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CONSILIENT TECHNOLOGIES AND THE NEWFOUNDLAND & LABRADOR ADVANCED TECHNOLOGY SECTOR: THE SEEDING OF AN ENTREPRENEURIAL ECOSYSTEM

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Executive Summary

This is the final report for the Harris Centre Applied Research Fund project: *Consilient Technologies and the Newfoundland and Labrador advanced technology sector: The seeding of an ecosystem*. The work examines the effects of Consilient Technology's 2008 bankruptcy on the Province's nascent entrepreneurial ecosystem. While Consilient's bankruptcy was, at the time, largely viewed as a negative event for the ecosystem, the longer-term impacts have never been investigated. Interestingly, evidence from other geographical contexts indicates that firm failure can have positive impacts on entrepreneurial ecosystems. This study, with the passage of time enabling a more balanced analysis, addresses the gap in our understanding of the failure's effects on the ecosystem. The work addressed four main research questions:

1. What happened to Consilient's employees after the closure - specifically, did they find other jobs in the local ecosystem, in what types of firms, and in what ways did their new employers benefit?
2. How much of the human talent created/nurtured by Consilient was 'recycled' in the St. John's ecosystem?
3. Did Consilient's closure have other effects on the ecosystem above and beyond the recycling of its human talent?
4. What were the attributes of Consilient and/or the ecosystem that influenced the impact on the ecosystem?

Using case study methodology, we conducted 28 semi-structured interviews and analyzed LinkedIn data from an additional 40 former employees who were not interviewed. Interviewees included: Consilient's two founders, former Consilient employees, funders, industry experts, government, and board members.

Six main conclusions are drawn from the data analysis:

- Consilient acted as a strong mechanism for attracting and retaining high quality talent to the ecosystem;
- Consilient, by provided its employees with a rich work environment and unique experiences that allowed for substantial personal development, provided talented (recycled) employees to the ecosystem;
- Consilient, in training its personnel how to think entrepreneurially on a global scale, contributed to a change in the ecosystem's mindset;
- The vast majority of people who worked at Consilient quickly moved on to work with other emerging tech companies in the local ecosystem;
- The knowledge spillover from Consilient to the ecosystem was evident across many companies, industry leaders, local investors, and both levels of government; and,
- Finally, Consilient served as an exemplar for the ecosystem across a number of dimensions from its ambitions to securing local funding.

This report concludes with a discussion of considerations for government funders.

In sum, this work strongly suggests that the Consilient failure had many positive benefits for the entrepreneurial ecosystem.

1. Introduction

This study examines the effects of the bankruptcy of Consilient Technologies Corporation ("Consilient" or the "Company") in 2008 on the nascent entrepreneurial ecosystem in Newfoundland and Labrador (the "Province" or "NL"). While Consilient's bankruptcy was largely viewed as a negative event due to the loss of taxpayer's money, Consilient's wider effects on the ecosystem were never considered in the ensuing post-mortem. This newsworthy failure deserved a deeper examination to more fully determine both positive and negative impacts. Our curiosity was further piqued when we reviewed the existent literature and found that, in other contexts, positive impacts of firm failure were reported. This research is an attempt to address this gap in our understanding.

Generally, the impact of company failure on entrepreneurial ecosystems is under-examined (Spigel and Vinodrai, 2020). This omission is particularly significant in peripheral, economically lagging regions. However, this issue is important in view of the focus by government and others on entrepreneurship (and innovation) as an important tool for economic development. Government spends large amounts of money on supporting entrepreneurship and ecosystem development efforts. Their long-standing approach in economically lagging regions is to provide three types of direct financial support to companies. First are financial incentives to promote new start-ups in the region. This is a long-established approach that has attracted substantial criticism (Shane, 2009). The primary criticism is that the supported companies often close after a relatively short time and are then characterized as 'a waste of money.' Other criticisms are that the jobs created are often of poor quality (e.g., few high-level management functions) and have limited spillover effects. A second form of support is to provide assistance to firms to prevent them from closing. This approach is criticised on the grounds that providing financial support is unlikely to resolve the causes of the potential closure and more likely to defer closure to a later date. Third, and a more recent form of intervention, is support for the scale-up of local, especially technology-based, companies. Typically, this intervention is designed to help them overcome financial and, less commonly, other resource constraints. This approach is criticized on the grounds that, because of high start-up failure rates, there is an elevated risk that the support will be wasted. Consilient is an example of this form of intervention: it was a scale up company that was the recipient of millions of dollars in government support.

Supporting technology start-ups involves risk and so failures are inevitable and expected. Yet, the nature of media and politically-driven discourse often suggests that the outcomes of such investments are entirely negative – that there is no return from the public money that these companies received. The effect of this narrative is to discourage governments, and likely others, to take the risk of investing in technology start-ups. In this study, we adopt an ecosystem perspective to reassess the 'waste of money' narrative. We do this using a case study methodology whereby we examine the longer-term effects of the failure of a prominent scaling start-up in a lagging peripheral region that received considerable government and private investor support. This study, then, offers a distinctive perspective on the assessment of government support for technology start-ups and provides a more balanced analysis that is detached from the knee-jerk assessments offered in the immediate aftermath of failures.

The post-mortem following Consilient's closure focused on the economic implications and loss of public money that it had received to support its growth. However, a firm's repository of skills and knowledge embodied in its employees do not disappear when it closes but are likely to be recycled, benefitting other businesses in the ecosystem. There are also likely to be broader learning effects. However, this dimension of firm closure has attracted limited attention from scholars and commentators and, in the case of Consilient, has been ignored. This project's rationale is to challenge this perspective by examining the failure holistically and following the passage of time. This affords the opportunity to determine whether positive impacts occurred. Furthermore, our study has relevance beyond the specific case study, offering important insights for all governments that provide direct financial support to entrepreneurial businesses.

The research questions that this project addresses are as follows:

1. What happened to Consilient's employees after the closure - specifically, did they find other jobs in the local ecosystem, in what types of firms, and in what ways did their new employers benefit?
2. How much of the human talent created/nurtured by Consilient was 'recycled' in the St. John's ecosystem?
3. Did Consilient's closure have other effects on the ecosystem above and beyond the recycling of its human talent?
4. What were the attributes of Consilient and/or the ecosystem that influenced the impact on the ecosystem?

The remainder of this report is divided into five main sections. The first section reviews the research on entrepreneurial recycling and firm failure to highlight the research gap that this study is addressing. The second section puts the Consilient failure into context: it describes the Newfoundland and Labrador entrepreneurial ecosystem at the time the Company was founded; the Company's start-up growth and activities, including the support that it received from government; and its ultimate closure. Section three describes the research methodology and data. The fourth section presents the findings from our LinkedIn data and our interviews with former Consilient employees, stakeholders, and its founders. The fifth and final main section draws out the wider implications for policy-makers involved in the entrepreneurial ecosystem.

2. Background Literature

The literature relevant to this work can be divided into the nascent work examining entrepreneurial recycling from an ecosystem perspective and the more developed work related to entrepreneurial failure.

The recycling of resources – the flow of people, especially skilled workers, knowledge and finance between firms – is a key process that drives the emergence and growth of entrepreneurial ecosystems (Spigel and Vinodrai, 2020; Malecki, 2018; Ensign and Farlow, 2016; Mason and Harrison, 2006). Recycling is usually context dependent and influenced by place-specific institutions and cultures. Significant recycling activity is often triggered by particular firm-related events, notably the acquisition of entrepreneurial companies, ownership change in larger established entrepreneurial companies (i.e. exit of the founding entrepreneurs), the contraction and

closure of local operations by large multi-establishment companies and the failure of local entrepreneurial companies (Mason and Brown, 2014). The resources that such firms have created, enhanced or attracted can be a major resource for other businesses in the ecosystem. The recycling of people within the ecosystem is important in a variety of ways. People take the skills, insights, knowledge of company routines and markets developed in their previous work to their new employers. Younger and smaller firms, which are less able to acquire employees from outside the ecosystem due to factors like lack of recruiting expertise and the expense of recruitment and retention, are particularly dependent on recycling.

Despite the importance ascribed to recycling, there has been limited research on the recycling of resources from an entrepreneurial ecosystem perspective. Indeed, Spigel and Vinodrai note, "the lack of sustained engagement with questions surrounding the dynamics of recycling within ecosystems represents a major gap in the literature" (2020, 2). Prior research has tended to focus on recycling that arises from successful economic outcomes. One theme of this research is the recycling of entrepreneurial finances (Mason and Harrison, 2006) following an entrepreneurial exit in which founders and key management, with significant equity in the business, as well as investors leave the company and re-engage in the ecosystem as serial entrepreneurs, investors, institution builders, mentors, advisers, and board members. A second theme is the role of anchor firms - primarily their role as 'talent magnets' (Harrison et al, 2004) for drawing in skilled workers, embedding them in the region, developing their technical, professional and managerial competences – some of whom subsequently join other local startups or found their own firms. This process is identified in studies of entrepreneurial ecosystems that present,via company genealogies, the companies that entrepreneurs worked for immediately prior to starting their own companies (Spigel and Vinodrai, 2020; Alvedalen, 2021).

Although there is an extensive literature on entrepreneurial failure that examines the attributes of the entrepreneurs of failed businesses, the personal impacts of failure on entrepreneurs, the characteristics of failed firms, and the reasons for failure, much less attention has been directed to the impact of failures on their ecosystems (Spigel and Vinodrai, 2020; Alvedalen, 2021). By releasing skilled technical and managerial employees that can be absorbed by other businesses or who start their own businesses, closures can have a positive impact on entrepreneurial ecosystems. However, the extent to which these benefits arise are context specific, dependent on factors like the nature of the employment in the business, the ability of the ecosystem to absorb and use this talent effectively, and whether workers leave for opportunities elsewhere.

In one of the few studies that has focused on the impact of a firm failure on an ecosystem, Spigel and Vinodrai (2020; see also, Alvedalen, 2021) track former employees of smartphone manufacturer Blackberry in Waterloo, Canada following its contraction. However, Blackberry's severe contraction is different from Consilient's failure. First, it was a contraction, not a failure; second, it was an anchor firm in the Waterloo ecosystem (Consilient, while high profile, was not an anchor firm in the ecosystem); and third, the Waterloo area is not an economically-lagging peripheral region. Nonetheless, Spigel and Vinodrai's work and other studies suggests that there is a link between the contraction and failure of established businesses and start-up activity (Harrison et al, 2004; Alvedalen, 2021). So there remains the important question that has not been addressed: whether the contraction or closure of businesses also triggers recycling processes in

under-developed ecosystems and is this process a key driver of entrepreneurial activity in small, under-developed ecosystems where large anchor firms are absent?

These gaps in the literature are the focus of our study. The empirical evidence that we present engages with two significant themes. First, it is the first study to address recycling processes following company failure in a small, immature ecosystem in a peripheral, economically lagging region (and, contrary to the existing literature, our focus is not on the failure of anchor firms but on a recently formed technology business that was in the process of scaling-up). Second, the focus is on a company that had received considerable investment from government in an attempt to kick-start the region's embryonic ecosystem. We also engage with the issue of whether this investment was wasted, which was the dominant narrative in the immediate aftermath of its failure.

3. Consilient in Context

In order to understand the potential impact of Consilient in the Newfoundland and Labrador context, particularly as it relates to the advanced technology sector, this section considers the sector prior to the formation, during the growth, and after the subsequent failure of Consilient.

3.1. A Short History of the Newfoundland and Labrador Entrepreneurial Ecosystem - Advanced Technology Sector

Though somewhat arbitrary, the story of the entrepreneurial ecosystem related to advanced technology in Newfoundland and Labrador can begin with the creation of the provincial crown corporation, Newfoundland and Labrador Computer Services Limited ("NLCSL"), in 1978. NLCSL was the organization that the provincial government created to manage its computer systems. It was located in St. John's, the Province's capital city. During the period between 1978 and 1994, various technology start-ups emerged in St. John's. For example, Compusult Limited started as an IT consulting company in 1985 and remains a going concern. Another company, ZeddComm Inc., was established in 1992 and became an IT consulting firm. It subsequently split into two companies, ZeddIT Solutions Inc. and Bluedrop Learning Networks Inc. Both ZeddIT (now known as Vision 33) and Bluedrop continue to operate. Numerous other IT firms opened and closed their doors during these early days of the Province's technology industry.

In 1994, the government privatized NLCS. At that time, a consortium of three companies led by NewTel Enterprises Limited purchased NLCS and renamed the company NewTel Information Solutions (NIS). The government contracted out its own IT services to NIS with the condition that NIS would create service agreements with local IT companies to act as subcontractors. This was a pivotal point for the ecosystem. These government-imposed conditions were intended to stimulate growth of new businesses and jobs, develop supply chains, and increase the skill levels of those working in the technology sector. Although the deal did not produce the results that were agreed upon (Auditor General Report, 2006), several IT consulting companies took advantage of the subcontractor arrangements to gain valuable skills and knowledge. The industry benefits agreement between the government and NewTel lasted until 2005 when the government created an internal department to manage its computer systems. Thereafter, IT consulting firms could bid directly to supply the government's IT service needs.

Concomitant with the development of NIS subcontractor firms, between 1995 and 2000, several companies with greater ambitions emerged in the ecosystem. Notable among these was Stratos Global. Founded in 1995, the company entered the global satellite communication space. Stratos relocated to the United States in 2000. Another prominent company was Telepix Imaging, incorporated in 1996, which developed software for digital photo kiosks. It was acquired by a large multi-national company in 2000. A Telepix spin-off, Beaufort Solutions is still operating in St. John's. Two other important developments occurred in the 1990s. First, what is now known as TechNL was established in 1993 as a not-for-profit industry association representing the Province's technology and innovation sector (www.technl.ca). By 2021, TechNL had over 140 members and delivers multiple programs and support in the technology sector. Second, in 1997 the Genesis Centre incubator was launched. The Genesis Centre is located on the premises of the Province's only university, Memorial University of Newfoundland and Labrador (MUN). Since its launch, the Genesis Centre has developed an international reputation as a leading high-tech incubator. According to its website (www.genesiscentre.ca), by 2021, Genesis-supported companies had raised $620M in private capital, generated $220M of annual recurring revenues, and employed more than 2,000 people.

Over the past 20 years, there has been a steady increase in the number of technology startups and the ecosystem has started to show signs of maturing. Companies are being recognized as leaders in specific industries and announcements of multi-million dollar funding rounds and acquisitions are no longer uncommon. Support organizations compete to find a distinctive role in the larger ecosystem. MUN has success with spin-off companies. The Province's only public college, College of the North Atlantic, started creating prototypes and solving technical issues for small start-ups. Angel investors and a small number of venture capitalists now play a role in financing early-stage companies. In 2015, the Newfoundland and Labrador government announced that its first early-stage venture capital fund for innovative, scalable start-ups would be managed by Pelorus Venture Capital Limited. Both federal and provincial funding programs are now more predictable and focused.

One remarkable company in this developing ecosystem was Verafin Inc., a firm developing software and services to detect money laundering, fraudulent transactions, and other related suspicious activities in banking systems. Four graduates from MUN established Verafin in the Genesis incubator in 2003. In 2021, the company employed over 600 people, and its products were used by over 3000 banks in North America. Verafin raised several large rounds of venture capital, including a record-setting investment of $515 million CAD in 2019 from American and Canadian investors. To date, this represents the largest-ever venture capital deal in Canadian history. The company was acquired by Nasdaq in 2020 for US $2.75 billion. As a condition of the transaction, the headquarters for Verafin remains in St. John's and, as part of the deal, Nasdaq donated $1M USD to the Genesis incubator. It has continued to expand both revenue and employment since acquisition.

3.2 Consilient Technologies Corporation

Against this backdrop of the development of the local ecosystem, Consilient Technologies Corporation was incorporated in June 2000. It was co-founded by Trevor Adey and Rod White, two former executives from Stratos, to develop products for the global wireless handheld device market. At that time, it was one of only a handful of technology-based companies in the province

that were developing their own products and pursuing international markets. The Company made headlines in 2001, when its software was used by the New York Fire Department to help firefighters tackling the 9/11 Twin Towers fire communicate better on their Blackberry smartphones. Consilient also attracted attention when it was announced that it was collaborating with Research in Motion (the maker of the BlackBerry smart phone), arguably the most successful technology company in Canada at that time. In an interview with the Globe and Mail newspaper in 2002, Adey and White stated that they were "hungry to do something concrete to turn Newfoundland and Labrador into a knowledge and industrial centre that can rival any in Canada" (Pitts, 2002). Consilient grew from 4 employees in 2000 to 24 employees in 2002, to 55 employees in 2005, and reached close to 100 employees before it closed in November 2008.

Consilient relied heavily on government grants, conditionally repayable grants, and loans to finance its growth. Between 2000 to 2008, it received approximately $7.7 million dollars from the Atlantic Canada Opportunities Agency (ACOA), a federal agency that works to create opportunities for economic growth in Canada's four Atlantic provinces. Consilient also attracted angel investment from local business people, many of whom sat on its Board of Directors, and was one of the first companies in Newfoundland and Labrador to obtain venture capital funding from a private equity firm. In 2006, Consilient was among the first provincial technology firms to open international offices – one in Silicon Valley and one in Singapore.

Consilient exhibited many signs of early success. It won several awards, including the Asia Mobile Innovation Award in 2007. In 2004, Adey received the Canadian Top 40 under 40 accolade. The company had the reputation as a place where those interested in the tech industry wanted to work. The technology was cutting edge, the Company was addressing complex challenges, the customers were global, and the culture was fun. Through its public relations efforts and astute marketing, the Company quickly developed a high profile both locally and nationally. Consequently, Consilient took on symbolic importance as the Company that politicians and others referred to when they discussed what economic success looked like in Newfoundland and Labrador.

However, this early success proved to be unsustainable. Consilient ceased operating in November 2008 in the midst of the global financial crisis, when its venture capital firm investor, the Quorum Group, lost faith in Consilient's ability to become profitable and foreclosed on its loan. Consilient was unable to repay the debt. The Company's demise attracted considerable negative media coverage, much of which focused on the loss of money that the firm had received from ACOA and the province.[1] Although not central to the themes of this report, the reasons for Consilient's failure seem relevant to further understanding the Company and the state of the advanced technology sector during this time. Key players in the Company are keen to point out that Consilient's collapse was all about timing, market dynamics, global economics, and the risk aversion of a powerful stakeholder who refused to stay the course and support the Company's business plan. The CEO of the Company, Trevor Adey, is quick to point out that the end of Consilient had nothing to do with Newfoundland and Labrador.

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[1] The $7.7m CAN in loans that ACOA provided to Consilient represented 20% of the $38.8m of loans that the agency wrote off in Newfoundland and Labrador between 2000 and 2010. https://www.saltwire.com/newfoundland-labrador/news/acoa-write-off-388-million-125867/

4. Research Methodology

This case study is based on information from 28 semi-structured interviews with Consilient's two founders, former Consilient employees, funders, industry experts, government, and board members (Tables 1 and 2) as well as LinkedIn data analysis (following the methods of Spigel and Vinodrai, 2020). 72 individuals were asked to participate in this research, 59 of whom were former Consilient employees;19 of these individuals were interviewed. All interviews, except one, were conducted between September and December 2020, with the last occurring in March 2022. In view of the COVID-19 restrictions in place at the time, all interviews were undertaken using a video link, usually either Zoom or Webex. Through LinkedIn data, limited information was gleaned - work and location history - on many of the 40 former employees who declined to be interviewed.

The project was initially vetted and approved by Memorial University's Interdisciplinary Committee on Ethics in Human Research on September 1st, 2020. In accordance with requirements, the same body extended this approval annually for the duration of the project. Also, in accordance with ethics requirements, all individuals contacted for interviews were identified from public sources like LinkedIn.

Table 1: All Interviewees

Role	Number
Consilient Employee **(E)** - including founders Adey & White	19
Non-Employee **(NE)** – Funder	1
Non-Employee - Industry Expert	7
Non-Employee – Government	1
Total	**28**

Table 2: Former Employee Interviewee Position at Consilient

Role	Number
Founder, Senior Management	3
Manager	2
Technical	8
Non-technical (e.g. Marketing)	4
Other (e.g. work-term student etc.)	2
Total	**19**

The first and second named authors conducted the interviews with, in some instances, the assistance of an undergraduate Research Assistant.[2] Interviews ranged between 20 to 67 minutes

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[2] In view of Dr. Bartlett's close connection to Consilient, she did not participate in the interviews, though, being a former Consilient employee, she herself was interviewed. Additionally, to further ensure interviewee anonymity, Dr. Bartlett did not have access to interview transcripts.

in length with an average interview length of 31 minutes. The interviews were transcribed using otter.ai transcription software. The resulting transcripts were edited manually for veracity and clarity. The semi-structured interviews with former employees consisted of questions around four themes:

- their work history prior to joining Consilient;
- their work history while with Consilient;
- their work history since Consilient; and
- the effect of their Consilient experience on this history.

The semi-structured interviews with non-employees consisted of questions around two main themes:

- their involvement with Consilient; and
- Consilient's impact on the St. John's advanced technology ecosystem.

This work used well-established case study methodology (Yin, 2013). Our data analysis proceeded using an inductive approach over three main stages (Denzin and Lincoln, 2017; Gioia, Corley, & Hamilton, 2012). In the first stage, the interview transcripts and LinkedIn data were reviewed. At this stage, the main objective was to identify the impacts of Consilient's failure on the ecosystem. In the second stage, the analysis focused on the emerging themes and understandings generated in the first phase. We categorized the impacts into themes based on similarity and assessed frequency (i.e. how many interviewees mentioned the same or similar impacts), while highlighting any differences that were apparent. In the final stage, we revisited the data interrogating and confirming our stage one and two findings and analysis to ensure their accuracy.

5. Consilient's Impact on the Ecosystem

We now consider the impact of Consilient's failure on the entrepreneurial ecosystem. With noted exceptions, the data clearly illustrates the positive impacts the Company has had on the NL ecosystem. In this section, we will highlight five themes that emerged from the data: first, Consilient's role in attracting and retaining talent, especially recent university graduates, from within the Province, as well as luring Newfoundland and Labradorians back to the Province; second, the ways in which Consilient provided a rich entrepreneurial and technological learning environment for its employees, which was uncommon in NL at the time; third, how many of Consilient's employees were quickly absorbed by other businesses and organizations in the ecosystem after the Company shut down; fourth, Consilient's role in stimulating start-up activity and an entrepreneurial mindset; fifth, other forms of knowledge and learning that employees transferred into the ecosystem; and sixth, Consilient's obvious demonstration effects on the ecosystem. We then note the limited and predominantly short-term negative effects of Consilient's failure before concluding with a discussion of the considerations for public funders as a result of our findings.

5.1 Talent Recruitment and Retention

Our data shows that Consilient acted as a strong mechanism for attracting talent to, and retaining talent in, the Province. Of the 59 former Consilient employees we were able to identify, 45 (76%) indicated – either in their interview or on LinkedIn - that they are still in NL. Significantly, a large majority of those we interviewed stated they would not have stayed in (or returned to) NL had it not been for Consilient.

Consilient quickly emerged as an attractive company for software engineers. The work was seen as exciting, challenging, and innovative. Trevor Adey emphasized that *"We didn't want to be a services company. We wanted to build a product where we own the intellectual property…that's where the value was, as opposed to the service,* [where] *you got paid by the hour."[3]* An employee observed:

> *"There was a bit of a buzz around the city amongst people my age…[The] technology that they were looking to get into was the latest and greatest in … mobile technology at the time. Of course, the landscape is very different now. But at the time, that was the leading edge of telecommunications and handheld devices. So there was that interest."* (E18)

And another commented that *"we were building a new technology that was really on the leading edge, and at the same time trying to kind of inspire the market, that it would hopefully someday flood. …. that was very exciting."* (E4)

Consilient's scale of operation and potential for growth were also attractive, one employee noted:

> *"I started looking for something that had…multiple software development teams with a structure above that…a little bit more formal. Consilient fitted the bill. At the time, it was maybe 120 employees, of which maybe 80 were involved directly in software development."* (E9)

Another commented as follows: *"I knew we were doing cutting edge technology…. [We] were really pushing, cutting, cutting edge technology in a way that if it took off, it could really be a big thing. … We knew it was a technology that was going to catch their [Google and Microsoft] interest. It was just a question of what happens when it does."* (E4)

The work environment and culture were also attractive.

> *"They had a very strong team based environment there. They had a …. tech startup type environment where like, you know, hey, it's like Friday afternoon everyone go, let's go play the Wii in the lobby in the kitchen because that's like the kind of environment set up ahead. There's like they had a nice kitchen with all this kind of stuff. And then there was like, couches and TVs and this kind of stuff, relaxed environment where you could, you know, blow off a bit of steam play together here, your fellow, you know, company teammates type things. I really enjoyed that. … That was the one of the things that brought me initially, it was just like this kind of friendly*

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[3] In order to preserve the anonymity of interviewees, quotations were not attributed to specific individuals or their roles. However, we do differentiate between former employees and other interviewees. The one exception was our interview with Trevor Adey, one of Consilient's founders, who asked that his comments be on the record.

environment that you don't see at larger companies. …. it does draw on younger people, but it brought me in, but it's not what kept me there." (E2)

Consilient's founders also recognized the importance of attracting high quality employees to the success of the business and the data suggests they achieved this aim. One employee commented:
> *"Entrepreneurial companies need … phenomenal employees …[It is] important that employees are happy and satisfied by their job…how important it is … to have employees who would work hard and get a good job out of working for an entrepreneur…if you are going to take a company big you've got to have people happy working for an entrepreneur rather than government or academia." (E21)*

Consilient also played a key role in talent retention. First, it recruited new and recent Bachelor and Masters graduates from MUN, particularly graduates in computer science, engineering, mathematics and physics, either immediately or soon after graduation. A Professor of Engineering noted that:
> *"They were certainly hiring our graduates, particularly international students at the time. Consilient would regularly hire bright, international graduate students who finished their masters or PhD programs at Memorial. And that was really unusual at the time…It was really unusual for a company at that time to be interested in graduates who had some background and aspirations to be involved more in research and development, and probably from their point of view was more involved in innovation."* (NE7)

A former employee commented that Consilient "*employed a lot of young, younger people, it was very young environment.*" (E3)

> *"It was a real kind of tight group…We were mostly close to the same age. A few people were a bit more senior. We were all really young. We had a group that was really similar in age group, and pretty similar backgrounds and stuff. And we're all Newfoundlanders. Eventually we had some people that came in …. that were weren't from home, or from here, but the first group were all from Newfoundland."* (E5)

Without Consilient, many are likely to have moved away from the Province. The scale of out-migration of talent was highlighted by one respondent, who noted that: *"In my* [MUN] *computer engineering class of 10 to 12 people* [after] *graduation, I think probably about 60 to 70% of my class moved to the mainland. They work in Ontario or down in Silicon Valley."* (E2)

A MUN graduate in computer science commented:
> *"I was planning to take some time off school and then figure where I was going to move away … There was really nothing I thought happening here in Newfoundland with respect to software development….. I had … a couple of jobs here, and then I figured I knew that some people had left* [name of company] [to work] *at Consilient. That made me think that was an opportunity to still stay here. I didn't want to move away… So Consilient was a way to stay here."* (E17)

Another commented:

"We had always intended to live here if we could, but we wouldn't have stayed around ... if things were not looking promising. So, I think that the Consilient opportunity allowed us to stay here ... Because at the time, there weren't like millions of opportunities here." (E11)

Another Newfoundlander joined the Company when it was less than a year old, with just 5 or 6 people, because *"I was trying to stay here. I wasn't looking abroad. I don't know if I would have but the need never arose for me to look beyond St. John's."* (E10) In other cases, employees had worked for other local companies before being recruited by Consilient, the effect of which was to anchor them in the Province. For example, a MUN graduate with a BSc in Math and Physics moved to Toronto where he worked with some local companies, coming back to St. John's two years later. He subsequently joined Consilient as a software developer: *"There wasn't any other firm or company in the in the city at that time that had really any interest to me, other than Consilient."* (E18)

Consilient also became a magnet for those who had moved away, either to study or to work. One respondent who had studied computer science in Nova Scotia, then worked in Ottawa and New Brunswick, returned home to get a job at Consilient because *"I saw what they were doing on mobile ... they were doing some innovative things back here ... so, my goal was to try to get to work for them. So, they did draw me back, I think, and I came home."* (E5)

Another respondent – a BEng from MUN – had worked for Nortel in Ontario for eight years.
"I was looking to come back .... The usual reasons - kids were getting old enough that they ... [should see] grandparents more and that kind of stuff. But I wasn't coming back without the right the right position and the right compensation, which at the time was a problem and in St. John's ..... Consilient had a strong need for talent at the time. .... They were one of the places that could afford me at the time." (E6)

Another respondent with a BEng degree from MUN who had left Newfoundland to take up employment came back after a year because *"we decided in the end that we both* [partner] *wanted to be at home."* He initially got a job with another local tech company, before subsequently joining Consilient as a software developer: *"And ever since then, you know, we've taking roots here and have no intention of going anywhere else."* (E19)

In summary, Consilient's initial impact on the local entrepreneurial ecosystem was that it "*drew plenty of competent resources back in the town ... it drew people back in, it kept people in place that probably would have left and went somewhere else. And we're still kicking around in town."* (E6)

5.2. Learning Culture

Not only did Consilient attract and retain talent, it also developed it. In addition to interview data, our statistical data from LinkedIn indicates most employees were given both increased responsibilities in their specialist area and/or the opportunity to explore beyond their specialty (e.g., technical person asked to take on marketing or general management responsibilities).

Consilient provided its employees with a rich work experience. Several former employees used the same phrase: "*It was a very positive experience.*" (E2, E4, E9, E10) A strong and consistent theme running through the interviews was that working at Consilient provided a unique learning experiences and personal development. This comment from a former employee was typical: *"I do think it was a very positive experience for me. The staff was great. The environment was great. A lot of learning took place."* (E4) Another commented:

> *"There is a core group of us that really grew together. We learned how to work together, we made a lot of mistakes, like I can't imagine like the, you know, the amount of times we try to do things we kind of were experimented with stuff, and it was uncomfortable. ... We were all on the brink of burnout for the longest time. And but it taught us a lot ... and we wouldn't learn that any other way. And we had the opportunity to do it."* (E5)

Several employees attributed their learning to rapid promotion to management roles. One commented "*we moved into leadership positions pretty quick. I was under 30 when I joined. .... Lots of maturity that happened there." (E5)* Another commented that *"after two years, I, I took the lead manager role for managing a team of like five to six workers."* (E1)

Various forms of learning can be identified from the data. One former technical employee commented as follows: "*every day* [there were] *problems in front of us that we needed solved. It...had a tremendous impact on my overall trajectory, of my career, how I thought about working in businesses as opposed to solving technical problems."* (E18) Elaborating on this point further, the employee commented:

> *"My technical understanding of Java object-oriented languages increased dramatically during those years that I was there. Largely because of the folks that were in the building with us. There were a lot of really bright young people looking to do the latest and greatest with these devices and over those networks, so I would say certainly was, was huge in that respect to my technical knowledge took a major jump forward with respect to Java."* (E18)

Another noted:

> *"We were working in a space that would, very shortly after, be taken over by the smartphone industry, So we were working with Java phones and BlackBerries. These were the only kinds of devices then you could get software of any kind on! So that was the kind of experience I got, a type that I wouldn't have gotten anywhere else."* (E19)

Another observed that Consilient *"...was doing the tech heavy stuff that I needed to learn... even now, like in my current position,* [it] *is still applicable and useful..."* (E2)

A second source of learning arose from the variety of work experience. One former employee noted that Consilient employees:

> "*got exposure to lots of different things...that was a really exciting time, it was a scary time, but like, it was all valuable experience, all of those things that our little team could come together to achieve. Yeah, like it, it's probably impacted my career more than most of my experiences...Consilient really seeded a lot of my experiences"* (E11)

Another, who is now a consultant working with startups, remarked on the different aspects to their learning, noting that:

> *"…it was definitely a lot of learning experience….both specifically related to my work and the kind of work I was doing in terms of software testing and quality control. But as well, it was a very interesting learning experience from the perspective of marketing and software design. Because we, the company, faced some interesting challenges in those regards. And it was interesting to see the company pivot and deal with those issues…"* (E4)

This theme, that working in Consilient provided varied experiences, was also emphasized by another former employee:

> *"I was able to take on a number of different roles……, and it meant that I was able to see a lot of different aspects of the business pretty early on in my career. So I got exposed to the real technical, nitty gritty …. but then I was also in the product management world working with clients and requirements, that more business analysis kind of thing, that which is what I actually do now, so, and then because I was part of the leadership team there, I got exposed to all of the things happening on the management side. So, for me, it really exposed me to a lot of critical areas of the overall lifecycle and people that I've been able to use as I've, I've continued on in my career."* (E11)

Another, who became an entrepreneur, commented that,

> "*everything that did happen, good or bad with Consilient, I view it as a positive experience. The whole experience is positive for me now looking back at it, even though I wasn't entirely happy when I left because of how I had to leave. But it's all been constructive and helpful. And I don't know that I would have had that kind of broad experience in any other business. If I* [had taken] *the other job that I'd been offered at the time, I would have been in a cubicle writing code. And I probably would have left that job out of frustration after a while and gotten to something else. And I'd be just another programmer, another engineer in the city, going from company to company. But just having that experience of seeing the company with no cubicles, just those five desks in the middle of a giant room when I walked in, and getting to know everybody really well. And watching it all grow from five people to 95 or 100 people. And being involved in all the, all the teams and all the big steps along the way. It has changed the way that I see things and the way that I think about things...*" (E10)

Another highlighted the learning benefits of working in an international company: *"I certainly got a lot of traveling. And we were big in Asia…. I got to visit Thailand, and Singapore. Malaysia. So you know, that's not something you do every day. So it broadened my horizons, I would say in that way."* (E7) Another commented that Consilient's clients were *"overseas or in the US";* it had an office in Silicon Valley "*so we learned a lot from working with Silicon Valley people."* (E15)

Importantly, the Company exposed technical employees to business and management learning. A number of former employees mentioned this learning impact:

"Because I had built that product, I was called into sales meetings with customers to be the technical salesperson. That's how I got into the business development role... And likewise, because I was the person behind the product, I evolved into product manager for that as well. And as we were building up the software development team, I was managing that. And as we engage with more customers, I had to do customer support myself, but then couldn't keep up with all the customers. So I had to start hiring customer support people. And I build that out as well. So that's, that's how I ended up with all those different job titles is that I started the product." (E10)

"I'm not only writing software ... but like, you know, [when] you're working for these smaller companies, you also get to see how like how the business side is really working because like, they'll have the developers in these business meetings because it'll help them give them input on this kind of stuff. And every small company I've worked for has had that kind of environment where there's a large crossover between marketing and developers, which is something you just don't see at larger companies. [In] larger companies, you work in your tiny developer team. And that's all you ever see you don't see the full picture." (E2)

"If I stayed on a government contract, I would never have experienced what I experienced there in that timeframe...to grow and got to, like, be a bad leader for a while, to be honest. And then learn how to treat people better. And learn what expectations are and how you manage performance, but also still caring for people. I had to go through that there [Consilient] to learn some of that stuff." (E5)

"I started as a developer. I was a developer for the first year or so. .... And the next thing I was co-managing the quality assurance team. .... And I became a technical product manager after that. So, I advanced in a series of progressively more responsibilities, roles, more responsibilities over the first few years that I was there." (E11)

"I do think that the knowledge I gained, not just in what's possible, but how a software company operates in the new century. And what is possible from a point of view of technology was definitely the biggest jump I've had, ... I'm still fairly fresh out of school and you don't have an opportunity to see a whole lot of change and in large enterprises, but there were no rules about what the change was, it was every day [there were] problems in front of us that we needed solved." (E18)

Other employees highlighted their exposure to global technical sales, a skill set that was (and, arguably, still is) in short supply in peripheral regions, such as Atlantic Canada.[4]

"At Consilient we had a lot of direct involvement between the customer and customer support staff, but also the sales people and even the developers to keep building the

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[4] Notably, Gerry Pond, an early investor in Q1 Labs and Radian6, two of the most successful tech companies in Atlantic Canada, which were acquired in 2011, expressed the view that Atlantic Canadian companies cannot scale to significant size without greater expertise in selling to international customers without people who can sell technology in the global market place. These skills are in short supply in the region (Entrevestor: Pond Offers $500K for Sales School, 20 February 2015, https://entrevestor.com/home/entry/pond-offers-500k-for-sales-school)

product out the way the customers wanted. So I would say at least half the company, even when it got to 100 people, had engaged with customers. Mostly North America, but as far away as Australia." (E10)

Another impact was learning about the product development process. A Consilient co-op[5] student commented that

"*being exposed to… creating this new product - this revolutionary idea to get emails on your cell phones - definitely helped for sure. I'm thankful for all of my work term experience, for sure… It gave me appreciation for all of the, like testing and work that goes into developing a new product."* E12

Some of the learning was highly specific. One employee commented that the Consilient experience increased his understanding of startup funding.

"[The learning] *gave me a new …. understanding of how venture capital works, and how funding works and how you need to leverage it, and how you need to make decisions about, when you have funding, how to spend it, right and how to utilize it to try to get back ROI* [return on investment] *and those kinds of things. So that level of understanding I never had, until I worked at Consilient…So we got an understanding for how those funding mechanisms work…all those type of programs that the government has that you can leverage with a technology company and all the reporting we needed to do. I learned all that too. I wouldn't have learned any of that, if it wasn't for Consilient.* (E-5)

Another commented on how Consilient's role in developing human talent was particularly important because of the numbers of new and recent graduates that it recruited.

"When I look at the people that have come out of Consilient, and what they did, especially the younger ones … it was their first job. And I look at what that achieved for those people. It was the very practical end of university for them. It was a learning practical learning experience. And, and they learned a lot, whether it was engineering, corporate stuff, you know, they learned a lot." (E13)

Some former employees also highlighted the value of the networks that they had developed with those they had worked with at Consilient.

"If I was out of a job tomorrow and looking somewhere, these are some of the people that I would reach out to … throughout the industry throughout the city, to say, you know, do you have an opening over there? …. We know each other, we know the shared experience we have, we have some idea about one another's skill sets." (E5)

Another commented that:

"There's people who I worked with who I still am in contact with today. They've moved on, like, for example, there's the [local technology firm] people, there's at [local technology firm], there's a bunch at [local technology firm] and also a bunch of people went to work for places like [Ontario based technology firm] …Having all those sort

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5 A MUN Co-op student would typically spend a 4 month period (i.e. semester) working in a business, three times during their undergraduate program of studies.

of contacts…it kind of gives you if I need to, I can reach out and tap into this, these
sources of information or these contacts, turn it into something." (E9)

An interviewee who had a co-op placement at Consilient commented:
"I didn't get as much out of the work at Consilient as hoped…. I was busy. But in terms
of learning a lot, I don't feel that I was really exposed to a lot. …. I think I didn't really
get guidance that I was looking for. So, I didn't really get to know as much as I think I
could have. I would say probably some of the tasks I was given, probably should not
have been assigned to me without any prior technical experience or knowledge." (E3)
However, the same interviewee conceded that they would not have found their way to their
present company had it not been for the Consilient experience: *"I've always worked in digital*
and technology and web based. I haven't done anything else. I don't know that I would found
my way there without that [Consilient experience]*…"* (E3)

5.3 Talent Recycling
Most of the staff that worked at Consilient moved to other firms in the local ecosystem. Some left
in the months before its closure, having seen the "writing on the wall." (E5, E13, E15, E17, E19)
One of the most frequently mentioned aspects of the Consilient story was that other firms in the
St. John's ecosystem immediately hired almost every employee. This was supported by the
LinkedIn data, indicating a high level of employment continuity. As already highlighted, the data
indicates that Consilient employees were highly employable, they quickly found local employment
in the ecosystem, and, indeed, many remain in St. John's to this day.

As one industry expert observed:
"These people did not pack up and move somewhere else or say, 'okay, that's it for the
technology business. Now I'm going to open up a bed and breakfast'…Most of the
people at Consilient found other employment or had been headhunted by other
technology companies to come onboard with them. So … most people were taken into
the ecosystem. It was very seamless." (NE5)

One industry expert (and local entrepreneur) characterized efforts by local companies to hire
Consilient staff as *'a feeding frenzy'* because *"they had some really good people."* (NE8) Another
industry expert, reflecting on the fate of employees, noted that they had, *"dispersed throughout*
the rest of the ecosystem. … a lot of subsequent companies that have started off in Newfoundland
and Labrador, you'll find, they are somewhere on the Consilient family tree." (NE6)

An industry expert (and local entrepreneur) whose firm *"ended up taking a lot of their people"*
commented that *"…they were fabulous. … they're fabulous, because they learned about things"*
which demystified the process of working with large companies *"these people … had negotiated*
or worked on international deals they had experience in dealing with these big [firms]*"* (NE2).
Employees themselves reflected on the hiring phenomena mentioned that it was not just because
of their *"technical ability. It was* [also] *the ideas about what they could do and how to do it and*
operational type things process…all that stuff?" (E18) *"Because everybody had these skills …*
they were able to go and take to these other companies." (E11)

Moreover, a number of respondents observed that the recruitment was rapid. For example, one commented:

> *"When it was known the Consilient people were available ... like everybody was a lot of buzz because they knew the Consilient people were available and people were trying to get everybody in the job within a couple of weeks. And I think that spoke to the quality of the people and the calibre of what was coming out* [of Consilient]. *The team that was left had no trouble winning jobs. ... we* [were] *in demand. People had lots of opportunities available to them. And you will find them now seated in all of the success stories around.* (E11)

Indeed, one former employee commented that the official announcement of the closure was "*at four o'clock on Thursday. And on Friday afternoon, I was doing reference check calls and recommendations for people ... The industry in town was hungry, looking for people.*" (E6) Another noted that former Consilient employees "*had interviews which resulted in a job offer the day after closure.*" (E4) And another commented that "*once the word went out that the company was closing 60 to 70% of the employees had a job for the day. There was already an immense demand for those people ... [That] helped keep the skill pool here. .... those people then just went on to work for other startups in the area.*" (E2)

Typically, Consilient employees went to other technology startups, one employee noting that former employees

> *"went to work for other emerging tech companies .... And a lot of people did consulting ... I kept gravitating towards these companies that are scaling up ... 100 people, 300 people because the culture was good. It goes back to the time I spent that Consilient where you got close connections with the people you've worked with. And we were able to move quickly. .... I found in bigger organizations like IBM, personally, I wasn't rewarded there, because I couldn't make an impact on the company at all...I want to be in a role where I can make an impact.*" (E5)

Local tech companies in the ecosystem were therefore able to take advantage of the talent that Consilient developed. As one employee forcefully argued, *"If you look at the Consilient diaspora, I would say that it is core to a number of significant companies."* (E7). Indeed, one former Consilient employee (E4) who left before its closure commented that he actively tried to hire former Consilient people. This point was further developed by another former employee, who stated:

> *"I think Consilient seeded the landscape ...[It] provided all these highly qualified, educated people with valuable experience ... at a time when things were still fairly immature. .... And all of these people got this really meaningful experience, international experience. .... and we're able to go and take that out into the marketplace."* (E11)

It is significant that a number of interviewees highlighted the flow of Consilient employees to Verafin, which, at the time, was still in its infancy. One noted that Consilient *"started losing employees to Verafin ... [when it was] very, very small, I guess just a Genesis client graduating out into their first space."* (E10) Another commented *"most of the people who left Consilient*

ended up at Verafin." (E17) Another, again, noted that *"a lot of guys I worked with* [at Consilient] *who started with are over here* [meaning Verafin] *now."* (E16)

A large percentage of the employees engaged in management positions at Consilient also continue to add value to the ecosystem in various positions. One industry expert noted that *"there's deputy ministers or assistant deputy ministers who played key roles. There's senior people in federal funding agencies now who played key roles."* (NE7) Still others went on to teach entrepreneurship at MUN and act as mentors for other start-ups in the local sector.

5.4 Stimulating Entrepreneurial Mindsets

Throughout the interviews, many respondents referred to their learned experiences by facing challenges, overcoming obstacles, creating networks, working as a team, dealing with failure, learning how to pivot, understanding how markets development, and maturing along with the Company. The employees became part in decision-making conversations about the future of the products and market demands. They learned how to adapt to a volatile industry and remained committed during periods of uncertainty. These aspects all relate to what is known as the entrepreneurial mindset, a way of thinking that can be developed over time (Daspit et al., 2021). These entrepreneurial mindsets became imbedded in other local firms.

Consilient employees noted that their experience provided valuable entrepreneurial learning. Many learned about the startup and entrepreneurial process. One commented that his experience at Consilient *"opened my eyes to the possibility that….you can build businesses around ideas, and not necessarily around something tangible."* (E18). Another noted that Consilient was a valuable role model:

> *"[Consilient was] showing the art of the possible for other companies that the export side of things that, you know, we could be doing something here that was more relevant somewhere else. We had clients in North America as well, but in the later years, it was all focused on Asian market. And I think that [this showed] … to people here to say that you could … do quality work here, meaningful work that was relevant for other parts of the world. …. So I think …. that was useful for people to see that that could happen."* (E11)

Another commented that Consilient *"taught those 100 people* [referring to former employees], *or at least a good chunk of them, how certain parts of businesses work, and that you can just create a business if you have a good idea and gave them connections, as well to be able to do that."* (E10)

Referring to his own experience, this respondent, a graduate in computer science and mathematics - elaborated in greater detail:

> *"When I went through university … I had no idea …. that it was possible to just start a company, it just hadn't occurred to me …. It wasn't until I was in Consilient. … I realized that this guy who just hired me, he started this business, he created this, and he wrote this business plan. And I could do this. ….. anybody could do it. But that part of that education, just sort of unlocking your brain, to entrepreneurship to let you know that this is an option. That's something valuable, I think that these startups give to people without necessarily realizing it."* (E10)

Significantly, this respondent's experience created the ambition to start his own business. He noted that the wide range of work he performed at Consilient – product development, sales meetings, customer engagement, product manager, team leader, manager – was *"what inspired me to go and start my own business. And I started piecing that together while I was finishing up at Consilient. And the job I had in between ... was just a day job, basically, while I was spending evenings and weekends trying to get my own startup."* (E10) He even hired some Consilient colleagues.

5.5 Knowledge and Learning Spillovers

The knowledge and learning that occurred at Consilient extended well beyond its employees, providing considerable benefits for a variety of stakeholders in the entrepreneurial ecosystem. For the ecosystem overall, Consilient provided learning around failure. This point was noted by many interviewees. They highlighted the failure process as an important source of transferrable learning. As one respondent said, "*it gave everybody else a reality check.*" (NE8)

For one respondent, Consilient was his second failure. He noted that at Consilient ,*"I was essentially witnessing the same failure I'd witnessed before."* He has gone on to use this experience in his consulting work, mentioning that,

> *"[In] advising ... a company that is experiencing rapid growth.... And so having learned from that experience myself, I'm able, as a consultant, to come in and say ... here are some of the things that I really feel like you need to put in place here, don't make the mistakes I saw happen. These are the things that we can do, right, to make things stabilize, and to ensure a smoother path forward. So as a consultant, I'm really drawing on that experience with Consilient in some of the advice that I'm providing."* (E4)

One employee commented that:

> *"The signs for failure are really important to know almost more than the signs for success ...because signs of failure can be subtle. And it can be cultural, it can be a lot of different things that you don't know .... Because you've seen them before, it can help you be more successful later. .... Because you need to know what to tweak. And you know what to change, and you need to pick up on it."* (E5)

Another reflected on the wider lessons from Consilient's failure and stated:

> *"Don't fly too high, too fast .... check out your rate of burn and make sure that you can sustain what you're trying to do and grow at* [a sustainable] *pace .. I think all of the companies that you see in an incubator .... they have people who were involved in and around the same time, they could see what was going on. And they learned lessons from that experience." Referring to a company that he is advising, " .... that was their big concern. We don't want to be like Consilient, we want to grow at a sustainable rate. We want to achieve something without having the stress of always trying to find money, because that directs the way a company is going to go ..."* (E9)

Non-employee interviewees also commented on the learning effects of the failure for the ecosystem. One observed that it had helped instill a greater tolerance for failure among all ecosystem participants: *"...when you're doing something that's really innovative, that's really creative, it's going to have a high risk of failure. That's just the reality of it. And we* [meaning NL

ecosystem] *need to embrace that failure…"* (NE5) Another remarked on the change in perspective on failure, noting that, *"back then, you know, the community, the ecosystem, the broader province, didn't have tolerance for failure, like it does now."* (NE6)

Other lesson included local investors enhancing their analysis and decision-making. As one interviewee noted:

> *"One of the things that we learned… is the importance of making sure companies have a complete management team, you know, financial strength, marketing, strength operations, technical, technical strength…because back in that era, there were a lot of companies that were really just two people…and even if they had a few employees...the employees weren't really being used in any kind of strategic fashion…you know…in the executive suite, they didn't have all the skill sets they needed."* (NE3)

Another non-employee noted that local investors developed a shrewder view about their choice of investment partners:

> *"The bitter lesson of Consilient from an investor's point of view is be careful who you get in bed with and Quorum was a terrible co-investor. They had an unusual structure. So another lesson is alignment of economic interests. Their structure was, they had money…under a government offset program. They were investing as an experiment for quasi-industrial, regional benefits type work…so, when the situation became very financially tight…we [local investors] had a business plan development report…we could get the burn rate down to a point that…our two organizations could carry* [Consilient] *until some anticipated revenue came in. Terms were set…Quorum refused the terms, wound the company down, took the IP and shifted it to another of their portfolio companies."* (NE6)

Consilient also provided other lessons. One non-employee observed that Consilient provided an example of international marketing, when he noted:

> *"None of the rest of the people within the space* [knew] *anything about getting funding, we didn't know anything about these international sales, international marketing, how to deal with different cultures. Consilient was in Asia and dealing in the US and selling to, you know, Erickson and selling to these large companies, right, and getting into a space that was emerging, and that it was new, and it was all brand new type stuff."* (NE2)

Consilient was also one of the first provincial companies to raise venture capital. One of the former employees commented that *"We had a stock option plan and cap table … we just didn't do that stuff in Newfoundland back in the day."* (E15). Another commented he learned *"how a software company operates in the new century"* (E18) from working at Consilient.

5.6 Demonstration Effects

A further positive impact of Consilient was that it served as an exemplar for other local technology start-up firms. A number of interviewees mentioned this demonstration impact:

> *"Their story … conveyed a sense that Newfoundland and Labrador could be a place where any kind of technology venture could be launched and could be successful. That was different than saying … we have to play to our strengths. And often our strengths*

are linking everything to the ocean … Consilient would have been one of a small number that would have conveyed and demonstrated that there were much more diverse opportunities here that could be capitalized from here. I think that's a big part of the legacy…they were conveying a vision for what could go on here. Perhaps they couldn't necessarily realize themselves, but I think they would have inspired a range of other actors more junior to them to think outside the box when it came to what could go on here." (NE7)

Drilling down, this demonstration effect had a number of dimensions. First, Consilient was one of the first technology firms in the province, which, from its beginning, intended to capture a global market. Consilient demonstrated to the nascent ecosystem that it was possible to be a 'born global' start-up. This represented a significant departure from the normal technology start-up in the then-nascent NL ecosystem. As one member of the local ecosystem noted, "*Consilient was one of the first companies to go international, it was one of the first companies that had a big deal with another world-renowned company. … And so in terms of the history of the ecosystem, it was a significant milestone.*" (NE1) In a similar vein, another non-employee observed that *"Consilient was "probably the first independent international IT company, in the province"* (NE2). Another highlighted that *"it was the first company that went as far as it did … one of the companies that took it further down the line into that technology dream of going public and or being bought… They were the poster children."* (NE4)

As a former employee noted, Consilient was
> "*international facing … with clients, largely in Southeast Asia…[It was] showing the art of the possible for other companies …. We had clients in North America as well, but in the later years, it was all focused on [the] Asian market. And I think that that was a bit of a proof of concept, if you will, to people here to say that you could work here and do quality work here, meaningful work that was relevant for other parts of the world. … We were traveling, we were, like I said, dealing with time zones and distributed teams, and all those sorts of things. And there wasn't a lot of that happening at that moment. So I think that it was useful for people to see that that could happen.*"
> (E11)

The ambitions of Consilient's founders to create a large firm – in the entrepreneurial vernacular, 'go big or go home'. As one of its founders pithily asserted, *"What I think I brought from [previous experiences] was the belief that you could do things in a big way."(*E21) Consilient was distinctive from many of the local technology firms of that time that were founded to be a small consultancy serving the local market using technology sourced from elsewhere. An employee noted his realization of this vision and potential as follows:
> "*I knew we were doing cutting edge technology, but I never really thought of it I guess in terms of this potential kind of growth…I kind of became more aware of the idea that we were really pushing, cutting, cutting edge technology in a way that, you know, if it took off, it could really be a big thing.*" (E4)

A non-employee stated that *"…Consilient was our first real example of a company that scaled up and went global in a very short period and showed that we could develop software here in Newfoundland and Labrador, that could compete with anything around the world."* (NE-5)

Another non-employee (and local entrepreneur) also suggested that Adey pushed *"some of the government folks to think bigger."* (NE8)

A further significant impact was that Consilient was the first technology firm to attract substantial local investment. In effect, Consilient created or widened the investment pool by demonstrating and convincing reticent local investors to look at technology-based investment opportunities. As one interviewee stated:

> *one of the positive things, it I think it brought some non-traditional money at play into this ecosystem, you know, the history of X [a local investor] was in real estate, grocery retailing, furniture, that sort of stuff. Well, you know, they actually invested in a pure tech play, right…so the positive is that we got someone like X to come in…"* (NE3)

Of course, the failure meant that they lost money, but *"it wasn't so bad, that it would cripple them. … it hurt them. .. but it didn't hurt them that much."* (NE3) Crucially, he went on to add that, *"I think they learned a lot from the experience…I think they moved up the learning curve."* (NE3) Indeed, one of the local Consilient investors subsequently invested in Verafin.

At a micro-level one interviewee suggested another demonstration effect. He argued that Verafin should be seen as *"the child of Consilient"* (NE7), noting that the founders of Verafin *"would have all been undergraduates in the late 1990s"* and *"would have come in at the time when Consilient was kind of a hot commodity tech and* [when they] *talked about what they were trying to do…. When they would engage with our students the effect it had would have motivated young people to think well, … we can do anything here."* (NE7)

Several interviewees suggested that Consilient had created a positive environment for other startups in the ecosystem. As one noted, it showed that *"…technology companies can do well here in Newfoundland. I think that's important. I think I don't know if that's really been driven home."* (E17) Another commented that:

> "*the possibility of doing something with an idea and rallying people together, …. encouraging others in business in the province, who had not been involved in technology in the past, to become involved…it was a tremendous shift … it was a pivot point for…how businesses see technology and how they see it, not as a red mark on their books, but as a as a potential for other business opportunities. …. I would consider Consilient to be a pivot point for that."* (E18)

5.7 Negative Consequences for the Ecosystem

Interviewees identified few negative effects of Consilient's failure on the ecosystem, and these were mostly short-term. One interviewee commented that some former employees opted for more secure employment outside the technology start-up world after Consilient's demise.

One former employee commented as follows:

> *"I don't think it was a discouragement. By the time Consilient was going down, Verafin was starting up. You know, I don't think there's a lack of ideas there. I think there are challenges around for entrepreneurs around getting the starting capital and getting the talent and these days the talent is becoming more of a challenge with Verafin taking*

most of it. But I don't think that that Consilient's bankruptcy was a discouragement. I went from one cutting edge company, right into another cutting edge company, while I watched coworkers go to Veriafin, which was still in its early days at that point. So I don't think it really slowed things much at all." (E4)

Of greater significance was that the loss of money that investors suffered had a chilling effect on other investors. One external stakeholder commented as follows:

"it probably made it more difficult … just briefly, but for a few months, it probably made it more difficult for all government and economic development organizations to provide significant levels of funding. For the next couple of plays, it kind of raises the bar a little bit, right? Because then everyone wants to go back and say; 'What did we do wrong?' and try to figure it out, so that you don't repeat the same problem." (NE3)

This observation was reinforced by another external stakeholder: *"it may have negatively impacted on investment in technology companies … So then there was a bit of a nervousness …But that certainly turned around afterwards."* In summary, as one interviewee commented: *"They failed, there was a $6 million hit, and people focus way too much … this is a bit of a bump in the road. This is not a train wreck."* (NE5)

The impact most mentioned concerned Adey, one of Consilient's co-founders. In the aftermath of the failure, Adey, being Consilient's public face, was seen to personally bear responsibility for the failure. One interviewee observed that:

"Trevor [Adey]*...himself, he paid a price when Consilient went down. He didn't go to work for anybody else…he left. He went to California... He doesn't want to move back here, but he desperately wants to do projects here. I think he's trying to rehabilitate his image here. And you know… this is not necessarily a forgiving town* [referring to St. John's]*… I don't think he's had any success in a trying to get anything off the ground here right."* (NE3)

Another commented that Trevor's reputation was damaged by the failure and *"that encouraged him to go to California."* (NE6) Adey confirmed that he *"moved to California and went to work as a consultant first for Ericsson and Stockholm. And then I was hired as a vice president, running partner and alliances. For four or five years, I was there as a VP at Ericsson. And I left Ericsson because I sort of always wanted to do the start-up thing again. And so I went back to Newfoundland."* Although he had private funding lined up, he was unsuccessful in obtaining government funding. A former employee recalled that Adey *"seemed to think it was something against him personally."* (E16) However, Adey said that *"I understand politically, how backing me is a problem. …. I just think it's a part of the risk tolerance … that exists in the ecosystem that holds it back."*

The stigma that Adey received was widely thought to be unfair. One former employee commented that:

"I … have always resented the bad press that it got especially around the … funding as if it was somehow a slush fund that you know, we were soaking up government money and nothing good ever came out of it. It's always bothered me that that that impression is there … if you add it all up, I do think it was money well spent… I think

it was used well, and a good use of resources. We trained a lot of people. ....If you look at the Consilient diaspora, I would say that it is it is core to a number of significant companies. ... All of these other great things wouldn't have happened without Consilient. [But] If Consilient did not exist, it would have been necessary to create it for something. I wish more people understood."(E7)

It was stressed that Consilient was seeking to transform the Province's tech sector, which at the time was dominated by small consultancy companies: *"they were in the higher risk building technology space."* (NE8) Of necessity, Consilient was dependent on Government,

"because there was no private investment ecosystem .... the only place you could go was the government. The government had power over you because they were the ones doling out the cash where you could survive. Consulting companies didn't need the government to survive and most of the government programs didn't fund consulting companies. ... [In] the innovation space, you're so dependent on the government, but the government's success criteria [is]they don't want to end up in the news and the guy who doles out the money doesn't want to end up being sucked into a failed organization. These people don't want to be the account manager associated with a failed the business. But they don't realize the benefits that even failure [generates]." (NE8)

Additionally, as one interviewee noted, Adey's leaving meant that much of his learning was also lost. He observed that:

"Trevor [Adey] was associated with a failure ... but [had] a whole pile of success along the way...Not everything succeeds. You learn a lot from [entrepreneurs who have failed...[But] you drive them out of the community, so you don't get serial entrepreneurs, unless it's somebody who's never experienced failure and learnt from it. So I think that was an impact that we didn't have. .... I didn't have mentors that I could go to who had had tech companies. And Trevor could never be a mentor, because he was driven out of, the local community. And he was looked at unfavourably whereas...you don't only learn from success, you learn from failure. And we didn't have that, there was no, there was no entrepreneurs that could guide you. There were people who worked for big organizations that you could use. But you didn't have that real hands-on entrepreneur mentor type of an ecosystem built." (NE8)

Indeed, one non-employee recalled that advice they had received from Trevor, some time after Consilient's failure, had been very useful when they sold their firm. He noted that:

"In 2011 ... we had negotiated a deal to sell...and it was all approved, we had accepted the offer.... And the due diligence was done...it was the close in two weeks...and we got a call...and they said, the CEO...he changed his mind. Right. You're two weeks away. Right? .... One of the things that we learnt ... from Consilient situation because we had taken Trevor [Adey] on as a consultant... he's telling us about .... how things went south on his deal at the last moment. And so, when we were dealing with our situation in 2011, we remembered that ...We were fortunate to have gotten the advice that we got from Trevor [Adey]…because we were a little more careful than what we would have been, I think, had we not had advice." (NE2)

6. Considerations for Public Funding Sources

Consilient's life cycle has important lessons for the government of Newfoundland and Labrador and the federal government of Canada. The Consilient story is also an opportunity for similar public funding sources, and the public in general, to pause and consider the larger implications of Consilient's failure. One interviewee, a retired government official, acknowledged that the current policy environment in Newfoundland is much different to the era in which Consilient operated. He asserted that "*And, you know, it's just a night and day, different environment than it was back 15 years ago.*" (NE6) He also observed that the provincial government had become more supportive and a "little more sophisticated" in their programs to support the start-up community. The research team's requests to interview government officials with knowledge of Consilient were politely (and, with regret, from the officials) declined. Nonetheless, our study has three clear messages for government that have wider applicability beyond Newfoundland and Labrador.

First, government has to be involved in funding the building of an entrepreneurial ecosystem:
"It doesn't happen for free, somebody has to put the money in. And it will seem to make sense that the government be there to put, at least, some money in." (E10) The interviewees in our study clearly understood the importance of the funding that government provided to Consilient. Perhaps this may offer some small measure of succor for the criticisms that government has endured regarding their decision to provide Consilient funding. Moreover, by highlighting the positive impact of firm failure on the local and regional ecosystem, this research should give government some confidence in providing this form of business support. It should also provide ammunition to counter critics of this type of intervention. But it is not a *carte blanche* for government to provide indiscriminate support for entrepreneurial businesses. It is critical to recognize the important qualification that the positive effects that occur depend on the type of companies that are supported. The positive impact that the failure of Consilient had on the St John's ecosystem arose because it was a technology-rich company, was very effective in developing its human capital, was "born global," and had a learning culture. The implication for government is that they need to be selective in the types of companies they support, making decisions that take into account the attributes of companies that, should they fail, will nevertheless have positive effects on the ecosystem.

Second, Government has to have a tolerance for failure. Government *"programs exist to help innovation happen. [But] every, every program isn't going to be a home run. Sometimes innovation doesn't work."* (E6) Government needs to recognize that with programs that provide direct funding to businesses *"there's not going to be 100% success rate with start-ups anywhere. So there's gonna be some failures. ...It's not gonna all work out, just some of them will."* (E10) This was articulated, in detail, by one non-employee:

> *"...The fact of the matter is that, you know, we talk a lot about innovation ... in this province...Well, you know, what goes with innovation [is] risk. And the fact of the matter is, most technology companies either don't reach where they want...or fail altogether. For every Verafin, there's 100 companies that did not reach that point. And that's not saying that's, that's a bad thing. That's just the reality of the business. When you're doing something that's really innovative, that's really creative, it's going to have a high risk of failure. That's just the reality of it.... Yet, if you look at governments .... they're totally risk adverse. .... As a private business person, I can go out and screw*

up half the time, fix it, move on, no big deal, okay? In government, you can go out and do the right thing, 99 times, and you get no credit for it. And the one time something screws up, they crucify you, you're on NTV [provincial television broadcaster]*, you're on CBC, you're in the television, everyone's [talking about] all that was a waste of money. We should have never done that, okay. And so that makes government risk adverse. So they want to make sure that they've got as much covered as possible. But you really can't do that when you're being innovative. It's a high risk venture." (NE5)*

Politicians themselves might reconsider the effect of making easy short-term political points about government funding failures. Rather, they could address the issues around such investments with a more nuanced narrative that enhances their constituents understanding of the economic development imperatives driving funding decisions.

Third, the funding of businesses that subsequently fail generates positive economic outcomes. Interviewees particularly focused on Consilient's investment in its employees, noting

- *"The jobs didn't go away. ACOA's focus is on jobs. So ACOA has paid to train people up in an area that somebody else has taken all the risk on other than ACOA is basically provided job subsidies to create expertise, all these people go feed an ecosystem." (NE8)*
- *"Whatever happened to the company, the investment was in the people and we're all mostly still here working in the industry. So how can that be a bad investment?" (E11)*
- *"It's the people that the expertise it dumped into the market to help build other companies. The multiplier effect of it .... they trained other people, and, they made for more successful companies, who could bring in more people. That was the big nugget." (NE8)*

Other interviewees also pointed to *"a number of returns that you can't* [calculate] *necessarily the dollar figure"* – its function as a role model ('poster child'), its impact on aspirations, and its use in government promotion – noting that *"their faces were on government advertisements and brochures."* (NE4)

The consensus, then, amongst interviewees was that these outcomes – non-dollar quantifiable returns - more than paid back government's Consilient funding. As one emphatically stated, *"I do believe, in my opinion, that the long term effects of it were far more positive than negative. And I do believe that Newfoundland has been rewarded tenfold, despite they lost money by investing in Consilient, because they really invested in skills and people and the competence we all got from that."* (E15) Another specifically credited Consilient as being *"a significant, positive contributing factor to the development of what is* [at the time of the 2020 interview] *a pretty vibrant ecosystem here. Particularly for our location and size of our, of our city and province."* (NE6) Another similarly stated, *"They were the catalyst that helped grow the* [Province's] *technology industry from about $465 million in 2006, when Consilient kind of failed, up to a 1.6 - 2 billion in 2016. So those people were part of that 10-year growth spurt that we had in the technology sector."* (NE5)

7. Conclusion

This Harris Centre Applied Research funded work examined the effects of Consilient Technology's 2008 bankruptcy on Newfoundland and Labrador's then nascent entrepreneurial ecosystem. In particular, informed by a literature review, this work addresses four main research questions.

1. What happened to Consilient's employees after the closure - specifically, did they find other jobs in the local ecosystem, in what types of firms, and in what ways did their new employers benefit?
2. How much of the human talent created/nurtured by Consilient was 'recycled' in the St John's ecosystem?
3. Did Consilient's closure have other effects on the ecosystem above and beyond the recycling of its human talent?
4. What were the attributes of Consilient and/or the ecosystem that influenced the impact on the ecosystem?

To answer these questions, 28 semi-structured interviews with Consilient's two founders, former Consilient employees, funders, industry experts, government, and board members (Tables 1 and 2) were conducted. In total, 72 individuals were asked to participate, via an interview, in this study. We also used publicly available Linkedin data from 46 individuals who had listed Consilient as a former employer.

Our evidence clearly shows that Consilient's failure had a number of positive impacts for the ecosystem. The most significant impact was that most of its skilled and experienced former employees remained in the NL entrepreneurial ecosystem, joining other technology startups.

In terms of limitations, this work is based on a single case study, and so requires to be replicated in other locations to confirm that our conclusions have wider applicability.

Future work in this area should attempt to establish how the stage of development of an entrepreneurial ecosystem influences the impact of business failure. For example, Consilient failed at a point in time when Newfoundland and Labrador's entrepreneurial ecosystem was at an embryonic stage and so was able to quickly absorb the talent that was released. To what extent does an ecosystem's talent absorption capacity depend on its stage of development? To what extent was the government's risk aversion and funding policies more of a reflection of the stage of development of the ecosystem at the time of Consilient's demise? How would both the provincial and federal governments, and the public at large, respond to a similar fact scenario today?

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