if it manages to maintain or improve its score.

Evaluation Criteria

We have used four criteria to evaluate and monitor firms in order to create a Scale-Up Score and these are shown in this following section.

Financial Velocity

In our first Impact Brief in 2017 (*The Narwhal List, released March 2017*), we identified an approach to measuring the progress of product focussed technology companies through the use of “financial velocity”. Financial velocity measures the speed at which a company acquires and consumes capital to fuel its growth. It is defined simply as the amount of capital a company has raised divided by the number of years it has been in existence:

$$\text{financial velocity} = \text{capital raised} / \text{years in existence}$$

Velocity is measured over time and is expressed in millions of dollars per year. It provides a simple and elegant tool to enable entrepreneurs and investors to gauge the financial attractiveness of young and capital-intensive firms.

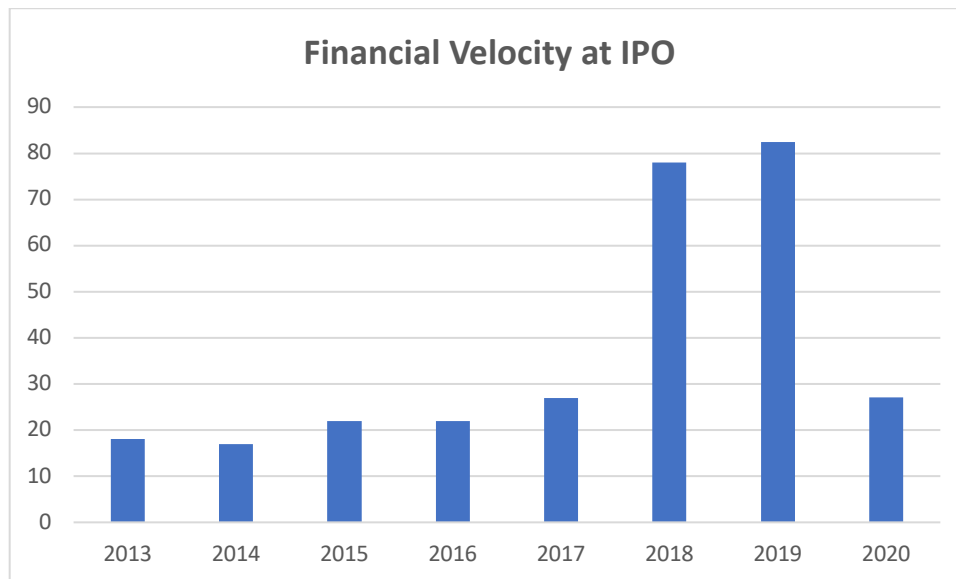
Achieving a high financial velocity means a company is raising more and more money over time. It is possible for a firm to have a high velocity in its first year if it raises a significant amount of funding. In each year of its existence, it must raise more and more money to maintain that high velocity. However, if a business does not raise any money—or raises too little—in any given year, its velocity will decrease; and this may be a sign of stagnant or declining growth. Financial velocity is also handy when comparing firms founded in different years.

Unicorn Velocity

As an example of the use of Financial Velocity, we looked at all US-based Unicorns in the CB Insights database as at December 31, 2018 for which we could determine financial. The average US Unicorn has a financial velocity of \$98.9 million per year (meaning that, on average, these firms have raised an astounding \$98.9 million per year since inception). The lowest-ranked US Unicorns (the ones with valuation of \$1 billion) may provide instructive examples on what is actually needed to Unicorn Status. We took a closer look at 34 US-based Unicorns with a valuation of \$1 billion, the minimum amount needed to become a Unicorn. These companies have raised an average of \$275 million. Of these, there are 21 US Unicorns with a financial velocity of \$10–33 million per year

Financial Velocity at IPO

Collecting data on companies as they go public allows us to check their financial velocity when they were private (because we now have access to revenue numbers for the two or three years before their public offering as disclosure of these numbers is required as part of an IPO). When we analyzed these numbers for the firms in our study, we noticed a dramatic increase in financial velocities for businesses with an IPO in 2018 and 2019 and a decline to more normal levels in 2020.



This shows a fundamental change in the practice of financing companies. While raising \$160 million to \$200 million over eight to 10 years and driving revenue of \$75 million to go public was once sufficient, firms now raise \$730 million (on average) to drive \$330 million of revenue in under 13 years. Firms have become less capitally efficient in recent years meaning their ratio of capital to revenue has increased. Financial velocity of firms going public used to be typically \$20 million per year, but this has recently increased to almost \$80 million per year and this year is returning to older numbers.

With revenue numbers for private firms, we were able to test the efficacy of our financial velocity metric. To do this, we computed “revenue velocity” defined as the average amount of revenue earned by firms since their inception (i.e. current revenue divided by years in existence.) The analysis resulted in a correlation of 0.76 between financial velocity and revenue

velocity, suggesting that financial velocity is a good proxy for the relative growth and size of private companies in the tech sector.

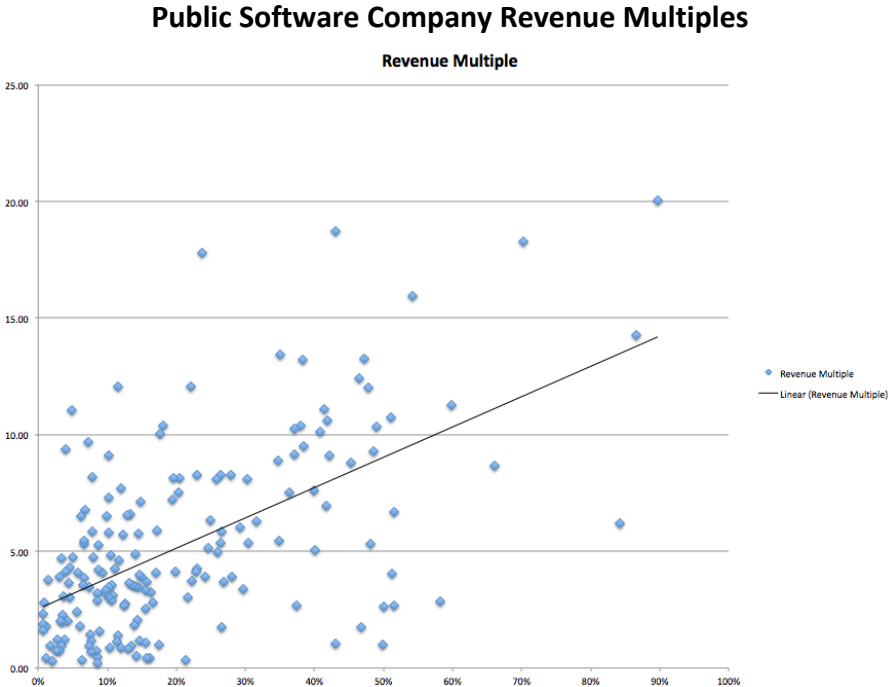
Growth Rate

To create a \$100M company, the most important thing is growth. Growth creates value in a technology company and it has a dual effect: first, higher growth rate results in higher revenue, which increases one dimension of the valuation formula. And secondly, the increased growth rate increases the revenue multiple, which is the other dimension in the formula:

$$\text{Revenue} \times \text{Revenue Multiple} = \text{Valuation}$$

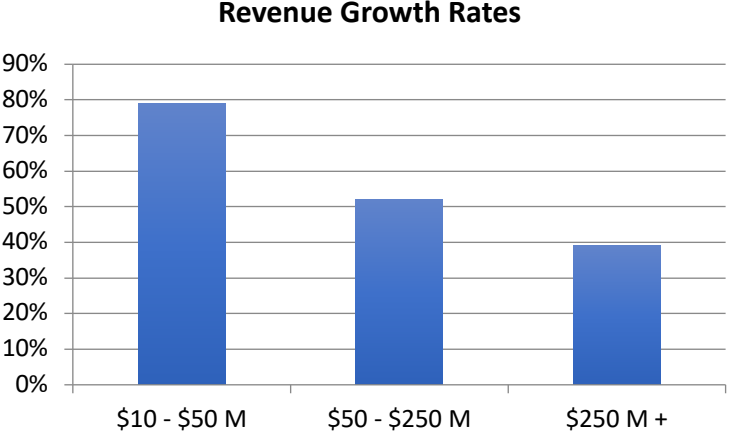
Growth rate increases revenue multiple

One can look at public markets to see whether this relationship between growth rate and valuation holds up over a broad range of companies. The following exhibit shows the results of 180 public software companies whose revenue in 2016 was over \$100 million



Growth rates of companies going public has changed over the last few years as companies have delayed their IPOs and greater returns were earned by venture capitalists. The low end of

expected growth rates for IPOs has increased somewhat from 15% to above 20%, the top end of the range of expected growth rates has declined from approximately 200% to about 75%. The relationship between average growth rate and revenue level is also further confirmed below, showing a declining rate of growth as companies grow, from an average 39% to 79% for the smallest firms.



Finally, if everything lines up, a company will need to achieve growth rates as follows:

Required Revenue Growth Rate

Size	Capital % of Revenue
Less than \$1 million	10% to 20% per month
\$1 – million to \$5 million	100% to 200% per year
\$5 million to \$50 million	100% a year
Over \$50 million	60% a year
Average	75% a year

Calculating Growth Rate

As growth rates in revenue are not publicly available, one proxy to use is growth rate in personnel. We calculate the average growth rate over the last two years for this section of our calculation. As firms grow, they hire employees to develop or sell products, to create a customer base, and to fulfill a myriad of other critical functions. The faster a firm hires employees, the faster it can grow. This close connection between revenue and employment

makes the rate of growth in employment another potential proxy for revenue growth. To determine employee growth, we used LinkedIn.

Our previous research into LinkedIn shows that while not highly accurate it is directionally correct so a good proxy for revenue growth. What may be happening with using LinkedIn as the source for employees, is that clerical, factory and other non-professional employees may not be using LinkedIn. As a firm grows it may hire more non-professional employees and thus LinkedIn will underreport the number of employees and the growth rate. Furthermore, companies that have individual partners in the business may report as being part of the company and this will exaggerate the number of employees. This would be the case for Uber and Wattpad for example. This, however is the only proxy data available.

Two years of growth is a better measure than one year or shorter periods as financings occur approximately every two years so that companies that grow in a step wise fashion as a result of periodic infusions of capital and will probably be experiencing one step wise growth period in the two year period but lack of employee growth as revenue catches up with employees growth is smoothed out

Size of Company

There are certain firms that can successfully bootstrap their way to world class status. While the number is small, these firms use a combination of profits, customer funding or employee funding to reach a large size. While it is difficult to grow in this manner (95% of companies losing money when they IPO) it is possible and it is important to recognize the success of these firms in a scaling model.

While the growth rate of these companies may be lower than others, eventually, when they reach a large enough size, they become candidates for going public. This is not often because of revenue growth rates but because of profitability. While this is not a strong driver of value, it still must be recognized as a viable path to world class status. For this reason, absolute size of the company has been used as well as a criteria for developing the Scaling Score.

Developing an Aggregate Score

Using either accurate company-supplied data or proxy data, it is important to realize that there is no single indicator that properly represents a firm's success at scaling.

- Financial velocity under reports firms that grow from profits instead of financing.

- Growth rates necessary for obtaining financing depend on the size of the firm and will decline over time.
- Firms that are larger and private, even if growing slowly should be accorded some status as they are already world class as a result of their impact on the market.

As a result, this Scale-Up Score has been developed to reflect the counterbalancing nature of these three data points. As there is not any one indicator more important than the other, they should all have equal weight. Because the scales are different for each one, an attempt has been made to develop a score that equalizes the scale of each measurement. This final scoring mechanism was tested against successful companies and data relating to this is displayed in the following section.

Comparison to Successful Firms

In order to be able to judge how firms are doing and to be able to determine the success scaling of these firms, we have included data on a variety of companies from those just receiving Seed financing to those who just went public.

Seed Rounds

To show comparative statistics for companies who have just received a Seed round, we downloaded data from Crunchbase that included all US based firms that had received a Seed round of financing between \$1 million and \$10 million in 2020 (to Oct 31). From this list we randomly selected 20 companies as being representative of the group as a whole. The following chart shows the statistics of those 20 companies.

Seed Capital Scale-Up Scores

Organization Name	Financial Velocity	Employees Now	Growth Rate	Scale-Up Score
Centricity	2.3	36	500%	170.2
Real	6.0	23	380%	133.3
Cann	2.5	21	358%	122.6
Verifiable	3.0	19	336%	115.6
Genemod	0.9	11	232%	78.4
Tomorrow Health	3.8	18	200%	71.0
ThreatLocker Inc	1.5	16	183%	62.9
Merico	2.1	19	152%	53.2
Lemonada Media	1.5	19	152%	52.7
First Dollar	5.0	11	135%	50.2
Arrive Outdoors	1.6	17	138%	48.2
Wrapbook	1.8	25	124%	43.8
BucksApp	2.0	10	124%	43.5
Rah Rah	1.4	12	100%	35.1
Britive	2.7	18	90%	33.2
addapptation	0.4	21	87%	30.2

Plannuh	1.3	27	84%	30.1
Synatic	0.3	6	73%	24.9
Ferrum Health	3.0	24	26%	12.6
Tempo Storm	0.6	6	-37%	-11.5

This list represents successful companies as they had all received a seed round of capital in the last 10 months. From this list it is apparent that a cut-off in Scale-Up Score of 25 would be appropriate to represent good scaling performance. All firms above this amount are growing in a manner that, if they keep it up, will enable them to obtain Series A funding in the future.

Series A Rounds

To show comparative statistics for companies who have just received a Series A round, we downloaded data from Crunchbase that included all US based firms that had received a Series A round of financing between \$5 million and \$30 million in 2020 (to Oct 31). From this list we randomly selected 20 companies as being representative of the group as a whole. The following chart shows the statistics of those 20 companies.

Series A Scale-Up Scores

Organization Name	Financial Velocity	Employees Now	Growth Rate	Scale-Up Score
Wise	8.9	45	571%	200.6
Orca Security	27.0	59	443%	176.7
Lunchbox Technologies	22.1	53	415%	162.1
Humane	10.0	22	369%	133.7
OctoML	18.9	32	183%	80.9
Shiftsmart	4.5	213	120%	51.6
Stellar Health	7.5	51	126%	51.2
OnSite Waste Technologies	1.0	18	145%	49.9
Ontic	5.6	65	124%	48.9
C16 Biosciences	12.0	19	95%	44.3
ReAlta Life Sciences	9.4	16	79%	36.3
Golden	6.5	35	71%	31.3

Ride Report	2.7	19	78%	29.3
MotoRefi	3.3	69	70%	28.8
Myst AI	4.0	12	73%	28.8
Krisp	2.8	88	68%	28.6
Arturo	2.7	34	51%	20.7
Tiltify	1.1	24	48%	17.8
CoreStack	2.9	92	31%	16.2
UrbanFootprint	3.0	32	15%	9.2

This list represents successful companies as they had all received a Series A round of capital in the last 10 months. From this list it is apparent that a cut-off in Scale-Up Score of 25 would be appropriate to represent good scaling performance. This is in fact the same level of Scale-Up Score seen with Seed capital recipients. All firms above this amount are growing in a manner that, if they keep it up, will enable them to obtain Series B funding in the future.

Series B Rounds

To show comparative statistics for companies who have just received a Series B round, we downloaded data from Crunchbase that included all US based firms that had received a Series B round of financing between \$10 million and \$100 million in 2020 (to Oct 31). From this list we randomly selected 20 companies as being representative of the group as a whole. The following chart shows the statistics of those 20 companies.

Series B Scaling Scores

Organization Name	Financial Velocity	Employees Now	Growth Rate	Scaling Score
Kalderos	8.8	81	185%	73.0
Kasa Living	12.5	129	154%	68.1
FortressIQ	15.3	79	129%	61.1
Nautilus Biotechnology	19.0	49	87%	49.7
Fetch Package	8.0	128	110%	49.0
Kin Insurance	24.7	156	47%	45.7
Proxy	14.7	72	81%	44.1
Flutterwave	16.1	222	44%	38.2

AccessFintech	9.4	66	77%	37.3
Pachyderm	4.7	27	73%	30.0
KETOS	6.0	56	60%	27.7
Keeps	23.3	12	10%	26.8
Rollbar	2.3	71	62%	25.4
SourceDay	3.3	75	53%	23.5
Skilljar	7.6	105	23%	18.9
READY Robotics	10.4	44	2%	12.7
Powerlytics	1.2	13	27%	10.8
Trifo	6.5	21	5%	8.9
Airside	1.9	37	13%	7.5
CognitiveScale	5.7	120	-22%	2.5

This list represents successful companies as they had all received a Series B round of capital in the last 10 months. From this list it is apparent that a cut-off in Scale-Up Score of 25 would be appropriate once again to represent good scaling performance. All firms above this amount are growing in a manner that, if they keep it up, will enable them to obtain Series C funding in the future.

Unicorns

To determine whether a cut-off in Scale-Up Score at a level of 25 is appropriate for Unicorns, we measured the Scale-Up Score of all Unicorns created in 2020 that had received the base level valuation of \$1 billion. The following chart shows the statistics of the 20 companies that meet those conditions.

Unicorn Scaling Scores

	Financial Velocity	Employees Now	Average Employee Growth	Scaling Score
Thrasio	198.3	301	334%	319.5
Zwift	103.3	359	34%	126.7
Sema4	80.3	652	32%	112.7
Alto Pharmacy	71.2	504	72%	111.9
VillageMD	70.1	557	46%	104.0
Apeel Sciences	48.8	397	80%	88.5
HighRadius	12.5	1913	36%	88.3

Eightfold.ai	44.2	210	105%	86.2
Tekion	46.3	439	69%	84.0
Trumid	67.1	87	27%	78.9
ClassPass	61.0	469	4%	78.0
Innovium	58.8	172	20%	71.1
Orca Bio	48.0	48	59%	69.2
KKW Beauty	66.7	19	6%	69.2
Upgrade	50.5	274	0%	59.7
o9 Solutions	11.1	683	77%	59.7
Redis Labs	27.4	388	31%	50.7
Flywire	29.2	427	12%	47.6
Amplitude	23.3	436	22%	45.2
Quizlet	4.1	230	33%	22.8

It would appear from this group that a cut-off Scale-Up Score of 25 is also appropriate as there is only one firm with a score below this level and all other firms are considerably above this score.

Initial Public Offerings

In order to be able to judge how reference firms are doing and to be able to determine the success scaling of these firms, we have included data on software and medical device companies that went public in the last seven years in the United States. This list does not include hardware or pharmaceutical firms at this time. The following is a profile of firms that had an IPO.

IPO Scale-Up Score Statistics

Firms with an IPO	Financial Velocity	Employees	Growth Rate	Scale-Up Score
Average	63.7	933.1	68%	116.3
Median	14.8	570.0	45%	57.0
Minimum Value	-0.1	41.0	-36%	0.6
1st Quartile (25th percentile)	8.6	360.3	28%	39.8
2nd Quartile (50th percentile)	14.8	570.0	45%	57.0
3rd Quartile (75th percentile)	30.3	932.8	75%	86.3
Maximum Value	2,471.3	22,263.0	613%	3,227.4

This is a list of the top 20 firms that went public and their Scaling Scores.

Top 20 IPO Scale-Up Scores

Comparison Firms	Financial Velocity	Employees	Growth Rate	Scale-Up Score
Uber	2,471.3	22,263	42%	3227.4
SnapChat	816.5	1,859	590%	1075.0
Lyft	701.8	4,791	103%	896.0
Varex Imaging	495.6	1,400	-8%	539.7
Pivotal	340.8	2,518	22%	432.2
Twitter	208.6	2,300	198%	351.3
Envista	321.8		1%	322.2
Hortonworks	82.7	524	568%	289.5
Dropbox	155.2	1,858	31%	227.5
Shockwave Medical	17.0	162	613%	226.9
Upland Software	180.3	296	81%	217.2
Slack	139.1	1,502	82%	216.4
Cloudera	115.7	1,470	57%	183.7
Pinterest	148.6		60%	168.6
Box	55.9	1,960	108%	157.1
CrowdStrike	60.1	1,455	110%	145.4
Nutanix	56.2	1,368	90%	131.8

Nimble Storage	19.8	464	284%	130.0
DocuSign	35.7	2,255	36%	122.9
SolarWinds	11.4	2,540	72%	120.3

To develop a cut-off, we also examined the firms with the lowest Scale-Up Scores

Bottom 10 IPO Scale-Up Scores

Comparison Firms	Financial Velocity	Employees	Growth Rate	Scaling Score
Talend	8.5	566	20%	33.9
Xoom	8.7	150	56%	32.4
Rally Software	6.0	360	38%	30.8
Xactly	9.0	345	30%	30.4
Everyday Health	7.7	520	11%	28.8
ChannelAdvisor	6.7	405	21%	27.2
i3 Verticals	5.1	326	32%	26.5
Tufin	1.4	424	32%	26.1
Impinj	8.6	208	21%	22.6
Veritone	21.7	41	-36%	11.0

Conclusion

Based on samples taken from data on over 1,000 companies that received a Seed, Series A and Series B round as well as data from over 200 Unicorns and over 100 companies that have had an IPO in the last seven years, we have concluded that a firm at any stage with a Scale-Up Score of above 25 is one that is on the path to becoming a Unicorn or going public if it manages to maintain or improve its score.



The Narwhal Project helps companies accelerate their growth. Working at the intersection of strategy, marketing and finance we provide companies with the analytical tools to make strategic decisions that will fuel their growth and valuation. We help them figure out the best markets to serve, how to differentiate effectively, ensure product market fit, improve unit economics and raise capital.

The work we do is based upon a multi year research project we established to discover the underlying factors that are essential to create world-class technology companies. Our objective has been to understand how companies can accelerate their growth and how governments, companies, and academia can identify and adopt best practices in technology commercialization.

Charles Plant

Founder of The Narwhal Project

narwhalproject.org

cplant@narwhalproject.org

416.458.4850

Charles Plant is a serial entrepreneur, innovation economist, and scaleup advisor. As founder of The Narwhal Project, he has written more than 35 research papers and a book entitled *Triggers and Barriers: A Customer Perspective on Innovation*. He is currently working on his second book: *Unicorn Math: Developing an Algorithm for Rapid Growth*. Plant was co-founder and CEO for 15 years of Synamics, a telecommunications software firm. He has been Board Chair at four and CFO of eight emerging technology companies. He has worked on numerous financing and M&A transactions in investment banking (Q1 Capital), on the management committee and CFO of three venture capital firms (MaRS IAF, TIAP, and Pool), and as an advisor at a number of incubators (MaRS DD, Communitech). He taught in the MBA program at York University's Schulich School of Business and has taught innovation and entrepreneurship at the University of Toronto. A Chartered Accountant, Plant has an MBA in marketing and is currently pursuing a PhD in Innovation Economics.