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Government Venture Capital

Can the Public Sector Pick and Nurture World Class Companies?

MaRS IAF

IMPACT CENTRE
VENTURE ANALYTICS

UNIVERSITY OF TORONTO

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Introduction

"Through investments in the IAF and BDC's venture arm, we have a marvellous opportunity to approach technology sector development with an in-depth understanding of best practices using a data-driven approach."

The Business Development Bank of Canada's venture capital arm (BDC) and MaRS Investment Accelerator Fund (IAF) were each established at a time when Canadian venture and seed capital were in short supply. Funding mechanisms such as these are considered critical to growing small technology firms, particularly in economies with restricted access to venture capital funding. However, since Canada's innovation ecosystem has been criticized for its inability to create world-class companies, this Impact Brief has been published to look at these mechanisms more closely. In this Brief we set out to examine these two entities' ability to pick and nurture world-class companies. To that end, we looked at 77 firms on IAF's investment portfolio and 51 that had received BDC investments. These are our key findings.

Both entities are effective at picking companies with world-class potential. Together they have nine firms on Impact Centre's current Narwhal List, and 14 of their other investee businesses have growth rates that make them close contenders for Unicorn status.

- The IAF is more successful when investing in companies that are under three years old. Companies that receive seed stage capital three or more years after inception in life do not perform as well as those that received funding earlier.

- BDC is statistically better equipped to pick winners because it can invest significantly later, either when companies are more established or even as late as Series C and D rounds. Thus, their investees tend to have higher average total investments as a result of other fundraising efforts prior to BDC.

- With an average seed stage investment of $1.59 million compared to over $3 million for BDC, the IAF does not appear to provide enough capital to maximize a firm's growth. As a result, IAF investee companies boast lower seed-stage investments, are slower to raise larger rounds of capital and are potentially slower to develop world-class potential. Governments would be well advised to support more significant financing at this stage.

- Both groups have investees with strong employment growth rates. However, as a result of the lower seed-stage rounds, IAF investees are, on average, half the size of BDC investees.

- The IAF may not be maximizing its potential for impact. With inadequate funds invested early on and without a co-ordinated strategy with Ontario Growth Capital (OGC), the IAF may be producing suboptimal results.

- If BDC were to adopt the creation of world-class companies as its objective, it would need to re-examine its current approach to investing. The current strategy is well suited to risk minimization and earning a fair return for the government. However, BDC does not have enough available capital to make the large bets necessary at both early and late stages to propel investees to world-class status more rapidly.

This study had two key objectives:(1) to review the IAF and BDC's respective contributions to creating world-class companies, and (2), to highlight a critical issue.

If we as a country want to improve our ability to create world-class companies, then we need to take a different approach. We cannot think that we are Silicon Valley North and merely attempt to copy what works in California. The federal and many provincial governments are devoting considerable resources to developing Canada's technology sector. What they are not doing is effectively using the data that come from their investments to do better.

Through investments in the IAF and BDC's venture arm, the Ontario and Canadian governments have a marvellous opportunity to approach technology sector development with an in-depth understanding of best practices using a data-driven approach.

We could have at our disposal data that come from hundreds of investments to determine best practices, publish the results, and train entrepreneurs and investors on what does and does not work to improve our chances of success.

If our governments are investing hundreds of millions of taxpayer dollars in companies to boost the technology sector, then investing to develop knowledge may yield significant return in terms of improvements in the system.

A Bit of History

The Business Development Bank of Canada's venture capital arm (BDC) and MaRS Investment Accelerator Fund (IAF) were both established when access to capital in Canada was much more limited than it is today. Each of them filled a niche in the market that was not filled at the time.

- In the 1980s, Canadian firms struggled to obtain venture capital (VC). There were few local funders and VCs, and they were not as mobile in their investment preferences. BDC's VC arm was created to meet that need

- In the 20 years after the creation of BDC's VC fund, the VC market in Canada had matured considerably. By 2007, however, Ontario's problem was a lack of seed capital providers. The IAF was created to fill that specific void.

Both entities have been successful since they were established, at least in the Canadian context. Their financial returns on investment mirror the experiences of the broader VC community in Canada. But as a whole, the community still underperforms relative to the U.S. The IAF and BDC have continued to invest with mandates that have remained relatively unchanged since they were established.

However, the VC market in Canada has continued to mature. There is more seed and middle stage funding available, and the IAF and BDC are now among many VC firms competing for the best companies. The abundance of such VC organizations also allows the creation of larger syndicates that can co-invest. However, the seed stage will always remain underserviced because it is expensive to manage a portfolio of smaller investments. It will also remain cyclical because seed stage funds tend to gravitate to later-stage companies as they grow because they they can deploy more capital per investment. The government's focus now is on growing and scaling companies but Canada still needs the farm system of finding and seeding promising companies.

Canada's problem is no longer centered on seed and mid-stage capital, for which these two entities were established. Canada's issue is now the availability of later-stage capital, and more specifically our ability to create world-class companies. Our report entitled *A Failure to Scale* argues that late-stage capital availability is constrained, not by the VC community but by inadequate financing in companies' early years, causing them to grow more slowly than should be possible and become financially unattractive.

If Canada's problem now is our ability to create large, public and industry leading world-class companies, then we thought it would be worthwhile to examine the IAF and BDC from that perspective. Picking and nurturing world-class companies does not require the ability to invest large amounts in later stages. Instead it requires identifying potential world-class companies early and providing them with enough capital to nurture their growth, making them attractive to later-stage funders, perhaps even foreign ones.

Assessing the abilities of these two entities on these metrics is is not something that would normally be done. Typically, VC firms are rated on their rate of return. However, our assessment does not examine rate of return at all. In fact, the sale of companies from the portfolio is counter-productive if the main objective is to grow world-class companies because firms that were sold have their future growth eliminated by their sale. According to CB Insights, Canada ranks fourth in the world in the sale of firms, so growing firms to sell them isn't our problem. The IAF and BDC are contributing well to our mergers and acquisitions (M&A) position as each of them has had a number of successful exits.

But the question remains, how well are the two organizations doing at picking and nurturing world-class companies?

Investment Accelerator Fund (IAF)

Established by the Government of Ontario in 2007, the IAF's original intention was to mitigate technological and market risk in startup firms in information technology, healthcare, clean technology and other areas. The fund was restricted to maximum investments of $500,000 in an early-stage company with limited revenue and institutional investments. To date the fund has invested in 126 companies. Seventy-one per cent of these companies have raised $652 million of follow-on funding. The IAF has exited 22 of these investments.

Portfolio Statistics

Table 1 shows the statistics for 77 companies out of the current IAF's investment portfolio. All firms were founded between 2006 and 2014 and currently remain in its portfolio. This time period represents all investments made from inception to those founded in 2014. If the average age of a company at investment is two years and the average time until the next investment is another two years, then those companies founded in 2013 should have received their second round of investment by now and those founded in 2010 should be on their third round.

IAF Investments
(See Methodology for sources for charts and tables)
Table 1

Investee Founded	Average Age at Investment	Number of Investees	Average Raised to Date ($ Millions)	Average Current Employment
2006	3.25	4	6.63	29
2007	2.33	3	22.79	58
2008	1.67	3	7.83	38
2009	4.00	5	1.59	24
2010	1.86	7	20.46	28
2011	2.50	8	6.59	37
2012	2.00	16	8.54	34
2013	1.59	22	2.73	21
2014	1.11	9	6.65	13
Total	2.01	77	7.78	28

In 2010, the contract for managing the IAF portfolio and the responsibility for making new investments was moved from the Ontario Centres of Excellence to the MaRS Discovery District. Prior to that shift, MaRS had an advisory role in managing the IAF. The most significant outcome after the change in management is that the average age at the time of investment declined over time. While initial investments were made in older companies, this was reduced over time to below three years.

Picking Winners

One way of determining whether the IAF has been able to predict winners is to examine the number of companies that receive follow-on capital, and in what amounts. Table 2 shows the current stage of investment reached by each investee and the amount of capital obtained.

IAF rounds of investment completed

Table 2

Rounds Completed	Number of Investees	Average Raised to Date ($ Millions)	Average Current Employment
Seed	35	1.59	18
A	12	8.93	39
B	2	20.27	62
C	2	47.79	38
Total	51	6.54	26

The data shows that 12 IAF-supported companies have gone on to raise series A rounds and four have gone on to complete Series B and C rounds of financing. These companies are still within a reasonable time frame for raising further capital, and thus should be seen as successes in terms of picking winners.

Amongst the companies that have received Series A capital, there are only two whose progress indicates that they are unlikely to obtain further capital. However, 15 others have received seed financing and whose growth may warrant further capital.

Another perspective on these results can be gleaned from looking at a company's age when it received its first investment from the IAF. The following table shows the results for 77 IAF investments.

IAF investee age

Table 3

Investee Age at Investment	Number of Investees	Average Raised to Date ($ Millions)	Average Current Employment
>4	2	1.98	12
4	6	1.26	15
3	21	5.39	22
2	17	6.33	30
1	22	13.26	36
0	9	6.46	29
Total	77	7.55	28

What is very interesting to see from these statistics is that the IAF produces the best results when an investee is two years old or younger. Its investee companies have slightly lower growth when the IAF invests in the first year and growth declines when investing in a company that is more than two years old. Ultimately, this is the logical result of the pattern in company growth. If a company is less than a year old, it likely does not have as much customer traction than one that is two years old. Investing at this stage carries more risk. If the IAF invests for the first time in a company more than three years old, it is likely that the company is slower at developing, taking longer to prove customer traction to such an extent that it may not warrant investment. Such companies often continue on this slow-growth trajectory without attracting future investment.

The better performance of younger companies may be related to the management of the IAF itself as recent management under MaRS has reduced the average time to investment and improved the selection process.

Nurturing World-class Companies

Although the IAF is not able to make follow-on investments as a result of their mandate, they can influence the ability of companies in their portfolio to get follow-on investment. We wanted to determine whether the companies invested in by the IAF receive sufficient capital and experience enough growth to become world-class companies.

Table 2 indicates that the average seed-stage capital received by IAF investee companies is $1.59 million and that this represents most of the financing received in the first two years. In the Series A round the average amount is almost $9 million. But our report on *A Failure to Scale* showed that in their first two years, the bottom 50 US-based Unicorns (private companies with valuations of $1 Billion or more) received an average of $8.6 million in capital and in the next two years, corresponding in timing to an A Series round, received an average of $46 million.

This finding demonstrated that as a country, we invest later in a company's development, less often and in lower amounts. The IAF has partially solved the problem of when we first invest, as they have brought the average time to first investment down substantially from when they started 10 years ago. They now invest more often in the first two years of a company's existence.

However, by investing in companies with an average investment of $1.59 million, the IAF does not provide enough capital to maximize a firm's growth to become world-class. Investing lower amounts works to enable entrepreneurs to build a company that can later be sold, but does not work to provide enough capital to make them eventual world-leading entities.

The BDC data shown later in this report suggests that the IAF participates in smaller syndicates. This translates to smaller second rounds in follow-on investments, thus making its firms less likely to go on and become world-class entities.

This factor is further reinforced by our analysis of employment numbers for investee companies. Table 4 shows that these firms produce reasonable 2-year employee growth rates. The average 2-year employee growth rate is 89%. They do not appear to have made any investments that are experiencing an employee growth rate above 75 per cent per year, although they have more investments with employee growth above 50 per cent a year than BDC does. The problem is though, as we have seen, the average IAF investee gets less money in its seed round and in follow-on rounds so that while growth is reasonable, it is lower than it would be if the company received more money earlier.

IAF 2 year employee growth rate

Table 4

2 Year Growth Rate	Number	Percentage
> 300%	0	0%
125% - 300%	8	31%
50%- 125%	8	31%
0% - 50%	8	31%
Negative	2	8%

While the Canadian government has a more unified strategy for investment through BDC, the Ontario government splits its investments between the IAF, which invests in startups, and the Ontario Growth Capital Corporation (OGC), which among other strategies for investing in funds, also invests directly with matching funds at later stages. To date OGC have made 27 investments directly to match with other VCs. Of these investee firms, seven have been acquired. Of the 16 for which data have been available, the average investment received to date by their investee companies is $17.8 million. As we will show shortly, this average total investment by IAF AND OGC combined is 25 per cent lower than the average amount for BDC investees, indicating perhaps that BDC is better able to nurture future world-class companies.

Conclusion

The data show that the IAF does have the ability to pick winners. The IAF has two companies on the current Narwhal List (www.impactcentre.ca/narwhal) and in total there are eight companies that have the potential, if they keep up current growth rates, to become world-class companies.

However, it appears that the IAF is not meeting its potential for maximum impact. Without sufficient funds invested early and a cohesive, coordinated strategy with OGC the IAF may be producing suboptimal results.

BDC Venture Capital

With a 30-year track record and more than $1 billion of capital under management, BDC is one of Canada's largest VC funds. They have invested directly or indirectly in over 400 companies through a series of specialized funds. They have recorded in excess of 60 exits. Unlike the IAF, which is limited in the scope of its investments, BDC is able to invest any amount in any Canadian business at any stage of development.

Portfolio Statistics

Even using a collection of sources (BDC website, Crunchbase, Pitchbook and CB Insights), we found it difficult to develop a full data set of BDC investments. To facilitate our analysis, we focussed on the 93 investments listed under "Direct Investments" in the portfolio section of the BDC website. To make results comparable to those of the IAF, we selected 51 companies founded from 2006 to 2014. The following table summarizes those investments.

BDC portfolio statistics

Table 5

Investee Founded	Average Investee Age at Investment	Number of Investees	Average Raised to Date ($ Millions)	Average Current Employment
2006	8.50	2	51.69	249
2007	4.88	8	24.06	55
2008	4.40	5	22.96	101
2009	4.25	4	32.67	86
2010	3.75	4	36.20	67
2011	3.00	7	17.55	52
2012	1.92	13	22.43	41
2013	1.57	7	11.53	37
2014	2.00	1	36.78	103
Total	3.31	51	24.13	64

Based on these data and the review of stages at which BDC has invested, it appears that BDC has begun to make investments significantly earlier and that the average age of the investee companies has declined over time. (However, this may be an anomaly resulting from the availability of data. Reporting by CB Insights has improved over time and earlier reporting may not have captured investments made 5 to 10 years ago.)

Picking Winners

Unlike the IAF, BDC has the ability to invest at later stages of a company's development and after several rounds of financing. This means it can wait several years to invest, thereby reducing risk. Table 6 shows this effect.

When BDC is able to wait until a company is older, perhaps making a first investment in a later round, the results are significantly better. By definition, these companies have raised more and are developing higher employment levels. The effect of these later-stage investments makes a direct comparison with the IAF very difficult.

Stage at which BDC first invested

Table 6

First Invested	Average Age at Investment	Number of Investees	Average Prior Investment ($ Millions)	Average Raised to Date ($ Millions)	Average sCurrent Employment
Seed	2.08	13	0.28	4.68	22
Seed and A	1.57	7	0.10	14.08	41
A	2.67	9	3.68	23.39	60
B	5.00	9	10.86	30.31	76
C and D	7.75	4	23.62	70.74	181
Total	3.29	42	8.73	22.04	61

Table 7 suggests that, unlike the pattern seen with IAF investments, the longer BDC is able postpone making an investment, the more likely they are to pick winners. This may mean, of course, that it pays a higher price and does not earn as great a return as it would by investing earlier, but the reduced risk is commensurate with the potentially reduced return. However, we are only judging BDC on its ability to help in the creation of world-class companies rather than on its returns.

BDC investee age

Table 7

Investee Age at Investment	Number of Investees	Average Raised to Date ($ Millions)	Average Current Employment
>4	12	37.16	133
4	6	26.71	45
3	11	16.70	47
2	12	24.56	40
1	9	15.09	28
0	1	8.4	92
Total	51	23.66	64

Nurturing Companies

Table 8 lists the current stage of investment reached by each investee and the amount of capital obtained in total. It indicates a clear advantage BDC has over IAF in being able to invest more money in companies. The average amount raised by companies that only obtained seed funding with BDC participating as the seed, or later investor, was $3.2 million. This compares favourably with IAF-supported companies, which average $1.6 million in the seed stage.

BDC investee progress
Table 8

Rounds Completed	Number of Investees	Average Raised to Date ($ Millions)	Average Current Employment
Seed	12	3.11	16
A	11	15.83	55
B	9	28.12	73
C and D	10	46.11	112
Total	42	22.04	61

This early advantage of greater capital translates through to following stages as well. By the time BDC-financed companies have completed a Series A round, they have raised a total of $16 million, compared with IAF-financed companies that have received under $9 million.

In the following stages, there is not enough IAF data to make proper comparisons; there may be a strong advantage to investing in larger amounts earlier that makes a firm more likely to become a world-class company.

Finally, one can look at the underlying growth of employment in investee companies as a way of determining investor success. BDC has made 33 direct investments made where employment has surpassed 30 people LinkedIn provides a publicly available source for estimating employment growth rates. The following table shows the employment breakdown.

BDC employee growth rate
Table 9

2 Year Growth Rate	Number	Percentage
> 300%	2	6%
125% - 300%	4	12%
50% - 125%	12	36%
0% - 50%	10	30%
Negative	5	15%

In order to scale to world class, we need companies that are growing at a minimum of 75 per cent a year, a number that matches the approximate average growth rate of Unicorns. At this rate, it would take a company eight years to become a Unicorn after obtaining seed capital. Based on the data that we have been able to obtain, there are firms in BDC's portfolio that are growing at this rate. Another four companies have growth rates in the range of 125–300 per cent in a two-year period. These companies, if they continue to progress with growth of at least 50 per cent per year, have the potential to become Unicorns in 11 years after obtaining seed capital. The other investments made by BDC may make good acquisition candidates.

Conclusions

The data demonstrate that BDC has the ability to pick winners. It has seven companies on the current Narwhal List (www.impactcentre.ca/narwhal) six companies have the potential, if they keep up current growth rates, to become world-class companies.

But if BDC were to adopt the creation of world-class companies as its objective, it would need to re-examine its current approach to investing. The current strategy is good for risk minimization and earning a fair return for the government, but BDC does not have enough available capital to make the large bets necessary at both early and late stages to propel investees to world-class status more quickly.

Moneyball

When we embarked on this study to see what we could learn from the BDC and IAF investments, we were pleasantly surprised to find patterns that have direct impact on investment policy and practice. The data that are available for such an evaluation are scant, as none of the investee companies are public. We needed to rely on sources of publicly available data (e.g. CB Insights and LinkedIn). We recognize, however, that the data available from these sources may not be complete or necessarily accurate, but they provide an estimate and speak to the wider patterns that we must examine more closely.

However, we see this as the beginning of a process. If we as Canadians want to improve our ability to create world-class companies, then we need to take a different approach. We cannot think that we are Silicon Valley North and merely attempt to copy what works in California. The companies established there are launching in an entirely different market—one that is mature, experienced and extremely successful. Companies operating in the US can rely on the collective wisdom of thousands of successful entrepreneurs and C-level executives, and the high concentration of experience, all within a small radius.

In Canada, we do not have the luxury of relying on thousands of companies that have succeeded internationally. We are a geographically distributed country that has long relied on mining, oil, gas, and financial services for economic growth. So we must do something entirely different if we are to become more successful.

In fact, the best analogy for the situation we find ourselves in comes from the baseball movie Moneyball. Canada is the equivalent of the Oakland Athletics, a team in a small market that did not have the resources to compete successfully against players with substantially larger resources such as the New York Yankees. (If you have not watched the movie or cannot remember it well, you should watch it again to understand what we are trying to get across with this comparison.)

To become competitive, the Oakland A's decided to take a different approach to the creation of a team. Instead of relying on the collective wisdom of scouts and managers, they took a data-driven approach to determine the metrics that really mattered in developing a team and used those metrics to make decisions about drafting players and managing the game. As a result of this radical departure to existing baseball orthodoxy, the Oakland A's, with a $44-million payroll were competitive with teams such as the New York Yankees who spent as much as $125 million on personnel in the same season. This approach enabled the A's to reach the playoffs in 2002 and 2003.

The Canadian technology community is the equivalent of the Oakland A's in that we face the NY Yankees' equivalents, luxuriating in Silicon Valley with billions of dollars and thousands of experienced entrepreneurs at their disposal. If we really want to become competitive with the Valley then we need to adopt a different approach, one that is data driven. Using data will help us determine what works for nurturing Canadian firms. It will assist us in picking potential winners so we can target our rather moderate resources towards companies with a greater chance of success. And these same data will help us mentor new entrepreneurs in what they must do to become successful.

The federal and many provincial governments are devoting considerable resources to developing the technology sector in Canada. What they are not doing is using the data that come from its investments to figure out how to improve. We as a country are behaving like the pre-Moneyball Oakland A's, expecting that mimicking Silicon Valley in our approach will be successful. While we have had much success, we have missed the opportunity to become even more successful by using the data developed through government-funded programs to identify best practices and use those best practices to teach others what they must do to succeed.

Through investments in the IAF and BDC's venture arm, the Ontario and Canadian governments have a marvellous opportunity to embrace a data-driven approach to technology sector development. Using as a base of analysis the over 500 companies that have received government investment, we could develop the equivalent of Moneyball for Canada's technology sector.

We could use the data that come from hundreds of investments to determine best practices, publish the results, and train entrepreneurs and investors as to what works to improve our chances of success, and more importantly, what does not work and sets us up for failure. This is the approach that successful investors such as Georgian Partners and many others across Silicon Valley use effectively and regularly with the results of their investments.

If our governments are investing hundreds of millions of taxpayer dollars in companies to boost the technology sector, then it makes good economic sense to devote a small percentage of that money to figure out what works and to use that knowledge to improve our capabilities

Methodology

This study looked at the fundraising patterns of the MaRS Investment Accelerator Fund (IAF) and BDC's venture capital fund. We were able to obtain data for 77 IAF investments and 51 BDC-supported firms. We used a collection of sources (e.g. Crunchbase, CB Insights, Pitchbook, and LinkedIn) to generate the best data set possible for this Impact Brief. The data were obtained in June and July 2017. All amounts in the charts are in US dollars.

The IAF assisted us by providing access to their Pitchbook data and also reviewed the data we had obtained from public sources to ensure that it was reasonably accurate. We did not request, nor did we receive any data from the IAF, as our objective was to use publicly available data for both BDC and IAF. We intend to ask both organizations for access to their data for future reports.

Please note that the author of this report, Charles Plant, served from 2007 to 2010 on the Management Committee of the IAF, as well as its Chief Financial Officer from 2010 to 2011.

This study was not intended to be academically rigorous, nor was it intended to be all-encompassing about the topic. It was designed only to add to the conversation on innovation and highlight areas worthy of future research by looking at data available from publicly available sources. We plan to complete further research on this subject in the future.

About the Impact Centre

Science to Society

We generate impact through industry projects and partnerships, entrepreneurial companies, training and research.

We bridge the gap between the university and industry to accelerate the development of new or improved products and services based on physical technologies. We work with graduate students and researchers to help them commercialize their discoveries. We provide undergraduate education and training for students at all levels to ease their transition into future careers.

The Impact Centre conducts research on all aspects of innovation, from ideation and commercialization to government policy and broader themes such as the connection between science and international development. We study how companies of all sizes navigate the complex path between a discovery and its market and how their collective innovations add up to create a larger socioeconomic impact.

Our objective is to understand how we can improve our ability to create world-class technology companies, how governments, companies, and academia can identify and adopt best practices in technology commercialization.

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