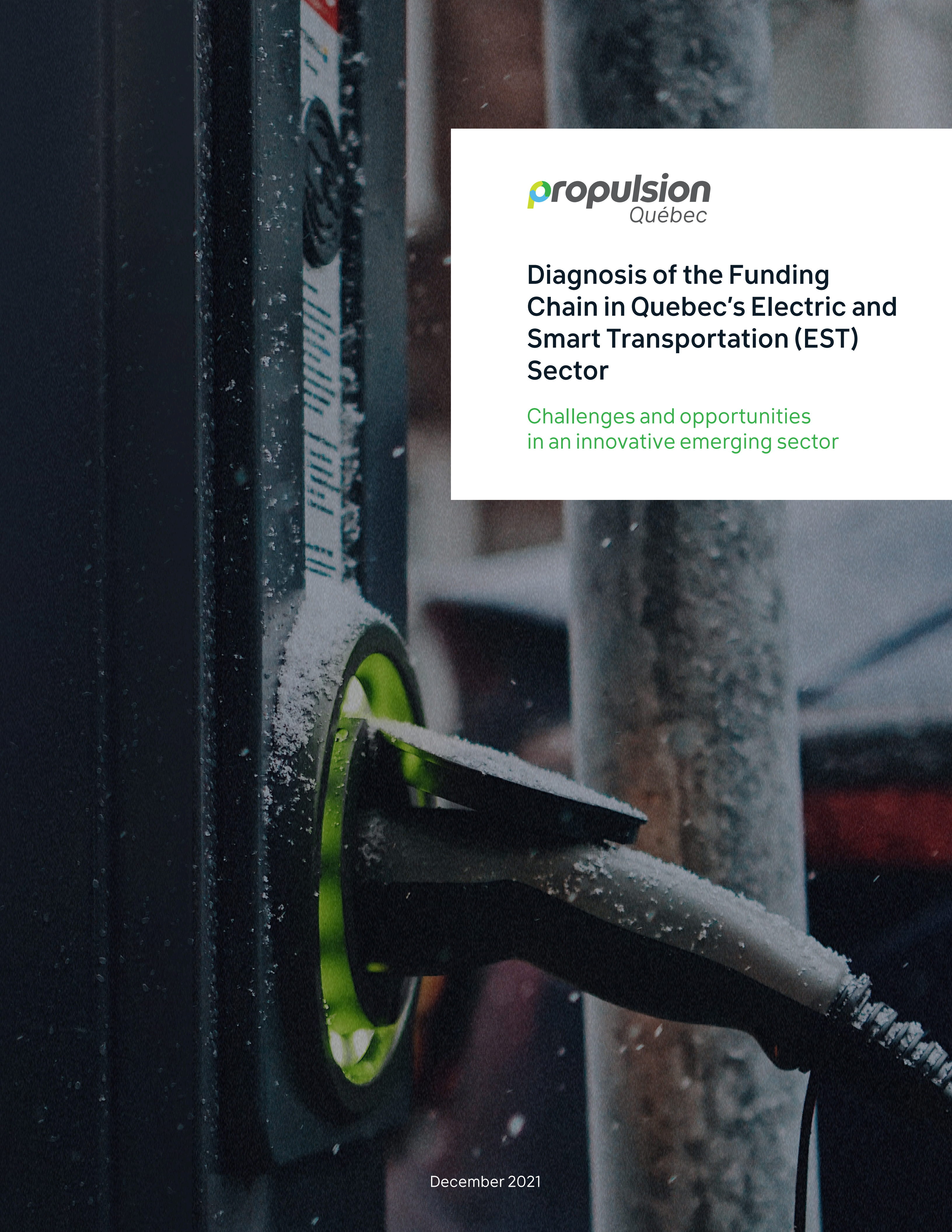

propulsion Québec

Diagnosis of the Funding Chain in Quebec's Electric and Smart Transportation (EST) Sector

Challenges and opportunities in an innovative emerging sector

December 2021

ABOUT THIS REPORT

Propulsion Québec mandated EY to conduct this extensive analysis of the funding chain in Quebec's electric and smart transportation sector with a view to identifying challenges, available funding tools, and investment opportunities to ensure the growth of this sector in Quebec. This report is based on EY's conclusions and recommendations.

ACKNOWLEDGEMENTS

This exercise was conducted jointly with a steering committee of Quebec funding players with the financial support of the Government of Quebec, Caisse de dépôt et placement du Québec, Desjardins Group, MacKinnon, Bennett & Company, Investissement Québec, Fonds de solidarité FTQ, Fondaction and Langlois Lawyers.

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Benoit Jaglin, Senior Advisor, EY
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Jean-François Tremblay, CEO, Founder, Mouve & Co

Our thanks to the steering committee members:

Marie-Claude Asselin, Desjardins Capital
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INTRODUCTION

A) BACKGROUND

Propulsion Québec, the cluster for electric and smart transportation (EST) in Quebec, is mandated through its funding initiative to connect companies in Quebec's EST sector to stakeholders in the funding chain to provide access to needed funding at different growth stages while helping achieve societal goals such as fighting climate change.

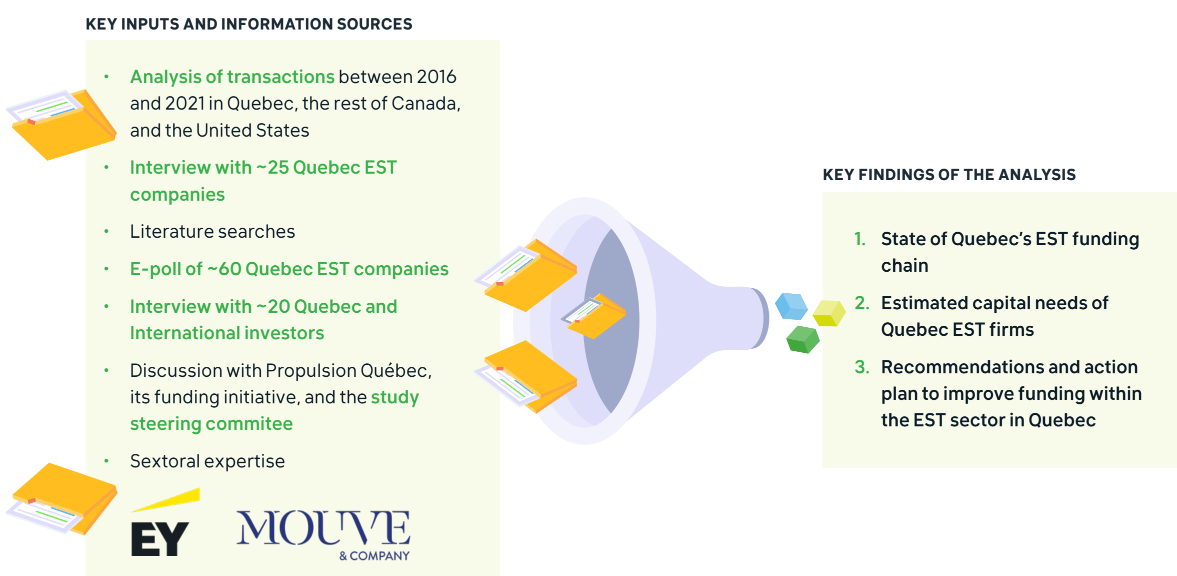
This led Propulsion Québec to launch a major undertaking to study and engage the business ecosystem and funding players in EST to identify and address certain funding issues. The goal was to assess the state of the funding chain, improve understanding of the funding needs of companies to secure their growth, and identify local and international funding sources available to the EST sector. The findings also form the basis of a strategy and action plan to tackle funding challenges in the EST sector.

B) METHODOLOGY

The project seeks to provide a Quebec industry perspective by:

1. Producing a complete diagnosis of the EST sector's funding chain
2. Estimating the capital needs of the EST sector
3. Presenting recommendations and an action plan to resolve the various issues and challenges identified in the sector.

Diagram 1 illustrates the methodology developed to carry out the project:



EST ECOSYSTEM IN QUEBEC COMPARED TO NORTH AMERICA

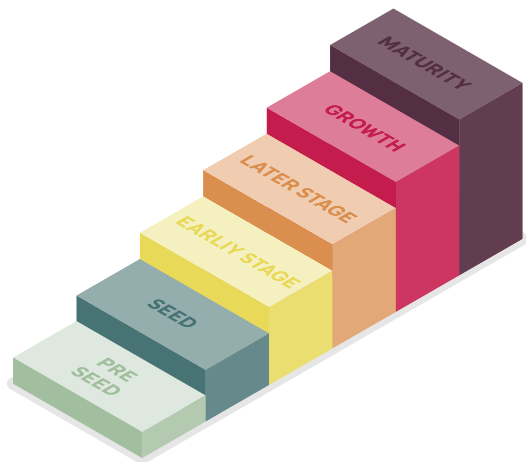
A) ECOSYSTEM DESCRIPTION

As part of the analysis, we produced a simplified mapping of Quebec companies whose main operations were directly and predominantly related to EST. Note that while some Quebec companies did have operations directly or indirectly related to EST, they were not included in our simplified mapping because EST was not necessarily their core business[1].

We were able to identify about 60 companies directly and predominately involved in EST in Quebec, and we believe that this sample is representative of the broad trends observed in the sector, particularly in the funding chain.

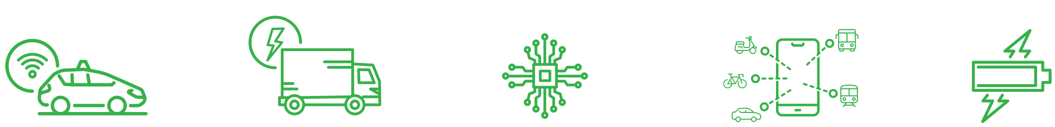
To simplify understanding of Quebec's EST ecosystem and structure our analysis of the funding chain, we segmented the 60-odd companies in two main ways, as presented in *Diagram 2*:

WAY 1
Development stage of the companies



Our study focuses primarily on the following stages: **Seed, Early stage, Later stage and Growth.**

WAY 2
EST subsector in which the companies operate



AUTONOMOUS AND CONNECTED VEHICLE

ZERO-EMISSION VEHICLE (ZEV)

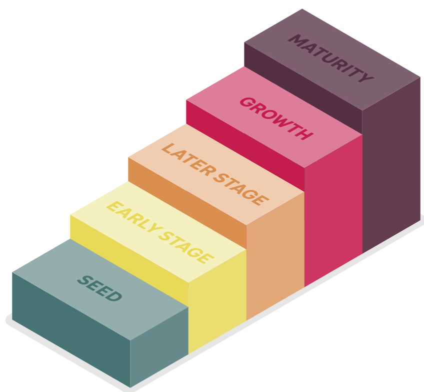
INFRASTRUCTURE (ELECTRIC AND/ OR SMART)

MOBILITY SERVICES (MAAS - MOBILITY AS A SERVICE)

BATTERIES AND ENERGY STORAGE

1 Examples of sectors/subsectors excluded from the scope of the study include consulting, mining, transportation of people and goods, mechanical maintenance, large multinationals, and not-for-profit organizations.

We also conducted an analysis of firms based on different stages of maturity[2], as shown in *Diagram 3* below:



SEED
Developing company that has not yet established commercial operations and needs funding for research, evaluation, and product development

EARLY STAGE
Company in the early stages of its operations and needs funding for product development, initial marketing, and other objectives

LATER STAGE
Company that has moved beyond the start-up and initial development phase and needs funding to support rapid sales growth potential

GROWTH
Established or nearly established company that needs funding to increase production capacity and marketing and sales efferts

MATURITY
Established company that needs funding to consolidate its market position or wholly or partly acquire another business entity for growth reasons

Sources : EY, CVCA

An "hourglass effect" was noted in the distribution of firms by development stage. While seed and early stage companies represent more than 50% of firms in EST, a significant dip can be observed in the number of firms at the later stage. The number of firms in the growth and maturity stages then rises appreciably, as shown in *Diagram 4* below:

Diagram 4

	SEED	EARLY STAGE	LATER STAGE	GROWTH	MATURITY
Proportion of number of firms at each stage	**25 %**	**32 %**	**9 %**	**19 %**	**15 %**
Graphical representation of the "hourglass effect»					

Source : EY

2 The pre-seed stage is not represented in the diagram above as our study focused on firms that have at least reached the seed stage. Certain companies considered to be at the maturity stage are actually in "transition." These are established companies that initially focused on non-EST sectors but are now trying to move their business model fully or partially toward EST.

B) EST BUSINESS FUNDING IN QUEBEC

As part of our study, we conducted a market survey of about 60 Quebec companies in the EST sector to gather primary information on their past and future funding strategies. Our response rate was over 75 percent, which is very high for this kind of exercise. We have appended some data on the sample.

Depending on their stage of development, companies generally turn to different types of funding with distinct characteristics. Funding typically allows a company to step up or transition to the next stage by supporting its growth and development. *Table 1* provides an overview of the main types of funding by stage of development of EST firms in Quebec:

Table 1

	SEED	**EARLY STAGE**	**LATER STAGE**	**GROWTH**
Typical funding at each development stage	Seed funding	Series A funding	Series B funding	Series C funding
Main funding objectives	Development and improvement of the product/service/technology	Marketing of the product/service/technology, industrialization of processes, business model refinement	Team expansion, strengthening of firm's processes and business model, first international outreach	Expand or maintain market position by continuing to develop the company. Initial strategic acquisitions
Average amount of funding in Quebec	**$700k**	**$8.0M**	**$23.3M**	**$66.0M**
Main types of investors	Angels, government funding, venture capital	Venture capital, industry groups	Venture capital, development capital, industry groups	Venture capital, development capital, industry groups, institutional investors

Source : EY

Key highlights from the survey findings that informed the analysis of funding chain issues are presented below in diagram and table format:

Diagram 6

Funding holds back the growth of EST firms

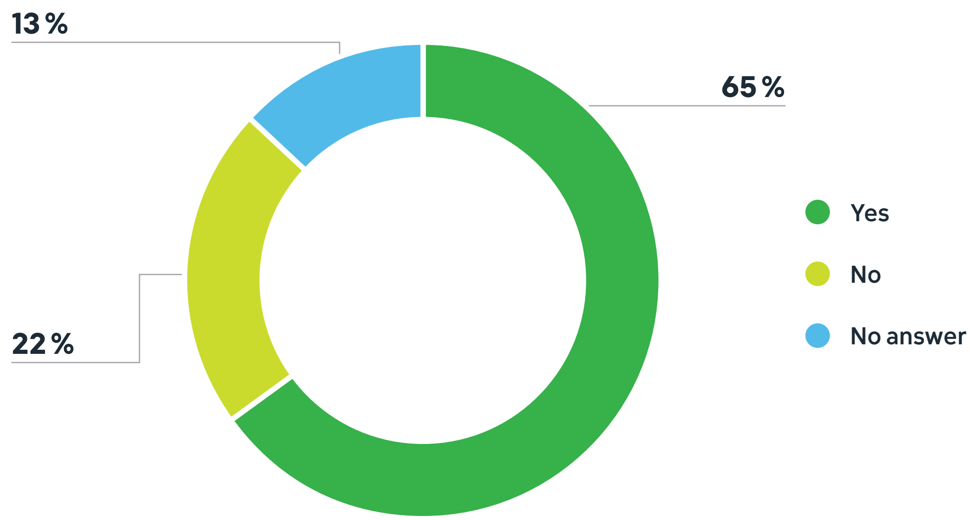


Diagram 7

Funding rounds made by EST firms

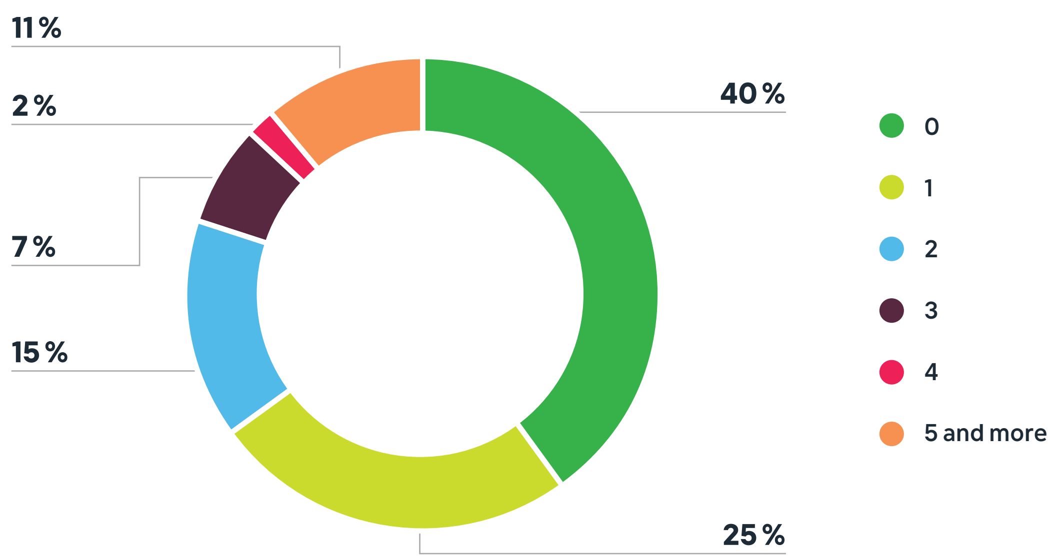


Table 2

Capital needs expressed by firms responding to the survey over different time horizons (in Canadian dollars)[3]

Total capital needs of companies by year within the next 12 months ($)	**$ 514,300,000**
Total capital needs of companies by year 1-3 year horizon ($)	**$ 473,000,000**
Total capital needs of companies by year 3-5 year horizon ($)	**$ 807,100,000**
Total capital needs over a 3-5 year horizon	**$ 1,794,400,000**

4- Key perceived funding challenges facing companies

50 %

of respondents feel that **negative, low, or hastily demanded profitability** has a significant or major impact on their funding.

41 %

of respondents feel that **difficulty finding a lead investor for their funding rounds** has a significant impact on their funding strategy.

39 %

of respondents feel that the Quebec **EST ecosystem is not responsive enough** compared to other regions of the world and that this affects their funding.

36 %

of respondents feel that having an insufficiently validated business model, product, or technology has a significant impact on their funding strategy.

3 The needs presented are those expressed by companies that responded to the survey. They provide an order of magnitude of the amounts required by the sector. This is not the complete estimate of needs as given in another section of the report.

C) FUNDING FROM A NORTH AMERICAN PERSPECTIVE

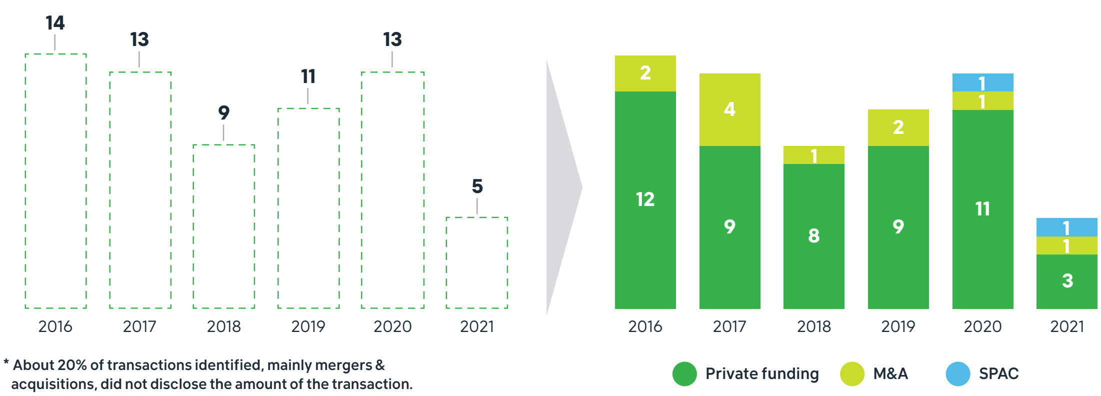
As part of the study, a large sample of transactions related to EST (+3,000) between 2016 and 2021 was conducted for Quebec, the rest of Canada, and the U.S. The transactions were compiled from different databases and AI tools at EY's disposal, and correspond to different EST[4] growth phases and subsectors as shown below:

Diagram 8

Overview od transactions in Quebec's EST sector between 2016 and 2021[5]

NUMBER OF TRANSACTIONS

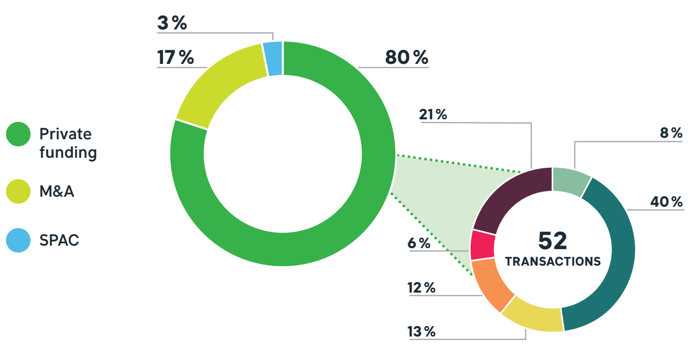
65 transactions with a total value of $1.576 billion*



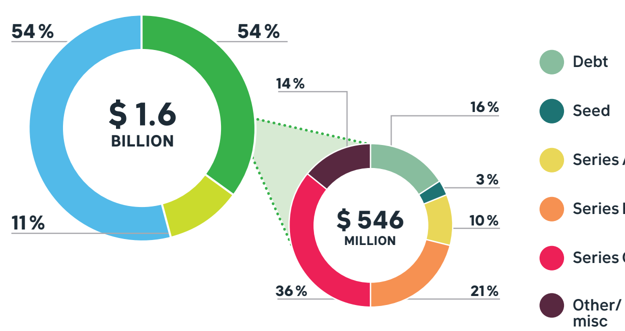
* About 20% of transactions identified, mainly mergers & acquisitions, did not disclose the amount of the transaction.

Sources : EY, Crunchbase, IQ Capital, CB Insights, Pitchbook, press releases

TYPES OF TRANSACTIONS (VOLUME)



TYPES OF TRANSACTIONS (VALUE)



Sources : Crunchbase, Capital IQ, CB Insights, Pitchbook, communiqués de presse

4 While considerable effort was made to identify as many relevant transactions as possible, the data analyzed and presented in this study were obtained through paid-access databases available to EY. No sensitive or insider information directly from the companies concerned was included. This explains in part the many transactions with undisclosed amounts. In addition, due to the difficulty in accurately delineating the EST sector, it is possible that some relevant transactions were not included. However, our analysis was based primarily on overall figures rather than individual transactions; we mainly analyzed average data rather than absolute values, thereby limiting the impact of missing data for particular transactions. The transactions cover the period from January 1, 2016, to February 28, 2021 plus certain transactions relevant to Quebec beyond that date.

5 Les données de transactions au Québec pour l'année 2021 couvrent la période de janvier à avril 2021 uniquement.

Diagram 9

Overview of transactions in Quebec's EST sector between 2016 and 2021

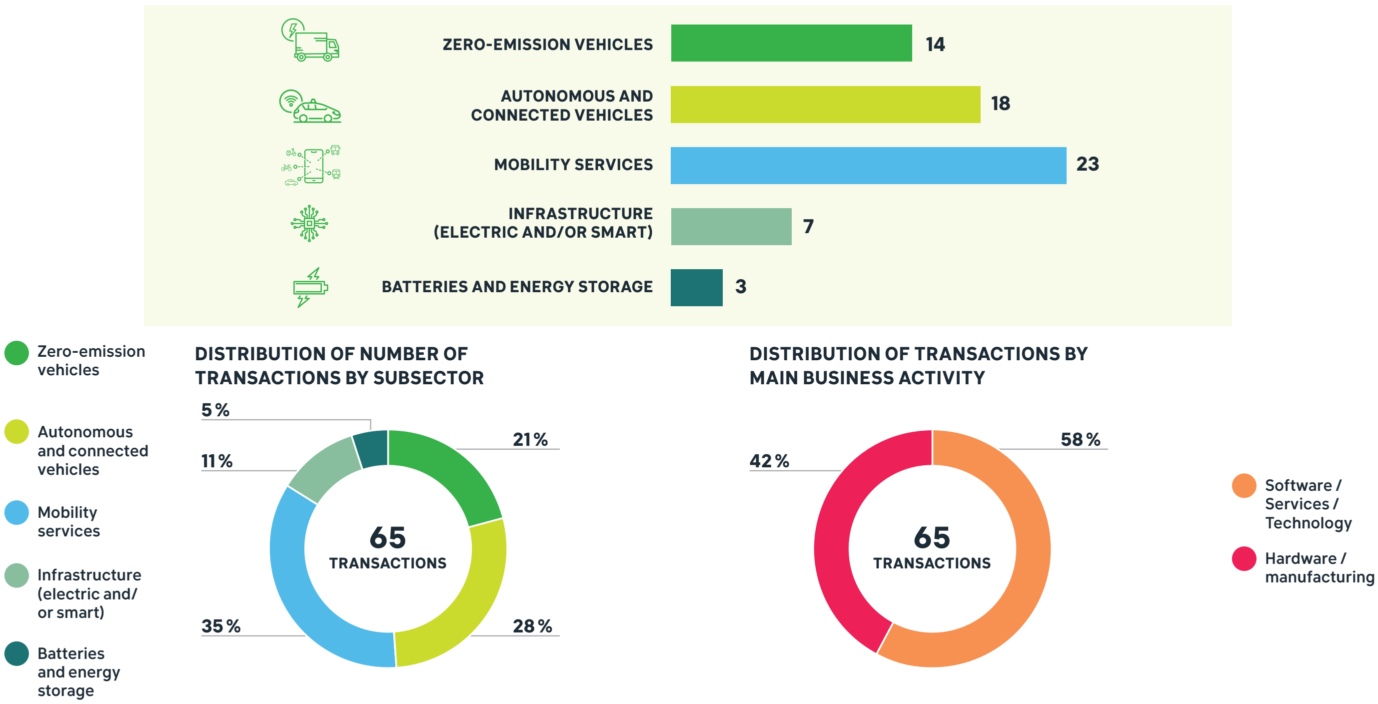
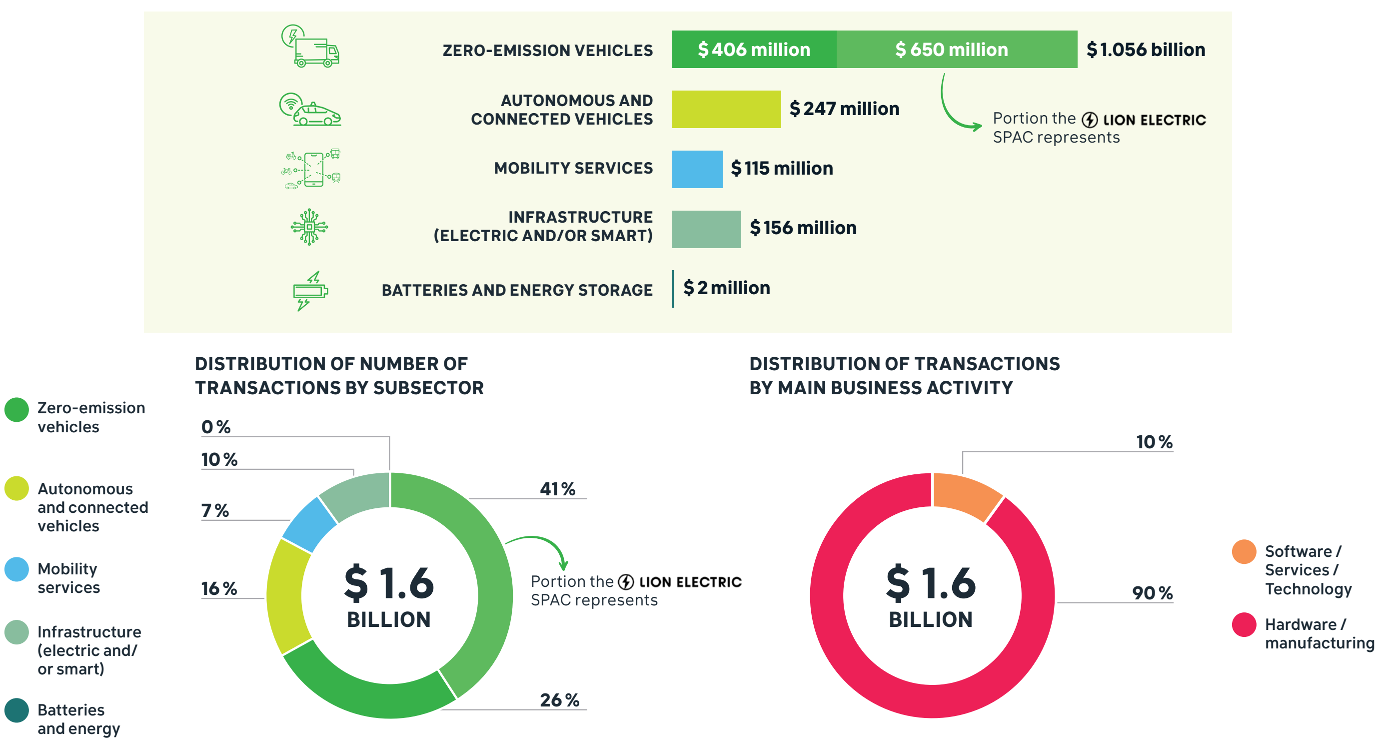


Diagram 10

Overview of transactions in Quebec's EST sector between 2016 and 2021



Sources : EY, Crunchbase, IQ Capital, CB Insights, Pitchbook, press release

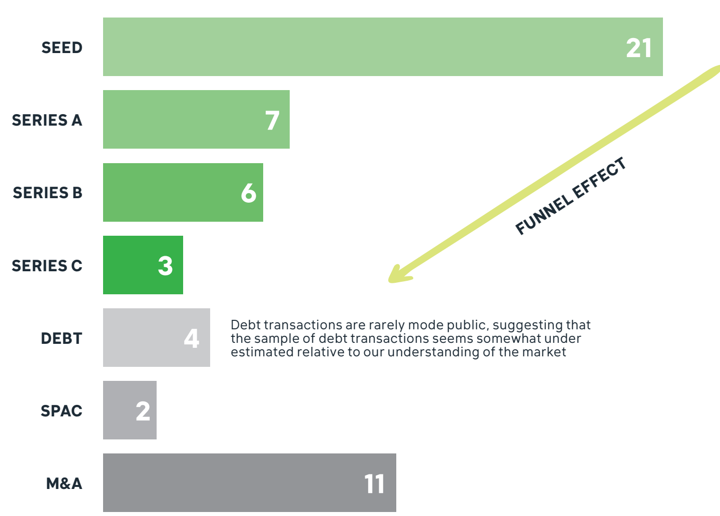
Conclusions from the data:

- There has been a steady flow of transactions in the Quebec EST sector—about 60 over the last five years—representing a total of about $1.6 billion.
- The number of seed fundings is relatively large (40% of private funding transactions), but they represent a low total absolute value of private funding transactions (3%).
- Start-up funding (Series C) represents only 6% of the private funding transactions analyzed, but accounts for almost 36% of the total value of these transactions.
- While SPACs represent only 3% of total transactions, they account for nearly 55% of the total value of transactions recorded in Quebec over this period. Two large transactions explain this, namely Lion Electric and Taiga Motors.
- While over 20% of transactions are in the zero-emission vehicle sector, these transactions account for nearly 70% of total value, demonstrating the importance of this subsector in Quebec's EST ecosystem.
- While almost 60% of transactions in the sample involve firms primarily active in software and in services and technology, these transactions account for only 10% of the total value of the sample. This shows that hardware and manufacturing firms (42% of the sample) require enormous amounts of capital (90% of the total value).

Number of transactions, average ticket, and speed of funding by type of investment was also examined in greater detail, as illustrated in the following tables:

Diagram 11

Number of transactions by type of funding



Sources : EY, Crunchbase, IQ Capital, CB Insights, Pitchbook, press release.

Diagram 12

Average transaction ticket by type of funding

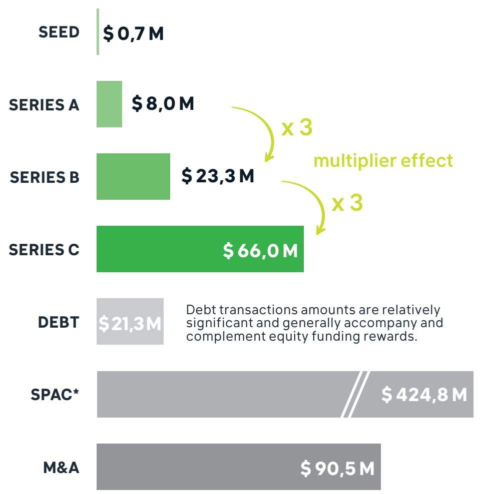
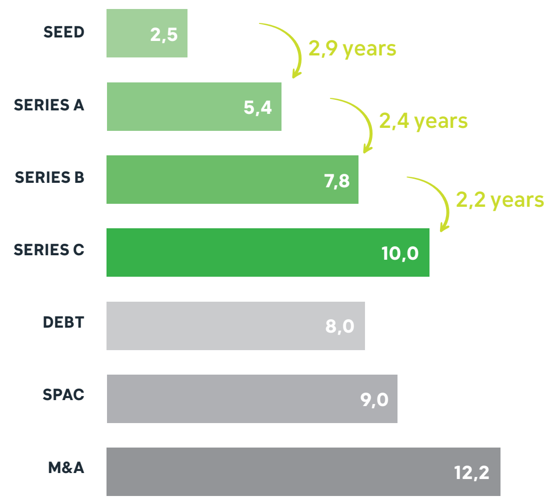


Diagram 13

Average age of companies at the time of transaction



* Includes the associated PIPEs
Sources : EY, Crunchbase, IQ Capital, CB Insights, Pitchbook, press release.

- A funnel effect in transactions is apparent, which seems logical to us, but could be reduced compared to other jurisdictions like the U.S., for example. This also points to the fact that there should probably be more start-ups in the sector in order to have more companies at the Series A, B, or C stages, because the more companies there are at the entrance to the funnel, the more transactions there are in subsequent stages, increasing the likelihood of creating strong businesses.
- Quebec companies take an average of three years to move from one funding round to another, reaching the Series C stage after an average of 10 years.
- There are a relatively large number of M&A transactions in the sector. This shows a certain propensity for Quebec companies to continue their growth within complementary structures, by selling part (or all) of their capital to investors (generally strategic) in order to pursue growth.
- A pronounced difference between seed funding and Series A funding can be seen, as well as a multiplier effect in subsequent funding rounds. This shows the importance of earlier phase investments, which increase subsequent phases more than proportionally.
- Two SPACs had taken place in Quebec by the end of the review period, one for Lion Electric in November 2020 (CAD $650 million) and the other for Taiga Motors in February 2021 (CAD $200 million). These are powerful instruments for large-scale funding.

When transactions of hardware and manufacturing firms are compared with software and technology firms, it is evident that while there are fewer transactions in the former category, they account for the bulk of total transaction value ($1.4 billion). Average transaction tickets ($65 million) for hardware and manufacturing firms are also significantly higher than for software and technology firms.

Comparison between hardware and software companies

	HARDWARE/ MANUFACTURING	SOFTWARE/ TECHNOLOGY
Number of transactions	**27**	**38**
Total value of transactions	**$1,422 M**	**$154 M**
Average value of transactions	**$64.6 M**	**4.8 M$**
Seed	$0.4 M	$0.8 M
Series A	$12.4 M	$6.2 M
Series B	$30.0 M	$18.8 M
Series C	$91.5 M	$15.0 M
Average age at the time of the transaction	**9,0 years**	**6,3 years**

Our analysis of transactions reveals a marked difference depending on average company age at the time of the transaction: hardware and manufacturing firms tend to be funded much later than software and technology firms. This trend is confirmed globally and also at each stage of investment. The explanation for this is undoubtedly that companies offering software and technology products and services reach a maturity stage (whether for R&D or marketing) much faster than hardware and manufacturing firms, so it is logical that they need funding more quickly. We can also assume that a longer development cycle for manufactured products prompts investors to take a more cautious approach and wait until the product or technology is actually ready before investing in hardware and manufacturing firms.

Quebec versus the rest of Canada and the U.S.

We also sought to compare Quebec with other North American jurisdictions, specifically the rest of Canada and the U.S., in terms of average transaction tickets and speed of funding by type of investment. See the results in the following tables:

Diagram 14

Average transaction ticket by type of investment

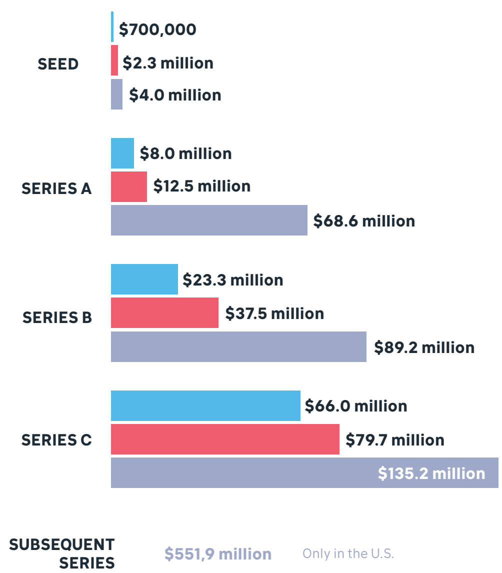
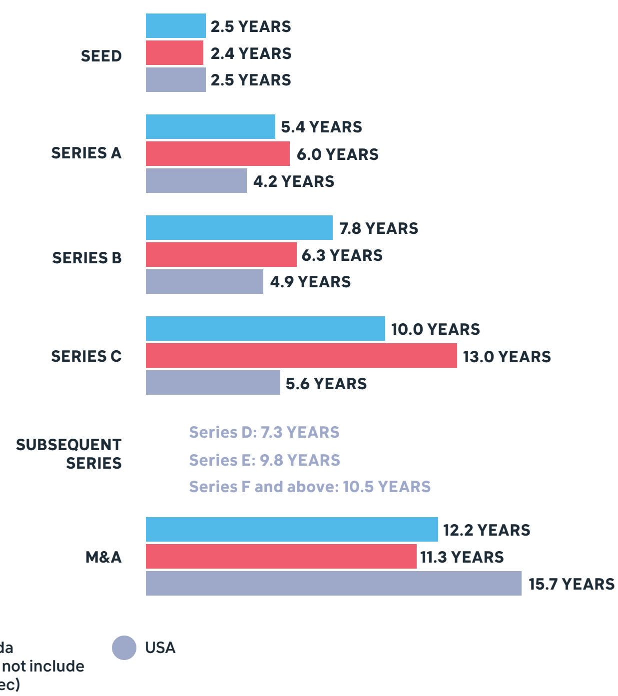


Diagram 15

Average company age at the time of the transaction



Sources : EY, Crunchbase, IQ Capital, CB Insights, Pitchbook, press release.

- First of all, a significant variance is evident between the U.S. and Canada in average investment tickets at all investment stages. The difference in seed funding seems relatively small in absolute value at first glance. However, through the multiplier effect observed at each funding round, the variance of more than $3 million between Quebec and the U.S. (and about $2 million between the rest of Canada and the U.S.) reveals a sizable difference in scale after all between the two countries.
- The average age of companies at the seed funding stage is very similar in Canada (including Quebec) and the U.S., suggesting that the initial development pace of Canadian and Quebec firms is very close to their U.S. counterparts. On the other hand, we note that while Quebec firms obtain Series A funding almost 3 years after their seed funding (about 3.5 years for the rest of Canada), U.S. firms are even faster, waiting less than two years after seeding. This suggests that companies develop much faster in the U.S. after they pass the seed phase. This seems to grow exponentially when we analyze the time lag between Series A, B, and C in the U.S., since less than a year elapses between each funding round, whereas Quebec companies wait more than two years between each.

A comparison of transaction numbers per 100 companies that receive seed funding in the U.S. and Quebec reveals a much less pronounced funnel effect in the U.S. than in Quebec, with 75% of companies reaching the Series A round, while only 33% of companies do so in Quebec. This shows that U.S. companies appear to have much greater capital needs than their Canadian counterparts, and also that willingness to invest and risk tolerance are appreciably greater among U.S. investors than in Quebec.

Diagram 16

Number of transactions per 100 Quebec companies receiving seed funding

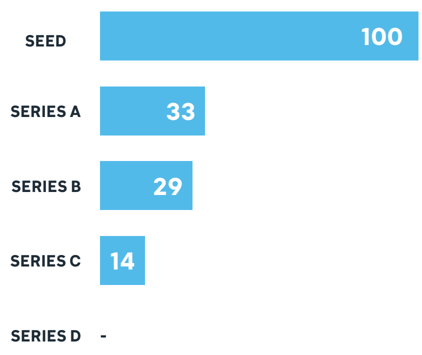
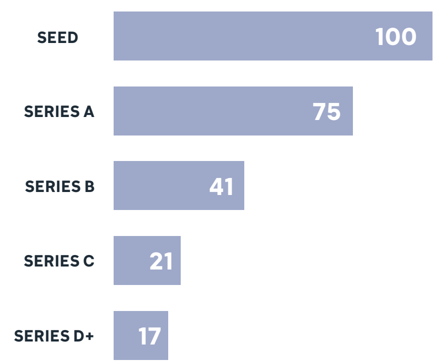


Diagram 17

Number of transactions per 100 US companies receiving seed funding



D) AVAILABLE FUNDING IN QUEBEC, CANADA, AND INTERNATIONALLY

This study made it possible to identify sources of funding available to EST companies at different growth stages. A complete directory of Quebec and Canadian sources of public and private funding and a list of foreign investment funds active in EST are available on Propulsion Québec's website.

ACCESS THE DIRECTORY

EST FUNDING CHAIN IN QUEBEC

A diagnosis was made of the EST funding chain in Quebec based on numerous interviews, a market survey, an analysis of transactions, and document searches conducted as part of this study. The identified issues are presented in *Diagram18*.

Some 15 key issues were identified and are presented in the summary table below and then described in detail. Comparisons between Quebec and the U.S. are sometimes presented, even though the context is somewhat different. However, we feel it is important to do so because Quebec companies compete directly in this market at different levels, including funding.

Diagram 18

The key issue and challenges facing Quebec's EST sector are organized in four broad categories and involve three different types of stakeholders

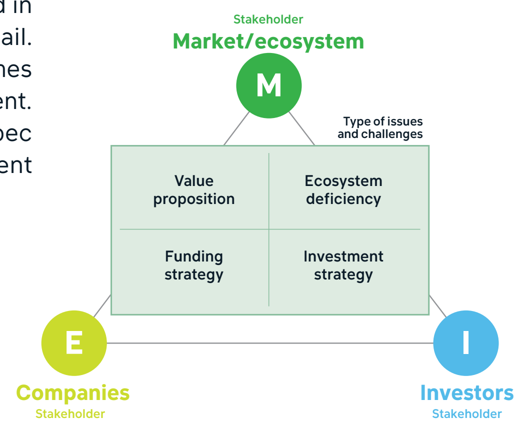


Table 3

Summary of key issues and challenges observed for Quebec's EST companies

FUNDING STRATEGY (COMPANY VIEWPOINT)

- E M I #1 Prolonged bootstrapping[6] of companies
- E M I #2 Quebec companies get relatively modest investment tickets
- E M I #3 Low funding speed for Quebec companies
- E M I #4 Quebec companies lack financial literacy
- E M I #5 Need to help entrepreneurs manage their risk

INVESTMENT STRATEGY (INVESTOR VIEWPOINT)

- E M I #8 Difficulty finding a *lead investor*
- E M I #9 Quebec's venture capital approach is not always adequate for the EST sector
- E M I #10 Valuing of companies and start-ups is a stumbling block in the EST funding chain

VALUE PROPOSITION (COMPANY VIEWPOINT)

- E M I #6 Approach focused for too long on product/service to the detriment of more strategic aspects
- E M I #7 Innovative business models and the need for investor education

ECOSYSTEM DEFICIENCY

- E M I #11 There are very few unicorns[7] and champions in Quebec
- E M I #12 An uneven impetus mechanism for start-ups in universities
- E M I #13 Lack of competition in the investment supply dedicated to venture capital and the EST sector
- E M I #14 Companies need a strong local buyer community
- E M I #15 Government support may have adverse effects on business development strategy

6 The definition can be found on page 18

7 The definition is presented in the appendix on page 33

A) 15 ISSUES AND CHALLENGES TO TACKLE

1) Prolonged bootstrapping of companies

Bootstrapping refers to the act of funding a company from its own limited funds, reinvesting profits generated and not using external funding. Bootstrapping—voluntary or not—may have different causes such as difficulty raising start-up funding, lack of time or resources to look for financing, determination to develop a "perfect" product before starting to raise money, or simply having a modest profit reinvestment strategy. Bootstrapping can significantly delay a company's growth and prevent it from meeting with real success. Worse yet, it will cause it to lag behind the competition and can make future investors doubt the company's potential.

2) Quebec companies attract relatively small investments

Quebec companies in the sector receive far smaller investments than their counterparts in the rest of Canada and the U.S. This is true across all investment stages, from seed funding to Series C, as shown in the table below.

Table 4

	QUEBEC	UNITED STATES	DIFFERENCE QC vs U.S.
Seed	Less than $1M	4M	$3M / x4 ratio
Series A	~ $8M	~$70M	$60M / x10 ratio
Series B	~ $15M	~$90M	$75M / x6 ratio
Series C	~ $70M	~$140M	$70M / x2 ratio
Cumulative funding after Series C	**~$100M**	**~$300M**	**$200M / x3 ratio**

A Quebec company initially receives$3M less than a U.S. company and this initial difference transforms into a difference of over $200M after three rounds of funding.

This clearly shows that a difference of a few million dollars at the seed funding stage takes on much larger proportions during subsequent funding rounds, demonstrating the extremely important impact of the "multiplier effect" on modest initial funding. This delays and downsizes the development of Quebec companies compared to their U.S. counterparts.

3) Low funding speed for Quebec companies

Although Quebec EST companies obtain their seed funding after two and a half years like in the U.S., subsequent funding is staggered much more in Quebec. This explains how Quebec companies take an average of 10 years to arrive at Series C funding compared to less than 6 years in the U.S., as shown in *Table 5*.

Table 5

Funding velocity in Quebec compared to the U.S.

	QUEBEC	UNITED STATES	DIFFERENCE IN VELOCITY	CUMULATIVE DIFFERENCE
Average age at the end of seed	2,5 years	2,5 years	-	-
	+ 2,5 years	+ 1,5 years		
Average age at Series A	5 years	4 years	1 years	1 year
	+ 3 years	+ 1 year		
Average age at Series B	8 years	5 years	2 years	3 years
	+ 2 years	+ 1 year		
Average age at Series C	10 years	6 years	1 year	4 years

Companies that are slow to be funded suffer a direct impact on growth. The longer a company waits between funding rounds, the more it delays growth and the more it lags behind the competition that funds at a more sustained pace.

4) Quebec firms are not financially savvy

Being financially savvy means improving your knowledge of funding products, concepts, and risks and knowing where and how to find appropriate funding assistance and make the right funding choices. Knowing how to navigate the funding ecosystem is critical to a company's credibility with investors—it's important to avoid knocking on the wrong door at the wrong time. In addition, poor preparation and lack of financial literacy can lead to misunderstandings between companies and investors. Our analysis revealed deficient funding strategies in Quebec EST companies.

5) Need to help entrepreneurs manage their risk

Many entrepreneurs have trouble managing their personal financial risk as they grow their businesses, often putting up personal assets as collateral. This naturally tends to dampen company growth and entrepreneurial drive. Moreover, we note that bankruptcy is stigmatized in Quebec, whereas in other jurisdictions—particularly in the U.S.—it tends to be viewed as a normal part of being an entrepreneur. Furthermore, many government programs contribute significant funding, with 80% publicly funded as long as the company funds the remaining 20% privately, and while many firms have taken advantage of this, a number of them (especially younger ones) have struggled to find the 20% private funding and have often had to solve their problems by accepting unfavourable funding terms.

6) Approach too product/service-focused to the detriment of more strategic aspects

Many companies stay strategically centred for too long on the product, service, or technology and fail to turn their attention soon enough to marketing and funding matters. A general tendency can be seen in Quebec for companies to want to have the "perfect" product or technology before starting to address marketing and funding issues. There is also a vicious funding circle at the local level with very (overly) demanding local investors, which tends to discourage companies from seeking out funding sources before their product is market ready.

7) Innovative business models and the need for investor education

Many Quebec companies have very innovative business models—often at the crossroads of software and technology or hardware and manufacturing—offering attractive, competitively priced products and services that can be sold recurrently. However, these companies have a hard time explaining these complex and innovative business models to investors and convincing them of the value of their business models. We also observed that some local investors have difficulty understanding and evaluating innovative and complex business models, which are generally outside their traditional analytical framework. This lack of understanding, combined with the lack of EST specialization among investors, generally complicates and slows the search for funding, thereby causing investors to be extremely cautious in their funding approach. Yet business models that are complex but have innovative and promising features should be perceived as affording the company a "natural" barrier to entry, which should give it a long-term competitive advantage.

8) Difficulty finding a *lead investor*

Few Quebec investors step up as lead investors in the different funding rounds within Quebec's EST sector and instead take a follower position. Few have in-depth knowledge of EST, which very often prompts them to seek out other, more experienced investors to take the lead instead of investing early in resources that will enable them to lead future rounds. Local investors seek to make their approach and investment less risky by relying on investors with experience in the sector (which is standard in all industries). Having few lead investors in this sector in Quebec complicates the task of local companies when they seek out funding. On the other hand, foreign investors often wonder about the absence of support from local investors, which they may see as a lack of confidence in the industry and therefore a barrier to investment. Developing local expertise in EST is essential to reducing the dependence of local investors on foreign investors and breaking this vicious circle.

9) Quebec's venture capital approach is not always adapted to EST

We observed that some local venture capitalists have an approach that only partially matches the standard venture capital approach as observed in other jurisdictions. They take a development capital approach, demanding a return on investment, sales, and even a positive EBITDA. This is most striking in early stage and later stage companies: many investors seem to be too conservative for venture capital, as is shown by their very low failure rate, which contrasts with rates observed in Silicon Valley or Europe, for example. While many local investors are backed by government investors or institutional investors, their risk aversion and desired return on investment generally align poorly with developing sectors such as EST. Many local investors tend to impose inappropriate and too hasty growth criteria on the companies they invest in, concentrating almost exclusively on their exit strategy and the money they will make (development capital approach).

10) Valuing companies and start-ups is a stumbling block in the EST funding chain

Our analysis revealed that entrepreneurs have difficulty properly valuing their companies, in part because of the complexity of defining their potential market (Quebec? Canada? U.S.? Other?), along with an inability of investors to recognize the fair value of the companies in which they are considering investing. Quebec entrepreneurs and investors have difficulty understanding and choosing appropriate valuation methods. As a result, many investors tend to use classical valuation methods, particularly based on a company's future income or cash flow, but are unable to value a company with no income, for example.

It is also difficult to find relevant comparables in order to properly value a company in an emerging sector such as EST. What's more, although Quebec and the U.S. are two distinct markets, it is still relatively clear that Quebec (and Canadian) companies are generally valued at lower amounts than their U.S. counterparts (with equivalent skills and potential) due to several factors, including the depth of the capital market. In short, while dilution is a natural phenomenon in a company's development path, a poor valuation can also drive entrepreneurs/founders to dilute very quickly and massively, which is not to be desired.

11) There are very few sectoral unicorns and champions in Quebec

The presence of unicorns in a given ecosystem tends to strengthen its overall drawing power and increase investor confidence in other companies in the sector. The lack of unicorns in Quebec shows, and is explained by the newness of the sector, which is not yet attracting masses of investors. Quebec (and Canada) has a rich fabric of small businesses, but relatively few world-beaters, the result of, among other things, more modest investment levels and slower funding that reduces the multiplier effect and the ability of companies to achieve champion status. While the existence of many unicorns is not a panacea and an end in itself, creating and fostering the emergence of multiple champions in the EST sector generally leads to a virtuous circle by promoting the creation of related companies.

12) Uneven start-up impetus in universities

Today few Quebec EST start-ups emerge directly from the university world, which gives students too little incentive to become entrepreneurs and start their own companies during their studies. Our various interviews within the Quebec EST ecosystem revealed that spin-offs from the academic world are generally high-quality companies and that technologies/products/services developed in the university setting are very innovative and have a high value-added potential. As such, promoting the creation of start-ups within universities would ultimately increase the total number of high-quality start-ups within Quebec's EST ecosystem and feed the sector's funding chain at all development and investment stages over the long term.

13) Lack of competition in venture capital in the EST sector

There are currently relatively few investment funds and structures dedicated to venture capital investment (mainly for the seed and early stage phases) and, while some do not exclude our sector, none are entirely specialized in EST in Quebec. This is in contrast to other Canadian jurisdictions, the U.S., and Europe. For now, ESTs are seen as a niche sector by local investors, who in most cases have decided not to dedicate specific resources and structures to them. Local investors still seem to have doubts about the depth and recurrence of transaction flows in EST in Quebec, so they are waiting to

8 La définition est présentée en annexe à la page 33

see this increase before taking a focused and massive interest in the sector. The lack of competition between investors also tends to complicate the search for funding by companies, which face a lack of alternatives to support them and investors who are very (overly) selective and restrictive in their investment approaches. Lack of competition also creates an automatic oligopolistic effect, giving investors strong leverage and inordinate bargaining power over companies, reducing the sector's attractiveness for entrepreneurs, and preventing the creation of a virtuous circle (more company creation -> more transactions -> more investors).

14) Companies need a strong local buyer community

We find that in early development stages, many companies have difficulty finding a local buyer community able to provide them with a market and sales outlets. In addition to funding their growth, young companies need to gain quick access to a market and find "reference customers." Securing early adopters is a fundamental issue for start-up companies, and we note that some "natural" customers of Quebec EST start-ups—such as municipalities or other government bodies—are a hard nut to crack and/or are not receptive to the innovative solutions or products being offered. Lack of access to local markets tends to weaken the credibility of young Quebec companies when they try to develop abroad. A similar phenomenon can be seen in funding. Many Quebec companies try to raise funds outside Quebec without first obtaining funding here, and unfortunately run up against the reluctance of foreign investors, who wonder why they can't get funding in Quebec.

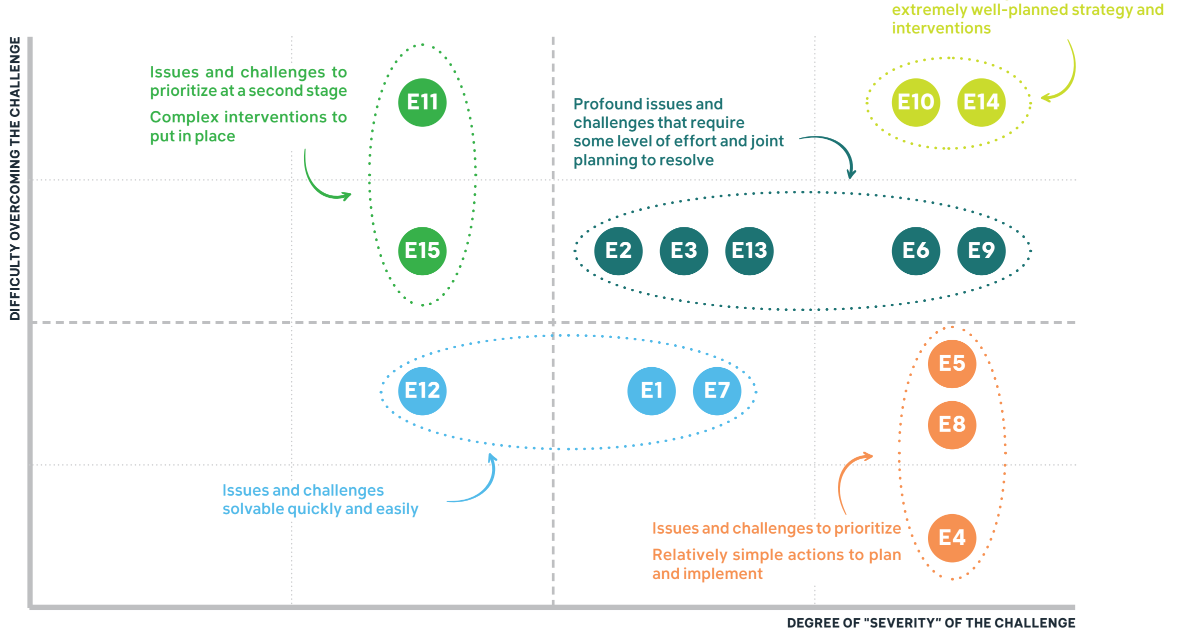
15) Government support may have adverse effects on business development strategies

The Quebec government and the Canadian federal government are very important funding sources for EST companies, but we have found that certain less promising companies are taking advantage of these grants for possibly too long, staying in business only thanks to the many programs offered by governments without really being able to make a convincing go of it. While it is vital for governments to keep supporting young companies and encourage entrepreneurship, overly long support for companies that are barely or not at all viable in the long term and have passed the initial stages of development (seed and start-up) prevents other more promising companies from receiving more financial support, limiting opportunities to create true champions who will lift the entire sector up. This is particularly striking in R&D, where the government funds a large share (usually 75%) of certain expenditures.

To address the different funding issues and challenges of Quebec's EST sector, we positioned them on two axes in the diagram below: difficulty in overcoming the challenge and "severity" of the challenge:

Diagram 19

Segmentation of key issues and challenges in the sector



- **E1** Prolonged bootstrapping
- **E2** Relatively modest investment tickets
- **E3** Low funding velocity
- **E4** Lack of financial literacy in companies
- **E5** Help entrepreneurs manage their risk
- **E6** Approach focused for too long on product/service
- **E7** Innovative business models and the need to educate investors
- **E8** Difficulty finding a *lead investor*
- **E9** Approach to venture capital investment not always adequate in Quebec
- **E10** The valuation of companies and startups is a stumbling blocks
- **E11** There are very few unicorns and champions in Quebec
- **E12** An uneven genesis mechanism for startup in universities
- **E13** Lack of competition in the investment supply dedicated to venture capital and the EST sector
- **E14** Companies need a strong local buyer community
- **E15** Government support may have adverse effect on business development strategy

CAPITAL NEEDS OF THE SECTOR AND RECOMMENDATIONS

CAPITAL NEEDS OF THE SECTOR

As part of this study, we attempted to estimate high-level capital needs over a five-year horizon (from now to 2026). To do so, we adopted a "status quo" approach, which takes into account observations made throughout the study concerning investment in EST.

The main inputs to this funding model are the various observations about the EST sector made during our study, which come from:

- transactions in the EST sector between 2016 and 2021 in Quebec, the rest of Canada, and the U.S.
- an e-poll of about 60 Quebec EST companies
- interviews within the EST ecosystem in Quebec (companies and investors)
- specific document searches conducted by EY
- EY and Mouve&Co expertise in the sector

The funding model uses the following methodological approach:

ANALYSIS OF DEMAND

Definition : Demand here means the total capital needs that companies in the sample believe are needed in the next five years to fund their development and growth plan.

KEY POINTS

Number of companies : Sample of about 60 Quebec companies in the EST sector. The sample is representative of the EST ecosystem in Quebec, both in terms of EST sub-sectors and the stage of development.

Distribution of sample companies by stage of development : All sample companies were classified by stage of development (seed, start-up, post-start-up and growth). Some model inputs are common to all development stages while others are specific to each stage.

Ratio of number of demands to raise capital/number of companies : Percentage representing the number of demands to raise capital per 100 companies.

Average capital need per demand from companies : Average amount sought by a company when it wishes to raise capital

Annual growth in demand : Percentage of annual growth in the total value of capital demand from companies.

ANALYSIS OF SUPPLY

Definition : Supply here means the total amount that investors active in the EST sector would be willing to invest in capital raising by companies.

KEY POINTS

Number of transactions per year: Number of capital raising transactions that should normally occur each year in the EST sector. This figure is based on trends observed in recent years in the EST sector in Quebec and North America.

Attrition rate between two stages: Percentage decline in expected fund raising transactions from one development stage to another.

Average ticket amount per transactions: Average amount generaly funded by investors during a capital raising

Natural growth in supply: Percentage of annual growth in the total value of capital demand from companies.

POSITIVE DIFFERENCE BETWEEN DEMAND AND SUPPLY

Insufficient supply: companies cannot fund all their needs

NEGATIVE DIFFERENCE BETWEEN DEMAND AND SUPPLY

Surplus supply : investors would be able to increase funding to companies.

This table summarizes projected capital needs in EST in Quebec from now to 2026 based on available data.

Table 6

Summary of the EST sector's capital needs over a 5-year horizon

		SEED	EARLY STAGE	LATER STAGE	GROWTH	TOTAL
2022	Demand for capital by companies	18.0	110.0	80.0	225.0	433.0
	Supply of private capital	8.0	28.0	58.0	81.0	175.0
	Unfilled capital need	10.0	82.0	22.0	144.0	258.0
2023	Demand for capital by companies	21.0	116.0	90.0	245.0	472.0
	Supply of private capital	9.0	32.0	67.0	93.0	201.0
	Unfilled capital need	12.0	84.0	23.0	152.0	271.0
2024	Demand for capital by companies	24.0	122.0	101.0	267.0	514.0
	Supply of private capital	10.0	37.0	77.0	107.0	231.0
	Unfilled capital need	14.0	85.0	24.0	160.0	283.0
2025	Demand for capital by companies	27.0	128.0	113.0	291.0	559.0
	Supply of private capital	12.0	43.0	89.0	123.0	267.0
	Unfilled capital need	15.0	85.0	24.0	168.0	292.0
2026	Demand for capital by companies	31.0	134.0	127.0	317.0	609.0
	Supply of private capital	14.0	49.0	102.0	141.0	306.0
	Unfilled capital need	17.0	85.0	25.0	176.0	303.0
TOTAL	Demand for capital by companies	121.0	610.0	511.0	1345.0	2 587.0
	Supply of private capital	53.0	189.0	393.0	545.0	1180.0
	Unfilled capital need	68.0	421.0	118.0	800.0	1407.0
	% of unfilled needs for all stages combined	5 %	30 %	8 %	57 %	100 %

KEY POINTS TO REMEMBER

SEED : The unfilled capital needs appear modest in absolute terms (~$70 million), but given the impact of the multiplier effect, it is important for start-ups to receive the funding they need at this stage for their development so as not to jeopardize their potential.

EARLY STAGE : The unfilled capital needs represent nearly 30% of total sector demand taking all stage combined, but the absolute value of these unfilled needs still seems substantial. This is due mainly to the high number of companies at the early stage, even though their average need is modest compared to the U.S.

LATER STAGE : The unfilled capital needs are smaller than in the preceding phase, mainly due to the "hourglass effect" seen in the breakdown of Quebec EST companies (many early stage but far fewer in later stage).

GROWTH :The unfilled capital needs represent more than 50% of total sector demand at all stages combined, which seems logical since companies on the way to maturity, while few in number, have high capital needs to maintain or increase their market position.

We estimate the total capital requirements of Quebec EST firms at $2.6 billion over the next 5 years, while the total amount of private capital over the same period is estimated at nearly $1.2 billion. This leaves a total deficit of about $1.4 billion to meet the capital needs of companies in the sector.[6] The above table indicates the shortfall by growth stage of the companies. It should be noted that this shortfall could be made up by direct private investment, initial public offerings (IPO) or the expansion of existing funds, the creation of new funds, or the awarding of loans and grants. These new capital injections could come from private or public sources.

B) SUMMARY OF OBJECTIVES AND INITIATIVES TO INCREASE FUNDING FOR QUEBEC'S EST SECTOR

Based on a detailed analysis of funding in Quebec's EST sector, Propulsion Québec has developed several recommendations to expand the funds available and contribute to a large-scale electric and smart transportation ecosystem in Quebec. This was done in parallel with another exercise conducted by the cluster, namely the an EST Roadmap to 2030 to guide sectoral development over the next nine years.

Below is a summary of the work carried out in conjunction with this exercise highlighting the objectives and outcomes to be achieved. The recommendations are presented under seven major themes and some twenty initiatives that will enrich the EST ecosystem action plan and Propulsion Québec's funding initiative.

9 This should be considered an order of magnitude and not an absolute value, given the inherent limitations of this kind of estimating exercise.

Table 7

Summary of objectives and initiatives to be implemented to increase the supply of financing in the TEI sector in Quebec - Align FDR 2030 tie

KEY OBJECTIVES	AMBITION 2030	THEMES	EXAMPLE OF INITIATIVE TO PUT IN PLACE
Increase funding at different growth stages of companies in the EST sector in Quebec	Quebec will succeed in improving the funding chain for EST companies at all stages of growth, contributing to the emergence of a high-performing and attractive ecosystem for local and foreign companies and investors.	A. Increase the interest and expertise of investors (institutional and specialized) in the EST sector.	Identify and mobilize potential foreign co-investors
			Educate local investors on opportunities, business models, and innovative valuation methods in the EST sector
			Encourage Quebec Institutional investors to invest as limited partners (LPs) in local or foreign funds specialized in EST
		B. Make more private funding available, through higher average investment tickets and faster funding, by creating special EST-dedicated funds.	Fill the "modest" need for capital at the seed stage
			Increase funding for companies at the start-up and post-start-up stages
			Improve the overall EST funding chain through a better understanding of the factors that would increase average investment tocket size and speed
		C. Fine-tuned government support for EST companies.	Lighten the burden on entrepreneurs by providing the ability to guarantee certain investments
			Establish a funding program for commercialization
			Tolerate accelerated de preciation of capital expenditures
			Explore new funding formulae other than 80/20
			Create start-up competitions with funding and collaboration from government corporations
			Establish mechanisms to encourage start-ups to participate in public tenders
Boost EST sector appeal to investors by promoting the emergence of a virtuous circle of growth for Quebec companies and the ecosystem	Quebec will succeed in attracting a critical mass of local and foreign players in the EST sector, both at the company and funding levels, making the province one of the best places in the world to start, grow, or locate a company in the sector. This virtuous circle will eventually generate a steady flow of new companies and investment opportunities, and ultimately attract more capital.	D. Build the "business case" and strengthen the appeal of the Quebec EST sector to showcase the ambition and strengths of the ecosystem.	Document and update the sales pitch and arguments for the EST sector
			Create an aggressive action plan for an accelerated transition to EST (EST Marshall Plan)
			Create a world-class EST ecosystem through a set of measures that support accelerated growth of the sector
		E. Improve financial literacy, risk management, and the market approach of EST firms.	Create an information document on local and international funding sources
			Strengthen the role of incubators and accelerators to coach companies (funding and approach less technology-centric)
		F. Increase the visibility and credibility of Quebec EST companies abroad.	Expose Quebec and Canadian international organizations to the entire EST ecosystem in Quebec
			Strengthen links between companies in the EST ecosystem and export-oriented Quebec or federal agencies
			Draw on approaches such as "Plug and play" to encourage the establishment of dedicated EST events
		G. Stimulate the creation of new companies dedicated to EST.	Encourage industry champions to develop projects dedicated to EST through the creation or involvement of start-ups
			Encourage universities to produce more start-ups
			Encourage the creation of EST start-ups "from scratch" (identification of an issue, a technology, team creation, incubation and start-up funding)

C) RECOMMENDATION TO CREATE A PRIVATE INVESTMENT FUND DEDICATED TO EST FIRMS

Creating a private investment fund[10] dedicated to EST to support the sector in Quebec was discussed with many stakeholders during this study. Propulsion Québec believes that creating such a fund could be generally beneficial for the sector in that it would:

- i support start-up companies
- ii fill part of the capital needs observed
- iii strengthen competition among venture capital funds

The typical investment target would be Series A funding in companies at the start-up stage. The fund should also be able to make "late seed" investments in seed companies to support them on the way to Series A and later rounds after the initial investment and until the growth stage.

There are three main options for creating a fund dedicated to EST:

1. Local initiative independent of existing structures, led by a new team of local managers
2. Creation of a new EST fund within an existing local structure
3. Creation of a new EST fund by a foreign manager

An alternative to creating a new fund dedicated to EST could be to bring seed investors specialized in EST to Series A and/or bring investors dedicated to Series A to ESTs.

Key terms of the fund

- Funds administered by a private manager specialized in EST and sustainable mobility investments
- Target size of fund: $50-100M
- Funds mainly invested by Quebec sponsors
- Main investment proposition: Accelerate the transition of Quebec and adjacent regions to EST
- Fund mainly dedicated to Series A investments, with possible late seed investments and follow-up investments after the initial round
- Average initial ticket of $1-10M
- Priority investment area is Quebec, but investing possible in adjacent regions such as Ontario and New England
- Priority sub-sectors of EST expertise acquired and/or with high potential

10 Although the study refers to the term investment fund

IN SUMMARY

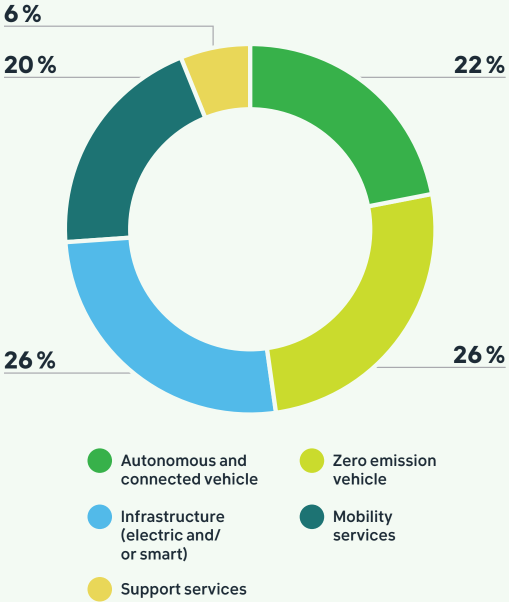
Propulsion Québec's study documented EST funding in Quebec and made observations on the industry funding chain. It compared financial transactions from a North American perspective, notably to highlight differences in the flow, size, and speed of transactions. It also documented available funding in Quebec, Canada, and internationally, listing sources according to various criteria.

All of this served to diagnose Quebec's EST funding chain with regard to 15 issues. The high-level capital needs of the sector were financially modelled, pointing to a funding shortfall of $1.4 billion between now and 2026. Lastly, the data collected helped define 7 broad objectives and 20 initiatives to increase available funding and ultimately create a private investment fund dedicated to EST to spur growth of Quebec's EST ecosystem and promote Quebec's position as a world leader in the sector.

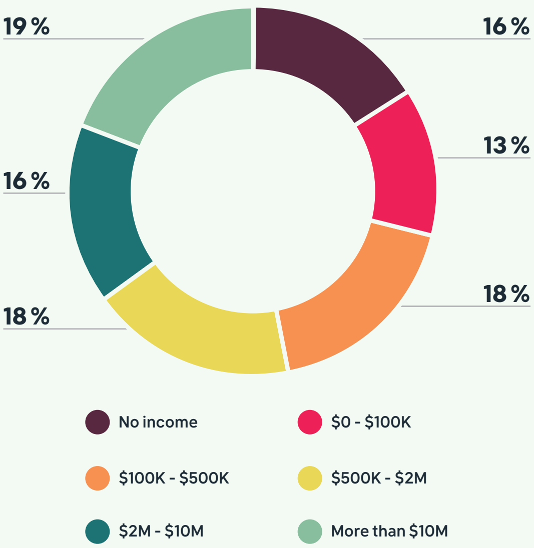
Appendices

A) EXCERPTS FROM THE SURVEY OF 61 COMPANIES CONDUCTED FROM MARCH TO JUNE 2021.

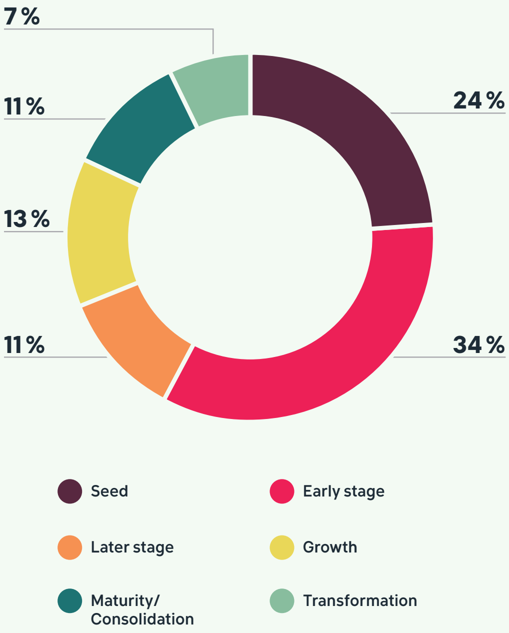
IN WHAT SECTOR OF ELECTRIC AND SMART TRANSPORTATION DOES YOUR COMPANY OPERATE?



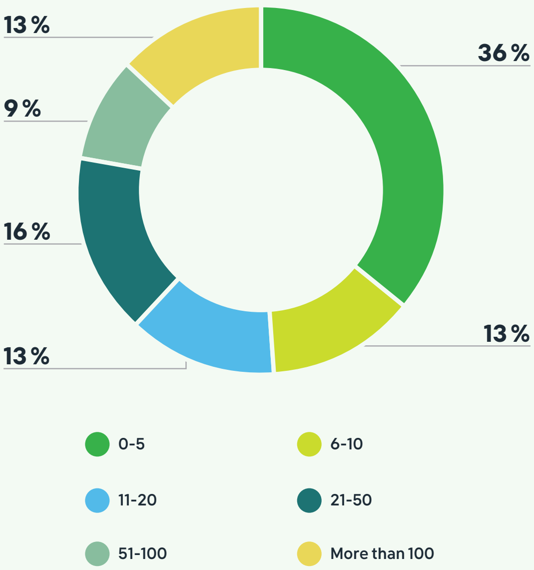
WHAT IS YOUR COMPANY'S REVENUE (LATEST 12 MONTHS)?



WHAT GROWTH STAGE HAS YOUR COMPANY REACHED?



HOW MANY FULL-TIME EMPLOYEES DOES YOUR COMPANY HAVE WORLDWIDE?



B) GLOSSARY

Average ticket: Average investment by stage of growth. This information is based on a representative sample of transactions.

EBITDA: Acronym for Earnings Before Interest, Taxes, Depreciation, and Amortization.

Hardware: Refers to the physical parts and components of a technological device.

Often paired with the term Software (see below).

M&A: An acronym commonly used in the transactions world for Mergers and Acquisitions.

Series A,B,C: The concept of Series A, B and C refers to funding rounds subsequent to seed funding.

Software: Refers to all programs, procedures, documentation, and means of use of a computer system or technology.

SPAC: Special Purpose Acquisition Company – A company with no operations whose securities are issued on a stock market with a view to a future acquisition or merger.

The term SPAC refers directly to the acquisition or merger.

Transaction funnel effect: Drop in the number of transactions as one advances through the growth stages, taking into account a process of natural attrition between stages as some companies "die" or do not move to the next stage.

Unicorn: A term used to describe a start-up valued at over US$1 billion. Refers more generally to companies that have enjoyed exponential growth and have quickly become industry leaders.

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