**Report on cross-cultural variations in country ecosystems for technology entrepreneurship from a gender perspective.**

**We need a nice cover Page with the Logos of all the Institutes (attached) and maybe the flags of the countries?**

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8. **Introduction**

Underlying most regional entrepreneurship and innovation ecosystem frameworks is the assumption that all entrepreneurs have equal access to resources, participation, and support, as well as an equal chance of a successful outcome (i.e. venture startup) (McAdam *et al*., 2019). In terms of the OECD agenda, women belong to the category of missing entrepreneurs: groups of people who require support and access to equal opportunities in order to create successful sustainable businesses (OECDa, 2019). Next to seniors, immigrants and young people, women are among the key target groups of the OECD’s inclusive entrepreneurship policy agenda, aimed at expanding entrepreneurship in order to create jobs, leverage technological development and meet economic and social challenges (OECDa, 2019). In addition, the EU has a policy specifically aimed at promoting gender and innovation, thus implying that women technology entrepreneurs are sought after[[1]](#footnote-2). However, women are still underrepresented in the entrepreneurial arena in general and in successful entrepreneurial ecosystems in particular, and a persistent gender bias continues to exist in entrepreneurship discourse and practice (Brush *et al*., 2019; McAdam *et al*., 2019). Despite a broad consensus that technological entrepreneurship ecosystems stand to benefit from a higher rate of female participation in terms of gender diversity (Alsos *et al*., 2017; Brush *et al*., 2019; Verheul *et al*, 2006), explanations for the lack of women in these ecosystems remain insufficient and incomplete. Indeed, it is only more recently that reliable information regarding the gender gap in ecosystems has been made widely available. Accordingly, the Startup Genome 2019 report, states that in the global average ecosystem only 14.1% of tech founders are women and despite measuring more than 80 ecosystems, in none of them women represented the “expected” 50% of founders[[2]](#footnote-3).

**1.1 Aim**

The aim of this report is to provide contextual information concerning the technological entrepreneurial ecosystems in the four countries participating in the GENRE Project (Ireland, Norway, Sweden and Israel) in order to enable a better understanding of the persistent underrepresentation of women and to provide a foundation on which to base further empirical investigation.

**1.2 Structure of the report**

The next section of the report will highlight similarities and differences between Ireland, Sweden, Norway, and Israel concerning the following aspects: country profile, gender balance as to several relevant indicators, ecosystem rankings and women in entrepreneurship. **Part Three** focuses on policies fostering technological entrepreneurship in general and gender issues in particular. In **Part Four**, we present the incubator scene and its characteristics in each country followed by a description of the financial landscape in terms of investors in **Part Five**. The conclusion presents a synthesized comparative analysis of the findings of the data.

1. **Country profiles and ecosystems**

Table 1 depicts data concerning the four countries in terms of size, economic performance, and Human Development Index. The data shows that all four countries are rather small in terms of number of citizens, with Sweden the largest with more than 10 million people. Israel is the smallest in terms of geographical size, followed by Ireland. Both Ireland and Israel are positioned in challenging locations, with the island of Ireland located on the western margins of Europe and Israel located in the turbulent Middle East characterised by recurrent tensions and wars with Arab neighbours (Fawcett, 2016). Among the four countries, Israel’s GDP per capita is the lowest; however, it ranks highest with regards to investment in R&D as a percentage of GDP, reflecting its “startup nation” image (Rosenberg, 2018). Income inequality differs between the four countries. The Gini Income Inequality Index is lower for Sweden and Norway. Accordingly, the percentage of public social spending is higher in these two countries, due to their welfare state political framework. Private spending on tertiary education is much higher in Ireland and Israel compared to Sweden and Norway, indicating that accessibility to academic education is more dependent on parental socio-economic status. Israel has a much lower Human Development Index[[3]](#footnote-4) ranking than the other three countries, which can be explained by the large gaps in educational outcomes between the different population groups (Resh *et al*., 2019). Interestingly, Ireland has the highest self-employment rate, whereas Israel has the highest percentage of total early startup entrepreneurial activity as indicated by the Global Entrepreneurship Monitor (Bosma *et al*., 2018).

**Table 1:** **Country Profiles[[4]](#footnote-5)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Dimension/**  **Rank** | **Israel[[5]](#footnote-6)** | **Sweden[[6]](#footnote-7)** | **Norway[[7]](#footnote-8)** | **Ireland[[8]](#footnote-9)** |
| **Size in population** | 8.9M | 10.2M | 5.3M | 4.9M |
| **Size in square km[[9]](#footnote-10)** | 16,132 | 449,964 | 365,123 | 70,280 |
| **GDP US$ per capita** | 41, 678 | 54, 834 | 68, 825 | 90,141[[10]](#footnote-11) |
| **GNI US$ per capita PPP[[11]](#footnote-12)** | 39, 940 | 54, 030 | 68, 310 | 67,080 |
| **Income inequality (Gini)[[12]](#footnote-13)** | 0.35 (2018) | 0.28 (2017) | 0.26 (2017) | 0.30 (2017) |
| **Human Development Index (Rank)** | 22 | 8 | 1 | 3 |
| **Private spending on tertiary education** | 41.6% | 11.3% | 4% | 26.4% |
| **Internet access % of households** | 74.1% | 96.1% | 98.4% | 90.6% |
| **Social spending % of GDP** | 16% | 26.1% | 25% | 14.4% |
| **PISA Average score of mathematics, sciences and reading** | 465.0 | 501.6 | 496.7 | 504.3 |
| **Military expenditure as part of GDP %** | 5.7% | 1% | 1.8% | 0.3% |
| **Gross domestic spending on R&D** | 4.9% | 3.3% | 2.1% | 1.1% |
| **Self-employment rate (% of employment)** | 12.4% | 9.6% | 6.5% | 15% |
| **Total early-stage entrepreneurial activity (TEA)[[13]](#footnote-14)** | 12.8% | 7.3% | n/a | 8.9% |

Typically, women take on more family responsibilities than their male partners (Olah *et al*., 2018) and therefore the institutional environment in the form of a country's family provision influences women’s engagement and participation in entrepreneurship activities (McAdam, 2013). Following Foss *et al*. (2019), women entrepreneurship will also be impacted by instances of gender discrimination and labour market policies as well as access regulations to relevant education, business ownership and capital. Relevant country data is presented in Table 2.

**Table 2:** **Country Data Related to Gender Issues**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Israel** | **Sweden** | **Norway** | **Ireland** |
| **Gender Equality Index[[14]](#footnote-15) (2018) rank of 149** | 49 | 3 | 2 | 9 |
| **Labour Force Participation[[15]](#footnote-16) (2018)** | 59.2% | 61.1% | 60.2% | 55.1% |
| **Share of Women in Parliament[[16]](#footnote-17)(2018)** | 27.5% | 46.1% | 41.4% | 24.3% |
| **Gender Wage Gap[[17]](#footnote-18)** | 21.8% | 7.3% | 7.1% | 5.9% |
| **Female STEM Graduates[[18]](#footnote-19)** | 24.8% | 22.4% | 19.3% | 24.8% |
| **Women in Entrepreneurship**  **GEM TEA[[19]](#footnote-20)** | 8% | 4.5% | n/a | 7.0% |
| **Share of women Investors (2017)[[20]](#footnote-21)** | 12.2% | 7.3% | 9.0% | 9.6% |
| **Women in High-Tech Sector[[21]](#footnote-22)** | 11.0 % | 20.82% | 19.45% | 18.95% |
| **Maternity related issues** | | | | |
| **Length of maternity leave/parental leave** | 15 weeks (105 days)[[22]](#footnote-23) | 16 months[[23]](#footnote-24) | 49-59 weeks (including 16-19 weeks paternity leave) | 26 weeks[[24]](#footnote-25) |
| **Financial support during maternity leave** | The same income as before giving birth | 80% of previous income 6 month before birth | 80% of salary (59 weeks) 100% salary (49 weeks) | Maternity Benefit[[25]](#footnote-26) |
| **State subsidized child- facilities from age** | 3 | 1 | 9 months | 2.8[[26]](#footnote-27) |
| **Average monthly cost of pre-school/kindergartens** | 3000 NIS (about 750 Euro) | 140 Euro, less for siblings | 3000 NOK  (approx. 270 Euro) | 736 Euros[[27]](#footnote-28) |

The Gender Equality Index (GEI) is a composite indicator that measures the complex concept of gender equality in several core domains such as work, money, knowledge, time, power and health. Israel is ranked lowest among the four countries with Ireland, Sweden and Norway all ranked in the top ten countries on gender equality. The ranking order reflects other comparative data, such as the wage gap and the share of women in the parliaments of the four countries. The data shows that Israel has the highest percentage of female investors, but at the same time, the lowest percentage of women working in the high-tech sector. Country differences were also found in relation to childcare facilities, which in practice play a critical role in supporting or constraining women's entrepreneurship (Welter, 2014).

**2.1 Comparing country ecosystems**

An evaluation of each country ecosystem is presented in Table 3 and is based on four data sets of ecosystem rankings over time.

**Table 3:** **Ecosystem Rankings**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Israel** | **Sweden** | **Norway** | **Ireland** |
| **Global Entrepreneurship Index[[28]](#footnote-29)** | 16 | 9 | 21 | 8 |
| **Startup Blink[[29]](#footnote-30)** |  |  |  |  |
| 2017 | 4 | 6 | 44 | 16 |
| 2019 | 4 | 7 | 46 | 14 |
| **Startup Genome[[30]](#footnote-31)** | Tel Aviv | Stockholm | (Oslo) | Dublin |
| 2012 | 2 | n/a | n/a | n/a |
| 2015 | 5 | n/a | n/a | n/a |
| 2017 | 6 | 14 | n/a | n/a |
| 2019 | 6-7 | 11 | n/a | 26-30 |
| **CEO World Magazine[[31]](#footnote-32)** |  |  |  |  |
| 2019 | 4 | 9 | 35 | 17 |

Whereas the Global Entrepreneurship Monitor (GEM) measures percentage of entrepreneurs of a country's population, the Global Entrepreneurship Index[[32]](#footnote-33) (GEI) is a composite indicator of the quality of entrepreneurship ecosystems in each country, measuring quality of entrepreneurship as well as the extent and depth of support agencies and policies. In the GEI, Ireland is ranked highest (8); followed by Sweden (9); Israel (16); and Norway (21). The Startup Blink 2019 ecosystem report ranks 1,000 cities and 100 countries worldwide and is based on an algorithm tracking both the momentum and trends in the startup ecosystem. The algorithm analyses data of registered startups, accelerators and co-working spaces. Startup Genome ranks startup ecosystems and provides information regarding sub-sector trends. Startup Genome's methodology includes the investigation of seven criteria: performance; funding; market research; connectedness; talent; experience; and knowledge. The CEO World Magazine’s report on “Most Startup Friendly Countries in The World”[[33]](#footnote-34) utilizes the following criteria: human capital investment; research and development; entrepreneurial infrastructure; and technological workforce. Israel ranks highest on these three reports, followed by Sweden, Ireland, and Norway. Additional rankings of importance used to compare the ecosystems of under investigation relate to the innovation and competitiveness index. As indicated in Table 4, for both indices, time-period data is available, which thereby accounts for trends over-time. Data shows that Israel improved its rank on innovation considerably between 2015 and 2019 (from rank 22 to rank 10). Sweden remained highly ranked throughout the entire period (2015 – 2019) and Norway improved from its ranking from 20 in 2015 to 19 in 2019. Ireland is the only country among the four with a declining innovation index from rank 8 in 2015 to 12 in 2019. The innovation pillar of the Global Competitiveness Ranking of the World Economic Forum ranks Sweden 8th in 2019, followed by Norway, Israel, and Ireland. Thus, while Israel ranks highest on the more general ecosystem measures, Sweden ranks highest in innovation.

**Table 4: Innovation and Competitiveness Rankings**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Global Innovation Index Ranking[[34]](#footnote-35) (2015 – 2019)** | | | | | | | | |
|  | **Israel** | | **Sweden** | | **Norway** | | **Ireland** | |
|  | Rank | ~~Score~~ | Rank | ~~Score~~ | Rank | ~~Score~~ | Rank | ~~Score~~ |
| **GII 2015** | 22/141 | ~~53.5~~ | 3/141 | ~~62.4~~ | 20/141 | ~~53.8~~ | 8/141 | ~~59.1~~ |
| **GII 2016** | 21/128 | ~~52.3~~ | 2/128 | ~~63.6~~ | 22/128 | ~~52.0~~ | 7/128 | ~~59~~ |
| **GII 2017** | 17/127 | ~~53.9~~ | 2/127 | ~~63.8~~ | 19/127 | ~~53.1~~ | 10/127 | ~~58.1~~ |
| **GII 2018** | 11/126 | ~~56.8~~ | 3/126 | ~~63.1~~ | 19/126 | ~~52.6~~ | 10/126 | ~~57.2~~ |
| **GII 2019** | 10/129 | ~~57.4~~ | 2/129 | ~~63.7~~ | 19/129 | ~~51.9~~ | 12/129 | ~~56.1~~ |
| **Global Competitiveness Ranking – World Economic Forum - Innovation Pillar** | | | | | | | | |
|  | **Israel** | | **Sweden** | | **Norway** | | **Ireland** | |
|  | Rank | ~~Score~~ | Rank | ~~Score~~ | Rank | ~~Score~~ | Rank | ~~Score~~ |
| **WEF 2011-2012[[35]](#footnote-36)** | 22/142 | ~~5.07~~ | 3/142 | ~~5.61~~ | 16/142 | ~~5.18~~ | 29/142 | ~~4.77~~ |
| **WEF 2013-2014[[36]](#footnote-37)** | 27/148 | ~~4.94~~ | 6/148 | ~~5.48~~ | 11/148 | ~~5.33~~ | 28/148 | ~~4.92~~ |
| **WEF 2015-2016[[37]](#footnote-38)** | 27/140 | ~~4.98~~ | 9/140 | ~~5.43~~ | 11/140 | ~~5.41~~ | 24/140 | ~~5.11~~ |
| **WEF 2017-2018[[38]](#footnote-39)** | 16/138 | ~~5.31~~ | 7/138 | ~~5.52~~ | 11/138 | ~~5.40~~ | 24/138 | ~~5.16~~ |
| **WEF 2019[[39]](#footnote-40)** | 20/141 | ~~7.67~~ | 8/141 | ~~8.12~~ | 17/141 | ~~7.81~~ | 24/141 | ~~7.51~~ |

Finally, Table 5 concerns the "Ease of Doing Business" measure, provided by the World Bank. We present the indicators that are most relevant for starting a high-technology business in addition to the general score for each country, which is based on the sum of 10 indicators. Each indicator has several sub-indicators with an overall score of between 0 and 100. The overall score of doing business for each country is based on the average of all 10 sub-scores. In the below index, Norway and Sweden are among the 10 highest-ranked countries when it comes to the ease of doing business, whereas the data for Ireland and Israel indicates significantly more barriers when it comes to the ease of doing business.

**Table 5:** **Ease of Doing Business**[[40]](#footnote-41)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Israel** | **Sweden** | **Norway** | **Ireland** |
| **DB Rank (1 to 190)** | 35 | 10 | 9 | 24 |
| **Starting a business** | 28 | 39 | 25 | 23 |
| **Getting credit** | 48 | 80 | 94 | 48 |
| **Protecting minority investors** | 18 | 28 | 21 | 13 |
| **Paying taxes** | 13 | 31 | 34 | 4 |
| **Trading across borders** | 67 | 18 | 22 | 52 |
| **Enforcing contracts** | 85 | 39 | 3 | 91 |

**2.2 Conclusion**

The four countries under investigation are high-income countries following the World Bank categorization. Additionally, all are considered small countries in terms of population size. Norway and Sweden are more welfare state-oriented and score high in terms of income distribution. Israel ranks lowest on gender equality indicators alongside parental leave and child-care facilities are considered less supportive than in the other countries. Sweden and Israel rank highest on entrepreneurship and innovation indicators and consider and label themselves as innovation/startup nations. Sweden ranks very high on global innovation and competitiveness, while in Norway, it is easier to set-up a business followed by Sweden, Ireland, and Israel. Overall, each of the four countries has a well-developed technological entrepreneurship ecosystem in terms of innovation and competitiveness and in 2019 all four were ranked with in the top 15% of 149/141 countries measured.

1. **Policies**

Government policies are a key element of entrepreneurial ecosystems (Hechavarria *et al*., 2014; Stam *et al*., 2016; Audretsch *et al*., 2017). Government policies can stimulate positive attitudes towards entrepreneurship (Berger *et al*., 2016) and more recently a wide array of government policies strengthening the promotion of entrepreneurship have been introduced (Heilbrunn *et al*., 2019). Governmental and regulatory frameworks include tax incentives, business friendly legislation, and access to relevant infrastructure, such as telecommunication/broadband and transport (Stam, 2015). Taking a critical stance, Naude (2016) maintains that although governments are actively creating a critical mass of entrepreneurs, government entrepreneurship policies do not necessarily create sustainable businesses, given the high failure rates. The main challenge of public policy in relation to entrepreneurship includes the recognition that “one size does not fit all”, the necessity for integrated and inclusive frameworks, and the need to make a distinction between entrepreneurship and small business policies (Mason *et al*., 2014).

Concerning the gender aspect of entrepreneurship policy, several studies have highlighted that often the underlying assumption of policy schemes is that entrepreneurship is fundamentally male and that women have to “adjust” (Ahl, 2006; Marlow, 2013; Ahl *et al*., 2015; Foss *et al*., 2014; Pettersson *et al*., 2017; Harrison *et al*., 2020). In fact, many governments have adopted a ‘fix the women’ approach (Foss *et al*, 2017) predicated on the view that, through education and training, women have to be socialised and provided with the appropriate tools and skills to compete in a man’s world. Embedded in a masculinist worldview policy is the solution to address (fix) women’s entrepreneurial underperformance and subordination in society (Marlow and McAdam 2013; Ahl and Marlow, 2012).

The following sections outline each county’s government support schemes as well as their gender orientation.

**3.1 Ireland**

SMEs and entrepreneurship are central to Ireland’s challenge of generating a broad-based growth and prosperity that builds on and extends its successes in attracting high quality foreign direct investment (OECD, 2019b).

**3.1.1 Structure of Government Support**

In recent years, the Irish government has pursued a policy of supporting the development of entrepreneurship, specifically supporting entrepreneurs with high potential and international growth aspirations. Accordingly, GEM 2018 data illustrates that Ireland has a positive culture for entrepreneurship, with as many as eight in every ten adults believing that entrepreneurial success has a high status (82%). Ireland is characterized by relatively high rates of entrepreneurial aspirations (14.8%), as well as high rates of early-stage entrepreneurial activity (8.9%). However, similar to many other countries, there is a gender 'gap' across a range of entrepreneurial activity measures, including aspirations to start a business (19% for men, compared to 11% for women), rates of business startup (11.7% for men and 6.3% for women) and growth aspirations (28% for men compared to 9% for women). This gap was particularly notable during the recent economic crisis, however, rates of female entrepreneurship in Ireland (pre COVID-19) have since recovered to their pre-crisis levels. GEM Ireland data suggest that if the rate of new business owners in Ireland for women was the same as the rate for men, an extra 8,000 women would have started a business in 2017. Compared to other countries, women in Ireland rank 8th highest in Europe for entrepreneurship, with men ranking 4th highest. This gender ‘gap’ is higher in Ireland than in many other European countries. More men (48% of all men) than women (41% of all women) perceive opportunities to start a business in Ireland. As is the case in many countries, in Ireland more men (52% of all men) than women (33% of all women) believe they have the skills and knowledge to start a business. About half of all men, compared to four in every ten women believe that “it is easy to start a business in Ireland.”

There is some evidence that men and women differ in terms of the business ideas they pursue. For example, the consumer services sector accounts for 58% of women’s ideas and businesses compared to 38% for men. Nearly one third of women (30%) are active in government, health, education, and social services sectors, compared to just 11% of men. Men and women also differ in terms of growth aspirations. In Ireland more men (79%) than women (54%), who are nascent entrepreneurs or new business owners, are or expect to be employers. Men and women also differ in terms of growth expectations. In Ireland, 28% of men and 9% of women expect to employ 10 or more people and to double the number of jobs within five years. Given this ‘gap’ between men and women, there has been active engagement by government and non-governmental agencies during the past decade to support female entrepreneurship. In addition to initiatives by Enterprise Ireland (i.e., the state agency that promotes the development of Irish entrepreneurs), programmes such as Going for Growth (an entrepreneur-led programme for high-growth aspiration female entrepreneurs), Acorns (a programme for early-stage female entrepreneurs living in rural Ireland), and Dublin City University’s (DCU) ‘Female High Flier’ programme all aim to support women in starting and growing businesses.

Government policies and support structures in Ireland are predominantly realized via Enterprise Ireland (EI). Additionally, the Irish Government established Local Enterprise Offices (LEOs) in 2014 to streamline and increase the coherence and accessibility of SME and entrepreneurship support for smaller firms. Although the LEOs are overseen by Enterprise Ireland, they are operated by the local authorities in a relationship governed by service level agreements laying out the nature of the services, delivery standards, performance expectations, and reporting requirements.

Enterprise Ireland supports include:

1. Developing the Proposition (Enterprise START Workshops providing information, New Frontier Program – incubation, Mentor program, Competitive Feasibility Funds).
2. Getting Investor Ready (HPSU Feasibility Study, Competitive Start Fund, Innovative HPSU Program).
3. Spin Outs from Research (Commercialization Fund, Incubation Centers)
4. Community Enterprise centers
5. Seed and Venture Capital Schemes[[41]](#footnote-42).

**3.1.2. Gender Oriented Government Policy/Unit**

In terms of female founder participation in the Irish startup ecosystem, TechIreland’s 2020 report titled, *Female Founder Review,* gives an insight into how such participation has developed and progressed overtime as well as how Irish state policy positions itself in relation to this prescient issue and how it aims to respond. The EI’s introduction to the report confirms that High Potential Start Ups (HPSUs) led by female founders has increased by 7% in 2012 to 22% in 2019. In 2019, out of a total of 2619 companies, TechIreland recorded 427 active female founders in Ireland constituting 64 additional startups than in 2018. However, in terms of funding, while female founders raised a total of €98m in 2018 that figure dropped to just €63m in 2019 (out of a total of €707m), which was spread over 50 companies and 60 funding rounds with €24m going to companies located outside Dublin. Although it must be acknowledged that the 2018 funding figure was skewed by the €51m of funding obtained by Nuritas and TransferMate. In 2019, the company Avectas secured 12m, while 49 other companies raised €51m between them. Over 60 female-founded technology companies are involved in disruptive startups developing DeepTech solutions utilising blockchain, AI, and machine learning, with the most prominent impact being felt in sectors such as Health/MedTech, Education, and Agritech. However, according to Dr. Shirley Davey, females still only account for 20% in STEM leadership roles signifying the need for additional supports. EI’s contribution to the report stresses that “women are still under-represented in starting, leading and growing businesses” even though research continues to highlight that “diverse management leads to better decision making, helps attract and retain talent, and ultimately increases profitability”. Alongside this, female founders are also missing out on funding throughout Europe and beyond.[[42]](#footnote-43) To counteract such under-representation, EI confirms its ongoing commitment and support for Irish startups to become more gender balanced and recognises that diversity is “broader than gender alone” but that raising founder diversity and female supports is a first step towards a more holistic approach to obtaining wider diversity within the Irish startup ecosystem.[[43]](#footnote-44)

The EI “Female Entrepreneurship Unit” was established in response to an under-representation of women entrepreneurs in Ireland. Its purpose is to support ambitious women entrepreneurs to launch and grow HPSUs, and to address the key challenges facing women in startups. Enterprise Ireland has developed a number of supports specifically for female entrepreneurs, including competitive funds to support female-led business teams, identification and promotion of role models, sponsorship of events alongside awards and supports to existing and new networks. These initiatives were developed in response to under-representation and research indicating the distinctive challenges faced by women in startups.

EI has recently published its 2020-2025 strategic action plan for women in business. This signifies EI’s understanding that diversity and under-representation of women in business continues to be problematic and that strategic planning is required to meet a modern and globalised society. The report is explicit is the need for diversity in leadership roles and that “increasing the participation of women founding, leading and growing enterprises will result in better businesses and faster economic growth”. Encouraging this move is the ample evidence of how female presence in leadership roles has a positive influence on profitability; better investment performance; attracting and retaining talent; an increased creativity, openness and innovation; reputational enhancement for the company; as well as a more focused and enhanced ability for a company to identify, understand and leverage the vagaries of consumer interest and sentiment. With this in mind, EI ascertain that achieving a better gender balance in certain sectors, such as manufacturing, ICT, engineering, and construction, is a key component of EI’s strategic planning going forward. The aim of this plan is to increase the number of women-led companies with international growth-potential; in management roles; in entrepreneurship generally; and lastly, by increasing the number of women-led HPSUs. In addition, EI aims to make ambitious structural reforms to its own management profile as well as to the local Irish support ecosystem itself. By 2025, it has the ambition to increase by 100% the number of women-led companies with international growth potential with the same increase for participation rates for women on Enterprise Ireland’s Management Development Programmes. Locally, this path forward to 2025 also aims for a 50% increase in LEO supports to women in business as well as a 50% increase in female participants of start-up programs and 30% increase in the proportion of female founded HPSUs.

As outlined in EI’s 2020-2025 strategic plan, the reasoning for developing further supports for women and progressing towards structural change is strong evidence of under-representation. For example, there is a 12% gender gap in the Irish labour force, which is compounded by the fact that Ireland has an EU-wide high gender gap in self-employment; only 30% are senior managers are female; less than 20% of CEOs are female, which then drops to 9% in larger companies; and lastly, in terms of funding, only 10% of VC funding goes to female founded companies alongside only 3% of angel investors being female.

Accordingly, Enterprise Ireland’s 2020 Action Plan for Women in Business refers to the implementation of a number of key objectives constituted by concrete actions:

* Objective 1: Increase the number of women-led established companies growing internationally.
* Objective 2: Increase the number of women in management (middle and senior) and leadership roles.
* Objective 3: Increase the number of women becoming entrepreneurs.
* Objective 4: Increase the number of women-led startups with high growth potential.

Notable actions related to HPSUs are as follows:

1. Appoint a dedicated team in EI to develop and drive initiatives directed at female founders.
2. Issue a series of funding calls targeting women entrepreneurs, and women researchers from third level institutions.
3. Pilot an initiative to include women leaders/senior managers in project teams spinning out from third level institutions.
4. Explore the potential to establish a female-focused seed investment group with key finance industry stakeholders.
5. Roll out national and regional communication campaigns showcasing women entrepreneurs.
6. Offer increased one-to-one engagement to women-led HPSUs and support female founders through mentoring with experienced entrepreneurs, who have scaled their businesses.[[44]](#footnote-45)

**3.2 Sweden**

Combining a long historical record of engineering, research and innovation in the manufacturing industry, with the contemporary high-tech scene of various tech-hubs in the country, and Stockholm in particular, have characterised Swedish innovation and entrepreneurship up till this day. It also forms the current focus of national innovation policies.

**3.2.1 Structure of Government Support**

Government policy and support structure is predominantly realized via Sweden's Innovation Agency (Vinnova), the Swedish Agency for Economic and Regional Growth (Tillväxtverket), which promotes business nationally and regionally and the Knowledge Foundation.

Sweden’s Innovation Agency (Vinnova)

Vinnova is Sweden’s innovation agency responsible for increasing Sweden's innovation capacity, contributing to sustainable growth. The vision of Vinnova is to promote Sweden as an innovative force in a sustainable world. Vinnova also invests long-term in strong research and innovation environments focusing on the following prioritized areas: Circular and bio-based economy, **i**ndustry and materials**,** smart cities, life science, **t**ravel and transport.

The Swedish Agency for Economic and Regional Growth

The agency has approximatly 450 employees and is located in Arjeplog, Gävle, Gothenburg, Jönköping, Luleå, Malmö, Örebro and Östersund and in Stockholm (headquarter). Its mission is to strengthen competitiveness and to facilitate entrepreneurship around Sweden with a focus on strengthening regions and business. The agency offers knowledge, networks and finance.

The Knowledge Foundation

The Foundation was established in 1994 with a founding capital of 3.6 billion SEK, and has now invested some 9.3 billion SEK in over 2,500 projects. Its main role is to fund innovation projects and the research needed to develop new solutions. State and industry cooperation on vehicles of the future; Long term programs concernco-operation for sustainable innovation; challenge driven innovation. Additionally, the agency is providing funds for research and competency development at Sweden'sinstitutes of higher education with the purpose of strengthening Sweden’s competitiveness; thereby, fulfilling the mission to strengthen Sweden’s competitiveness through collaborative projects between academia and industry.

**3.2.2. Gender Oriented Government Policy/Unit**

"Promoting Women’s Entrepreneurship" national program, 2007- 2010, 2011-2014 is a "women only" national program with two aims. First, to create growth, renewal so that more women start and grow their own firms. Second, in collaboration with business promoting actors and authorities, produce a national strategy for equality between men and women on business promotion. The program was directed at three target groups: 1. woman who run a business, alone or with others, and who want to expand their businesses; women who want to start their own business; women who want to develop innovative ideas 2. Institutional actors working at promoting and developing businesses on a regional basis; 3. the public, media or other actors interested in information about women entrepreneurship.

Several different initiatives were launched simultaneously and organized by a variety of groups, including companies, universities, and NGOs. Sweden has also a foreign-born female entrepreneurship program – promoting primarily small and medium-sized business development.

**3.3 Norway**

**3.3.1. Structure of Government Support**

Norway's public support system is important for the start-up ecosystem and includes several key players. An important feature of the business promoting policies in Norway is the regional dimension. Thus, the 15 regional county councils are an instrument which much of the funding is channelled through, the aim is to give a better fit with regional developmental strategies.

Innovation Norway (IN) is a public body organized as a public enterprise co-owned by the ministry of Trade, Industry and Fisheries and the 15 County councils. IN also works as a (regional)business development bank. IN represents the government's most important instrument for innovation and development of enterprises and industry. Innovation Norway aims to support companies in developing their competitive advantage and to enhance their innovation capacity. The mission is to increase the number of successful entrepreneurs; to develop more enterprises with capacity for growth; enhance more innovative business clusters; and overall, increase Norway's competitiveness internationally. Among other aims, Innovation Norway promotes interaction between enterprises, knowledge communities and R&D institutions.

Practically, it provides grants, loans and programs for different stages, purposes and industries, such as start-up grants; commercialization grants; start-up loans; and seed-funding programs etc. (<https://www.innovasjonnorge.no/en/start-page/>)

Siva is a public body that provides innovation infrastructure via science parks, knowledge parks, incubators, and rural business centres. These receive basic funding from Siva. From 2020, the responsibility for public financial support for incubation programs is transferred to County administrations as part of a region reform in Norway. Incubators are still part of Siva’s network and followed up by Siva. The Norwegian catapult is administered by Siva, and provides funding and access to competencies, facilities and technology to build and test ideas.

The Research CouncilNorway (RCN) provides R&D grants for research projects for businesses and for research collaboration between businesses and research institutions. SkatteFUNN is an important tool for R&D based innovation in businesses, it is administered by RCN. The scheme gives tax deduction for R&D based innovation costs. SkatteFUNN was originally not aimed to support start-ups, but businesses “out of tax position” receives pay back of R&D-costs and thus SkatteFUNN has been an important way of funding R&D based innovations (Alsos et al, 2007)

**3.3.2. Gender Oriented Government Policy/Unit**

Coming to gender equality policies the Norwegian politicians and bureaucracy have moved policies and means toward gender mainstreaming. This implies that the specific programs aimed at promoting women entrepreneurs have disappeared, and theoretically should be integrated in all means and policies. In 1998, a gender quota was put on the start-up grants offered by Innovation Norway[[45]](#footnote-46). The target was that minimum 40% of start-up grants should be granted women entrepreneurs starting 1999. At the time, the average share was between 20-30%. Already in 2000, the goal was met (Alsos et al. 2006). During the following years, similar targets were put on other support schemes offered by Innovation Norway and Siva. From 2014, all gender targets on support schemes were removed. This led to a reduction of women recipients of the different support schemes. Interestingly, the share women receiving start-up grants was reduced from 42% in 2013 to 14% in 2018 (Action plan for female entrepreneurship, 2019)

Currently there is some milder focus on gender balance among the support institutions. Innovation Norway has a program for “Growth for women and diversity” (Personal communication 27.05.20 with Siv Isabel Eide, Innovasjon Norge) which aims to contribute to increased value creation and innovation by supporting participation of women and minorities and strengthen their positions in entrepreneurship and businesses. For example, Innovation Norway has organized an annual competition “Female Entrepreneur” to promote women with entrepreneur role models, this is now terminated. Siva has currently no programs or action plans to promote women entrepreneurs (personal communication with Randi Torvik, SIVA26.05.2020), however they have as a goal that a share of 40% women should be found in their incubator programs.

RCN has a policy for gender balance and gender perspectives in research and innovation (RCN, 2019), but this does currently not include gender perspective in commercialisation, business support or entrepreneurship.

**3.4 Israel**

**3.4.1. Structure of Government Support**

Israel's flagship organization to promote innovation and entrepreneurship is the government funded Israel Innovation Authority[[46]](#footnote-47). The Authority has an approximate yearly budget of $500M and plays an important role in supporting early and growth stages in startups as well as promoting policies that target specific support areas.

The Israel Innovation Authorityhas six major divisions:

1. Startup Division – offers unique tools to support the early development stages of technological initiatives. Target audiences include entrepreneurs with innovative technological ideas and startup companies.
2. Growth Division – operates a range of incentive programs that promote technological innovation of mature and growth companies. Target audiences are high technology companies in sales or pre-sale growth stage and mature high technology companies that utilize growth channels based on technological innovation and/or seek assistance in funding innovative research and development.
3. Technological Infrastructure Division - focuses on development of generic technologies and R&D infrastructure. Incentive programs address academic applied knowledge development and transfer integrating academia and industry. Target audiences are researchers and research institutions and industrial corporations.
4. International Collaboration Division – offers a variety of international cooperation and incentive programs through multinational frameworks such as Horizon 2020. There are several bi-national funds providing finance for joint projects of Israeli and foreign companies. Target audiences include foreign and local actors, such as companies and researchers as well as the Israeli government maintaining agreements of collaboration with international agencies.
5. Advanced Manufacturing Division - focuses on the promotion and implementation of R&D and innovation processes in manufacturing firms. The incentive programs support owners of SMEs plants and factories to develop innovative products. The target audience includes industrial manufacturers operating in low and medium-low technology sectors.
6. Societal Challenge Division – focuses on harnessing technological innovation to solve substantial problems in society and in the public sector. Specifically, it focuses on the lack of skilled workers in the high technology industry, supporting training programs and entry into industry. Target populations include ultra-orthodox Jews and minorities (including women).

**3.4.2 Gender-Oriented Government Policy/Unit**

In February 2019, the Israel Innovation Authority launched an Incentive Program for Female-Led Startups in order to narrow the gender gap and increase the number of female entrepreneurs in the Israeli innovation ecosystem. Women-led startups (requiring at least 33% ownership and a managerial or technological role in the company) are eligible for research and development grants of up to 75% of the company’s R&D funding in the first year of the program, and 70% of funding in the second year, with a budget cap of up to NIS 2.5 million in the first year and NIS 4.5 million in the second year. In addition to the grants, the Innovation Authority opened a dedicated support program for women to enable access to all the support tools available through the organization. The program is designed for early stage companies and operates under the Early Stage Incentive Program offered by the Startup Division of the Israel Innovation Authority. It offers unique benefits that joins other programs offered by the Authority for support of under-represented populations in the high-tech industry, such as the Incentive Program for Ultra-Orthodox Jews and Minorities. The program allows woman-led companies to promote innovative technological projects and raise capital from the private sector[[47]](#footnote-48).

No data as to the success of the program are yet available.

**3.5 Conclusion**

All countries participating in the study have a dedicated public innovation agency: Enterprise Ireland, Innovation Norway, Sweden’s Vinnova and Israel Innovation Authority. These are public, governmental flagship organizations aimed at promoting entrepreneurship and innovation ecosystems as part of a national strategy. Whereas Enterprise Ireland and Israel Innovation Authority are the main key national players assimilating many divisions, programmes and platforms, in Norway and Sweden additional actors exist, pointing to a lesser degree of centralization. Policy makers in Ireland, Sweden and Israel all acknowledge the narrowing of the gender gap and increasing the number of female entrepreneurs in the ecosystems as key remits. Therefore, in these countries dedicated women focused programs exist, such as Enterprise Ireland’s 2020 Action Plan for Women in Business, Promoting Women’s Entrepreneurship national program in Sweden including also a foreign-born female entrepreneurship program and Incentive Program for Female-Led Startups in Israel. In contrast, Norwegian policies have moved towards mainstreaming gender, with the majority of specific programs fostering women entrepreneurship terminated.

1. **Incubators**

Technology Business Incubation (TBI) is an umbrella term which includes science parks, innovation centers, accelerators, and technology incubators (Ayyash *et al*., 2020); all of which are considered important policy tools in supporting innovation and technology-oriented entrepreneurial growth (Mian *et al*., 2016). Generally, they take the form of public-private collaborations between universities, government, and end-users (Lamine *et al*., 2018). Conceptually, technological incubators help connect science, technology, education, knowledge, entrepreneurial talent, and capital (Mian *et al*., 2016). Key stakeholders within the regional environment of technological incubators include industrial clusters, universities and colleges, research laboratories, as well as banks and investors. Utilizing linking mechanisms, incubators connect tenants with other stakeholders (van Rijnsoever, 2020) and thereby impact the entrepreneurial value chain at the national and/or regional level (Phan *et al*., 2005; McAdam *et al*., 2016).

**4.1 Incubation in Ireland**

In Ireland, the incubator system is small but developing apace. There are thirty prominent incubator/hubs with the majority (i.e. approximately fifteen) being dedicated Technology Business Incubators (TBIs), who are public-private partnerships and connected to higher education institutions (i.e., general and technological universities). Ten incubator/hubs have a more general remit as Business Incubation Centres (BICs). The TBIs, primarily located in Dublin, tend to be focused on attracting (HPSUs) and have strong network connections to Dublin-based venture capitalists. On the other hand, BICs traditionally have had a more general business focus and regional remit. Such incubators tend to be less developed, based outside Dublin and maintain good networks with individual business angels and angel syndicates, such as the Halo Business Angel Network (HBAN). About five incubators are identified as hybrids in that they are BICs interested primarily in HPSUs, provide funding, and maintain strong connections to business angels and venture capitalists as well as regionally located accelerators. A good example of such a hybrid is the Dublin BIC. In terms of ownership, the vast majority of TBIs and BICS are public-private partnerships alongside private hubs, such as Dogpatch Labs and the Mill in Drogheda.

Ireland’s startup ecosystem is very much Dublin-centric and there is a systemic centre-periphery divide with the capital city of Dublin acting as a focal point for HPSUs, incubators and financial networking. Regional city ecosystems are smaller and less developed, generally acting as a stepping-stone to Dublin’s economic and social opportunity structures. In this environment, regional ecosystems must leverage sectoral expertise in order to compete. For example, the Western ecosystem (i.e., Galway, and Mayo) gains competitive advantage in the MedTech sector due to spinouts emerging from the Galway-Mayo Institute of Technology (GMIT), a world-leader in medical device research. Of the thirty incubator/hubs identified, eleven are all highly developed and Dublin-based while the rest reside outside Dublin in regional cities.

By 2019, after overcoming the financial crash of 2008 and the Great Recession, incubators began implementing plans to expand the space available on their premises as the Irish economy entered as phase of growth and recovery. Such plans involved adding extensions to premises so as to attract new types of tenants, who would need either specialised technical facilities or general hot desks. However, such plans have been thrown into disarray by the Covid-19 pandemic, which has prompted a forced lockdown in Ireland and across the world. Suddenly, precarity prevails with incubators forced to close and tenants working from home. Not only has this unprecedented situation impacted business operations and funding possibilities, it has also jeopardised the fundamental character of incubation, which relies on close in-person mentoring and social networking. Incubators will thus need to adapt to the ‘new normal’ and find new ways of working in a socially-distanced environment; however, how such health measures will impact incubator capacity, growth and functioning remains to be seen.

* + 1. **Gender orientation**

Of note is that in the Irish ecosystem, the most prominent incubators have strong connections or are incorporated into higher-educational institutions. Thus, these incubators are either located on campus or relatively close to the main institution. These strong linkages also enable resource sharing between incubator and institution. This relationship therefore impacts diversity and equality policies, in that many university-associated incubators adopt the diversity and equality policy of their affiliated higher-education institution as opposed to developing a tailored policy for the incubator environment itself. With that said, some incubators would see gender inclusiveness as an “untapped resource” to be developed further while other incubators take a more gender-neutral stance by not acknowledging gender dynamics as a significant issue deserving differential treatment (Marlow and McAdam, 2012).

Emanating from a detailed search of incubator websites and documents as well as media articles, of the thirty incubators identified in the Irish startup ecosystem, eighteen had implemented some form of support or advocation for female founders. These supports ranged from the formation of female founder entrepreneurial programs; actioning gender quotas for new tenants; the publication of news articles to advocate for female entrepreneurial issues; female-oriented workshops; interaction with EI’s HPSU female unit; and also award and support days tailored to female entrepreneurs. For the other twelve incubators, no evidence was found that these incubators explicitly promoted a gender orientation; however, that is not to say that such an orientation is non-existence. There is the possibility that a gender orientation does exist but is implicit by way of an individual staff orientation or just not pronounced and/or published explicitly.

It must be stated that a detailed search of incubator outputs on the Internet (e.g., company website, company documents, media articles) did not provide key information. For example, it was difficult to identify if a tenanted startup had a female founder or not. For such information, the TechIreland live database was helpful as it records and tracks the presence of female founded companies throughout Ireland.[[48]](#footnote-49) Identifying links between incubators and specific venture capitalists (led by women) was also not easily discoverable through publicly available information. Exceptions to this, relate to venture capital firms that reside within incubators, a practice which is becoming more common in Ireland. An example of this would be the relationship between CIT Rubicon and venture capital firm Kernal Capital. Notably, women are represented in leading position in venture capitalist firms (e.g., Atlantic Bridge, Drapier Esprit) in the Irish ecosystem either as principal investors, fund managers, investor analysts or associates. Furthermore, it was also difficult to gather information about incubator board members and whether females are represented and in what numbers. In general, board details are not posted on incubator websites, with the exception being the Cork-based Tyndall Research Centre, which had five out of thirteen female board members.

**4.2 Incubation in Norway**

In total, 34 incubators are connected to Siva in Norway (SIVA, 2019), of these 26 are identified as somehow tech-oriented and an additional eight non-tech/general incubators (own counting from websites).

Siva (Selskapet for industrivekst) is the most important actor in the field, it is a public enterprise owned by the Norwegian Ministry of Trade and Fisheries, and the Ministry of Local Government and Modernisation. Siva is part of the public funding agencies for innovation and works closely with Innovation Norway, the Research Council Norway and the Norwegian Patent Office. Typical fields of focus of the incubators are fishing/marine industry, biotechnology, petroleum, energy, environment, and health tech (own counting from web sites).

Geographically, the incubators are spread-out all over Norway, but with a rather high concentration in the south. Many incubators are linked to local universities; some are linked to corporations. The funding scheme for incubators have been transferred from Siva to County administrations starting 2020.

* + 1. **Gender Orientation**

No incubator in Norway is specifically targeting women entrepreneurs but one incubator had an accelerator program focusing on women entrepreneurs in 2019. In Siva’s annual report (2019), the account for the share of women in leading positions in the incubators tenant firms is estimated to approximately 25%. Eight out of the 26 incubators are led by women and only one incubator has no women on the board of directors. In general, there seems to be 25-40% women on the board of directors of the incubators in Norway (own counting from websites).

**4.3 Incubation in Sweden**

The Swedish Incubators and Science Parks (SISP) has 65 members and there are approximately 40 more incubators that are not members of SISP. “Swedish Incubators & Science Parks are actively developing the world’s most efficient innovation ecosystem by adding connectivity between our members and Sweden’s leading universities, corporations, public organizations, customer and exit markets"[[49]](#footnote-50) About 60 of all incubators in Sweden are technology-based and many follow the triple helix model which concerns the connectiveness of three institutional pillars, namely the government, universities and industry (McAdam *et al*., 2018).

Three trends in open innovation can be observed (Swedish incubators 2018, SISP)

1. Big companies house innovation processes or startups from incubators in their environments.

2. Big companies break out their R&D and place them in an incubator as a startup, where they can work undisturbed in a creative environment.

3. Big companies are customers to startups in order to create increased innovation.

Incubators are often connected to the national strategy of regional smart specialization with different regions specializing in specific areas of research and development (McAdam *et al*., 2016).

For example, the Game Incubator (thegameincubator.se) in Skövde started in 2004 and has since itsits inception developed over 100 companies with approximately 500 employees, actively connected itself to R&D programs in various big companies and the university college of Skövde. Notably, 25% of all Swedish companies within computer gaming are located in Skövde. The university college of Skövde has the largest computer gaming department in Sweden and is engaged in advanced researchin the field. Skövde is a smart specialisation region. Less than 10% of all companies in the Game Incubator are managed by women, with as gaming considered a traditional male-oriented field (Toro-Troconis and Mellström 2010).

**4.3.1. Gender Orientation:**

1. In general, board member representation in incubators is clearly dominated by men; board representation, chairman of the board and the managing director.

2. Almost half of the personnel working for the incubators are female; however, though there is a male dominance among the coach/advisers working with tenants.

3. The tenants in the incubators have a male dominance. Blomkvist and colleagues identified that only 15% of the entrepreneurs identified on the webpage of different incubators were women (Blomkvist et al. 2010).

4. In the study by Blomkvist et al. the pictures presented on incubator websites predominantly represent a male focus. As in other studies (see for instance Ranjbar 2017; Roelofs 2018), their findings are similar to the stereotyped picture of the entrepreneur-as-male. Thus, traditional gender segregation pattern continues to manifest itself both vertically and horizontally in the incubator environment.

**4.4 Incubation in Israel**

In Israel, there are 19 government supported technology incubators funded through the Innovation Authority, with additional support from corporations, private investors, foundations and universities. There are, however, other not-for-profit and for-profit incubators in Israel not through the Innovation Authority. The main purpose of both types of incubators is to provide a physical environment for an extended period of time (1-2 years) that supports novice entrepreneurs to proceed from concept stage to obtaining funding. The incubators in Israel tend to focus either on particular themes such as manufacturing, software, fin-tech, agriculture, life sciences, etc., or on particular regions (periphery) or on populations (minorities).

In 1991, the Israel government created the Public Technological Incubator Program (PTIP) to leverage the strengths of approximately 750,000 scientists, engineers, and physicians who had arrived from former USSR. Under the auspices of Israel's Office of the Chief Scientist (OCS), a division of the Ministry of Economy, they started six "incubators" designed to foster seed and early-stage technology development through entrepreneurship.

These programs morphed into the Innovation Authority's Incubators Incentive Program (IIP) which continued to support entrepreneurs interested in establishing startup companies based on innovative technological concepts. Currently these technological incubators are centres for entrepreneurship and invest in new startup companies by providing technological, business and administrative support as well as initial funding. The incubators offer a supportive framework for the establishment of a company and development of a concept into a commercial product. The Innovation Authority chooses the IIP incubator licensees through a competitive process for a license period of eight years and aims to have them spread across Israel[[50]](#footnote-51).

The government provides 85% of the R&D funding while the licensees provide the management expertise and the additional 15% funding. Typical services and support provided by IIP incubators include physical workspace, seed level funding, consulting and networking. Most of the incubators obtain equity in client companies upon accepting them into their incubation programs.

**4.4.1 Gender Orientation**

None of the IIP incubators focus specifically on women entrepreneurs – and it is not clear how active any of the incubators are in promoting a specific gender agenda.

The performance of these for-profit incubators is mainly judged by financial success; thus, the licensee leadership team is selective in choosing participants.

On the other hand, there are over 300 accelerator programs and over 250 co-working spaces in Israel and several of these promote programs in support of women. For example - WOSNA – is a high-tech accelerator based on the community of Women of Startup Nation, together with Google Campus. The accelerator’s first program launched in August 2019, and their second cohort is scheduled for June/July 2020. The startups cover fashion, artificial intelligence, fintech, real estate, advertising, enterprise software and gov-tech. Each participating company must have at least one woman on its founding team. WOSNA offers four weeks of lectures and workshops by investors, entrepreneurs and tech executives. Similarly, Microsoft Israel is part of a group that includes M12, Mayfield and Pivotal Ventures running its second *Female Founders Competition*, focused on assisting women entrepreneurs in raising funds in the fields of "business-to-business, software-as-a-service and deep-tech solutions."[[51]](#footnote-52) Startups led by women in Israel, the US, Europe, and India are competing to receive a total of $6 million and "access to technology, resources, mentoring and other benefits" that support women entrepreneurs.

Additionally, a co-working space specifically for female entrepreneurs and founders in Tel Aviv, ’Women Lead Ventures’[[52]](#footnote-53), has been established, which folded after 3 years when no sustainable business model was found. More recently a co-working space has opened again in Tel Aviv, Panthera, which specifically provides space for professional woman, and offers networking and business development assistance but is not focused purely on startups or technology.

**4.5 Conclusion**

Technological business incubation is an important policy tool in supporting entrepreneurship in general and technological entrepreneurial growth in particular. In Ireland there are 30 prominent incubators, half of which are dedicated to the technological sector. In Ireland, technological incubation is located mostly in Dublin, however regional universities located throughout Ireland also have affiliated incubators. Norway has 34 incubators of which 26 are in the technological field. Sweden registered slightly above 100 incubators and science parks, with all 60 incubators technological based. Many follow the triple helix model of innovation. Similar to Norway, incubators in Sweden are spread all over the country. In Israel there are more than 50 business and technological incubators, 19 within the framework of the Innovation Authority. In Israel technological incubators tend to focus either on particular themes, regions (periphery) or populations. Overall, there are some gender specific themes and agendas, in correspondence with government schemes and policies and/or gender policies of institutions hosting incubators. Nonetheless, women are underrepresented in the incubation systems of all four countries, in terms of founders, investors and incubation management.

1. **Financing**

Access to appropriate finance is an important foundation of entrepreneurial ecosystems (Hechavarria *et al*. 2014). Indeed, start-up capital is a critical resource for technological growth-oriented startups, in terms of sustainability, growth and performance (Mason and Harrison, 1992); thus, resulting in the emergence of governmental and non-governmental schemes specifically addressing access to financial capital. Finance is a documented challenge for all business owners per se however, there is a well-researched body of literature to indicate that female business owners experience additional disadvantages as a result of their gender (Bhide, 2000; Carter, 2000; Carter and Marlow, 2002; Marlow and Patton, 2005). According to Hisrich (1985:73) “while financing is a problem for every entrepreneur, for women entrepreneurs the problem is even more acute”. Furthermore, there is evidence to suggest that obtaining venture capital is gendered and that women entrepreneurs face more challenges that their male counterparts in raising early stage equity investments from venture or business angel investors (Brush *et al*. 2001; Becker-Blease and Sohl 2007). Financial stakeholders play a critical role in the growth, development and sustainability of female-owned high-tech startups; therefore, it is important to understand the country specific characteristics of the financial landscape in the respective ecosystems.

**5.1 Financing Technological Entrepreneurship in Ireland**

This section gives an overview of the avenues by which technological entrepreneurship is financed in the Irish context (i.e., the Republic of Ireland (ROI) only). Notably, while Ireland in 2016 was slowly beginning to emerge from the toll of the financial crash of 2008 and the prolonged Great Recession that followed, in the years 2017 and 2018, there remained a drought of funding for startup technology entrepreneurs. This is commonly known as a ‘seed funding gap’ or ‘seed void’ and it has had a deep impact upon early venture technology startups. Despite a pickup in early 2019, it has been challenging for early stage technology startups to obtain seed funding in Ireland, which has been negatively compounded by the global coronavirus pandemic and the subsequent lockdown of Irish society in March 2020. Although select Irish startups have received large sums of funding in 2018, the total amount of funding flowing into firms dropped 47% in the first nine months of 2018.[[53]](#footnote-54) This was especially noticeable in the severe shortage of seed funding. Although seed funding has increased (from €16m in first half of 2018 to €38m in the same period for 2019), concerns are growing about the lack of a holistic governmental approach to this early-stage funding issue, particularly with Brexit running alongside the financial and everyday impact of the coronavirus pandemic and a global downturn on the horizon.[[54]](#footnote-55) According to the Irish Venture Capitalist Association’s (IVCA) Venture Pulse survey, venture capital funding to Irish technology firms increased by 16% to €228.9m in the first quarter of 2020 but the figures may disguise a serious threat by Covid-19 to SME funding.[[55]](#footnote-56)

According to TechIreland’s *H1 2019 Funding Review,* female founder funding is double that of H1 2018 i.e., €19.8m to €43m.[[56]](#footnote-57) However, that is only 10% of the total headline figure of €437m and thus, despite good targeted efforts from Enterprise Ireland (EI), TechIreland has declared that female founders “need continued support”. The review also found 400 female founders in Ireland, 216 incubation “hubs” and an overall total of 101 companies funded in H1 2019. Dublin based firms received 70% of total H1 2019 funds with regional areas receiving a total of €129m with the following allocations to the top three regional locations: Galway 40m, Cork 37m, Limerick 22m). A regional technology ecosystem is still in development spurred on by EI’s regional strategic planning.[[57]](#footnote-58) The top three sectors funded in H1 2019 are Fintech (€145m across 16 companies), Health/Medical (€137m across 25 companies) and Enterprise Solutions (€34m across 23 companies). *[[58]](#footnote-59)*

**Public Funding**

The primary state agency that facilitates public funding and support schemes for founders is Enterprise Ireland (EI), who support all founders in applying for national schemes, such as the New Frontiers program, High Potential Start Up (HPSU) schemes and general Competitive Start Fund (CSF) program alongside a female-dedicated version connected to EI’s ‘Female Entrepreneur Unit’. Applying for funding from EI is the common norm for most early-stage technology startups and is a process supported by incubators. Of note is that 36% of EI’s staff are female.

EI’s *End of Year Statement 2019* gives an insight into the performance of the Irish startup ecosystem before the coronavirus struck Irish shores.[[59]](#footnote-60) Employment increased in all sections of the country, except the midlands which was down by -1%. Furthermore, 16, 971 jobs were created with 66% total new jobs being created outside Dublin.[[60]](#footnote-61) In terms of employment, cleantech was up 9%, life sciences and fintech up 6%. As of 2019, 221,895 people were employed in Enterprise Ireland’s associated companies. In terms of building scale, innovation and reach in 2019, EI helped establish 38 women-led startups; 126 new start-ups were supported through HPSU and CSF funding; 13 HPSUs emanated from the research sector; and a new €175m venture capital fund was launched. In relation to Brexit, EI introduced a number of schemes so that companies could implement Brexit planning and make concerted efforts to diversify exports ahead of the UK exiting the EU. EI has managed to support 2,000 Brexit-exposed companies through the utilisation of €125m in support funding. On the ground level, Brexit supports were also implemented through the use of advisory clinics and webinars at various national events. With Brexit now an inevitability, EI also made significant efforts to expand its global outreach having 40 EI offices around the world, 8 of which are in new markets as well as 56 ministerial-led trade events. Furthermore, Ireland’s centre for Applied AI (CeADAR) received 12m EI funding to accelerate the development and deployment of AI, data analytics and machine learning alongside €2.5m in funding to extend and double the size of the Arclab innovation hub at Waterford Institute of Technology (WIT).[[61]](#footnote-62) Overall, the above figures are positive showing an eagerness to fund nationally and expand globally. However, the unexpected Covid-19 pandemic has changed the business environment, which had already been complicated by the repercussions of Brexit. The years 2020-2022 will be challenging – for startups, established business and governmental agencies - as they all negotiate the intricacies of a depressed economy constituted by the outfall of Brexit and the “new normal” dramatically imposed by the coronavirus.

Although the Irish government and its agencies have implemented a wide array of supports for entrepreneurship and have additionally implemented plans to tackle gender issues and raise the support given to female founders, notable interest groups in the ecosystem, such as Scale Ireland and IVCA, have actively analysed governmental budgets and proposed solutions alongside publicly criticising areas of current government policy and action. Such criticisms and proposed solutions relate to the lack of seed funding in the Irish ecosystem for life science startups, who struggle with cashflow issues as well as for start-ups generally impacted by the persistent “seed void”; the need to revamp incentives delivered through the “Key Employment Engagement Programme (KEEP)”; proposed improvements to capital gains tax as well as calls to amend the “Employment & Investment Incentives Scheme (EIIS)”, which aims to drive investor activity, but which has only been implemented by 36 companies so far in 2019. Lastly, there are persistent calls from interested parties to look at best practice in other European ecosystems, such as the startup development and maternity supports available in Sweden alongside enabling investing to be more accessible to all instead of remaining a siloed financial activity.[[62]](#footnote-63) Such critique continues with the advent of Covid-19 crisis, with Scale Ireland advocating strongly for emergency liquidity supports for indigenous high-growth innovative startups and scaleups in the Irish ecosystem.[[63]](#footnote-64) Certainly, the Covid-19 pandemic and subsequent health lockdown has detrimentally impacted the Irish economy and its startup scene, with Scale Ireland predicting thousands of job losses in the region of 30,000,[[64]](#footnote-65) but only time will tell how the government responds to such calls for aid and how the Irish ecosystem emerges into a “new normal” created by external factors.

**Venture Capitalists**

Venture Capital (VC) funding is an important avenue for startups, particularly those who wish to advance towards higher growth and success. This environment is small and social networks are strong between the various venture capital companies and between VCs and incubators, especially in Dublin. Due to the financial crisis of 2008 and the subsequent Great Recession, venture capital funds became scarce for pre-seed and early stage startups with VCs tending to wait until a company developed significantly and de-risked with the help of other funding pathways. As the recession eased, VC companies began to show more interest in early startups again, particularly university-connected ventures with high-growth potential. Such a focus relies upon continuous tracking and strong social networking with selected HPSUs, which have the potential to spin-out from university research centres into associated incubator programs and VC-backed funds. For example, Atlantic Bridge has recently established a ‘University Bridge Fund’, which aims to scale HPSUs emanating from leading universities and third-level research institutions. This fund is particularly focused on innovative technologies in software and hardware, life sciences and physical sciences.[[65]](#footnote-66) Although such a fund has been broadly welcomed, it has also raised criticisms with regards to its narrow focus on HPSUs emanating only from the third level research sector.

**Angel Investors**

As in other countries, business angel investors are collaborating by pooling resources and collectively de-risking investment decisions. For the Irish context, this has resulted in the formation of the Halo Business Angel Network (HBAN), a collaborative organisation supported by both EI and InterTradeIreland, to enable privately-based strategic co-investing.[[66]](#footnote-67) HBAN aims to promote and encourage “a culture of risk-taking and entrepreneurship in Ireland”.[[67]](#footnote-68) It brings together and co-ordinates the investments of 700 individual business angel investors, who invest on average €25,000. It is important to acknowledge that angel investing in Ireland has an aura of mystery surrounding it, in that angels generally keep a low profile and founders keep their contacts close and anonymous; thus, consequentially there is a lack of data about angels and their investment processes. In the pre-investment stage, due diligence is pivotal to the relationship between angel investor and technology founder, which includes extensive monitoring and networking. In the Irish context, due to the continuing funding gap experienced by early startups and a cautious reluctance on the part of venture capitalists to fund at an early-stage, (a stage of low-growth and high-risk), angel investors have come to play a very significant role in filling funding gaps and developing startups.[[68]](#footnote-69) During this transitional period, hands-on angel investors may take on a mentoring role to founders in terms of developing the business concept, as well as providing strategic advice on how to achieve growth. Furthermore, such guidance may also influence incubator selection and tenancy. Angels may also aid founders in relation to obtaining public funding, which may occur before entering an incubator or in the early time-period after taking up an incubator tenancy.

**Crowdfunding**

The use of crowdfunding by technology startups in the Irish ecosystem is minimal and constitutes an area for further research to explore. Importantly, crowdfunding remains unregulated in the Irish context with the Department of Finance currently working on regulative legislation.[[69]](#footnote-70)

**Private Equity Funding**

Like crowdfunding, in the Irish ecosystem, private equity funding (i.e., funds from high net-worth individuals and institutional investors, such as pension funds, insurance companies and endowments) plays a minimal role and provides an area for future research to explore.

**5.2 Financing Technological Entrepreneurship in Israel**

Israel's venture capital industry was born in 1985, when the first Israeli venture capital fund, Athena Venture Partners was founded by a team of Israeli and US investors who dreamed of taking Israeli High-tech companies public on NASDAQ. Subsequently, in 1990, a second VC firm, Veritas Venture Capital Management was formed by investors from America and South Africa. The Israeli government started taking a more significant role in 1993 by starting a group called YOZMA (which means “initiative” in Hebrew). Yozma invested around $80 million for 40% stake in ten new venture capital funds. They used public funds to leverage foreign financing, primarily from the United States. This was accompanied by equity guarantees for foreign investors, programs to link Israeli firms with foreign business angels, and exits of Israeli venture firms on foreign stock exchanges. YOZMA was described in a 2010 OECD report[[70]](#footnote-71) as “the most successful and original program in Israel's relatively long history of innovation policy.” The YOZMA program was slowly phased out as by 2000, the Israeli venture capital industry had reached the stage whereby the private sector led the public sector in investments. [[71]](#footnote-72).

With over 370 multinational corporations currently present in Israel (R&D, M&A, Innovation Hubs, Venture Scouting), Israel's venture capital and incubator industry plays an important role in the high-tech sector that is often referred to as "Silicon Wadi" being considered as an offshoot of its Californian counterpart, the Silicon Valley.

According to the Israel Venture Capital (IVC) Data and Insights report, in 2019 over 522 deals raised $8,3B capital for Israel startups. This was 31% above 2018 results. VC-backed deals accounted for $6.4 billion in 2019 compared to $4.75 billion in 2018 and $1.13 billion in 2010, which marked “a decade of extensive growth,” according to the most recent IVC report. Over 90% of the deals include foreign investment and in addition, almost 100 Israeli companies are currently listed on NASDAQ.

In 2019 Israeli VC-backed deals topped all years, however, COVID-19 crisis affected Israeli deal-making and in March 2020 - only 17 VC-backed deals were closed – 50% down from previous dynamic months of 2020[[72]](#footnote-73).

**Public Funding**

The Israeli Innovation Authority has several incentive programs aimed at various stages. The funding program are related to the divisions of activities described above. Some examples are listed in the following: The Ideation (Tnufa) program is designated for fledging entrepreneurs to assist them in developing and validating innovative technological concepts (NIS 200000 over two years). The support of Tnufa is a sort of “vote of confidence” enabling entrepreneurs to raise additional capital. The Early Stage Incentive Program provides grants for early stage companies and is focused on special populations (ultraorthodox and minorities) and peripheral areas. The R&D Fund intends to encourage technological innovation and provides between 20 to 50% of approved expenditures. Such a fund is also available for large companies and dedicated industries. Additionally, Magnet – a generic technologies R&D consortium provides up to 66% of an approved budget for industry and up to 100% for a research institute. The Innovation Authority also funds R&D in manufacturing industries, as well as participation in international frameworks and designated programs in digital innovation for public sector challenges[[73]](#footnote-74). **Venture Capitalists**

Of the $8.3B raised by Israeli high-tech companies in 2009, VCs contributed 77% with $6.4B. The software sector was the largest in 2019 with $4.4 billion raised in 26 deals that were each over $50 million, making up 58 percent of the total amount raised in the sector. Investments in AI-based companies and cybersecurity firms also increased, according to IVC, with AI firms raising $3.7 billion cybersecurity companies raising $1.88 billion. Eighteen deals over $50 million accounted for 55 percent of the total amount of capital raised by AI-based firms. Fintech companies raised $1.7 billion in 2019, up from $880 million in 2018. In addition, life sciences companies raised $1.37 billion in 2019, up from $1.18 billion. [[74]](#footnote-75)

Important to note,

* Each of the universities in Israel are reporting on founding their own VC funds aimed at either students or faculty research. For example, the Technion’s Research and Development Foundation and UG Capital Management started a $200m fund for companies related to Technion and its alumni.
* In recent years, the trend has been for international VCs to invest more in growth stages rather than early and pre-seed stages, but more Israeli based VC's are focusing on earlier stages as well. Still, there is a reduction in the number of startups being formed.
* A preliminary observation is that the vast majority of client companies funded by VCs are business to business (B2B). This observation is based on analysis of several Israeli VC firms and confirmed by an article in Globes: 80% of Israeli high-tech companies and startups aim at the business sector and only 20% at the end consumer[[75]](#footnote-76).

**Angel Investors**

There are many individual Angel Investors and international investors supporting Israeli startups as well as several large Angle Investor Groups. This is partially an outcome of the many Israeli exits allowing for a considerable number of executives and serial entrepreneurs to be in comfortable position to invest.

However, seed is the only type of round that has shown a decline in recent years, in both amounts and number of deals. Seed round amounts shrank in 2019 to $148 M compared with $169 M in 2018. This could be attributed to the fact that the annual number of startups is on the decline[[76]](#footnote-77).

**Crowdfunding**

Crowdfunding is exercising increased positioning in the funding landscape in Israel since 2012, raising tens of millions of dollars from many people who want to invest small sums of money (typically starting at $10,000) in Israeli startups. In 2017, the Israeli Parliament amended a series of regulations to ease fixed-income debt crowdfunding for startups and small businesses.

The leading equity crowdfunding platform in Israel is OurCrowd[[77]](#footnote-78), the largest platform of its kind in the world, which has raised over $1B from thousands of investors and invested in over 170 startups since its inception in late 2012.

Another serious player is iAngels, which combines angel investing and crowd funding. Founded in 2013, this platform gives investors the opportunity to angel invest by participating in funding rounds alongside top-tier angel investors.

* Crowdfunds focus on early stage startups, where less funding is needed compared to growth stage startups.
* Consumer focused investors realize their investments upon an “exit”– with equity crowdfunding investors obtain shares in the company.

**Private Equity**

In 2017 Israeli private equity firms invested approximately $1.7b in startups (~26% of the total investments). In 2014 private equity investments were contributed approximately 34% of the total.

In sum, the YOZMA program started by the Israel government in the 1990s was critical in stimulating the growth of the VC industry in Israel, demonstrating that government input is sometimes needed for the growth of entrepreneurship. While the YOZMA program has been phased out, the well-funded Israel Innovation Authority in a sense is playing an analogous role, by funding elevated risk ventures that might otherwise not receive support from VCs or angels. While the Authority does have a program that focuses on supporting women-led startups, there is not enough published data to indicate to what extent this program has been successful. Under the new program, women-led start-ups (requiring at least 33% ownership and a managerial or technological role in the company) will be eligible for research and development grants of up to 75% of the company’s R&D funding in the first year of the program, and 70% of funding in the second year, with a budget cap of up to NIS 2.5 million in the first year and NIS 4.5 million in the second year.

Up to date, the overwhelming majority of VCs do not mention any particular interest in encouraging women led startups. Since VCs must answer to their investors, it is not surprising that assessing future profitability of candidate companies is their prime concern, not promoting a social agenda. An exception is the VC firm, Lightspeed Venture Partners, whose website notes, “We believe women are the earliest adopters of consumer technology. That’s why female-fronted organizations represent over one third of our consumer portfolio.” This observation supports the hypothesis that one factor in explaining why women are not equally represented in technological entrepreneurship may be that women led startups mainly focus on meeting needs and desires of consumers, while VCs tend to focus on funding business to business companies.

A2018 [Lady Globes article](https://en.globes.co.il/en/article-israeli-vc-funds-appointing-more-female-partners-1001195938) stated that more Israeli women were becoming venture capital partners, and some were setting up funds.[[78]](#footnote-79)

The Israeli venture capital industry was very attractive at the time and with the rise of capital venture funds in Israel a pattern of women as venture capital fund managers and founders was emerging. Unfortunately, even though the Israeli tech industry likes to think of itself as similar to Silicon Valley, the trend did not continue in Israel, and the emphasis on diversity, and specifically gender diversity, in venture capital funds appears to be on the decline[[79]](#footnote-80). While the Innovation Authority has financing schemes for Ultraorthodox and Arab Israeli entrepreneurs, there are presently no data available as to the investment of venture capital industry in these population sectors.

Thus, data published in 2020 showed that venture capital funds in Israel are far behind when it comes to diversity. Apparently, the collective number of female partners in U.S. venture funds grew by over a third in 2019, from 9% of partners to 13%, while Israeli funds saw a decline in the number of female partners. Out of 68 Israeli funds examined, just 13 had female investing partners. Out of a total of 171 VC partners in Israel, just 22 were women and only 13 of them were investing partners. Though there is a large female presence in these companies, they differentiate between investing and non-investing partners and women play only a small part in financial decision-making processes.[[80]](#footnote-81)

**5.3 Financing Technological Entrepreneurship in Sweden**

Funding for startups in Sweden are divided into five categories; bank loans, venture capital, angel financing, public financing and crowd funding[[81]](#footnote-82) (There are several actors who serve as mediators to assist potential new entrepreneurs to getting in contact with investors.

**Venture Capitalists**

In 2017, formal venture capital (VC) investments in Swedish portfolio companies increased slightly. Foreign VC funds accounted for most of this increase. As previously, ICT and life science companies attracted most investment. In 2017, 72% of the total investment volume was placed in portfolio companies in these two sectors. Since the peak year of 2008 (when almost SEK 5 billion was invested in Swedish portfolio companies), investment volumes have decreased. Over the past eight years (2010 – 2017), the average annual investment volume has been SEK 2.2 billion. In 2017, VC investments in Swedish companies (in all phases) sum up to SEK 2.39 billion, an increase of SEK 0.15 billion (+7%) in comparison to the previous year. In 2017, foreign funds accounted for 59% of total VC investments in Swedish companies. Thus, these invested more than Swedish private and state funds combined. Swedish state funds provided 25% of the total investments and Swedish private funds 16%. Foreign funds invested SEK 1,402 million, an increase of SEK 476 million (+51%) on the previous year. Swedish state funds invested SEK 598 million (-2%) and Swedish private funds invested SEK 390 million (-44%). Over time, the trend is towards Swedish private investment decreasing while foreign investment is increasing (state investment remaining rather stable). The state is the main investor in companies in the earliest phase (seed). Foreign VC funds have concentrated on the later phases. Broadly speaking, there remains little eagerness to invest in cleantech. Cleantech investments have decreased considerably since the peak year of 2008 (when SEK 700 million was invested). From 2007 to 2011, many Swedish private funds stated that they invested in cleantech. However, since 2013, it has primarily been state funds that have declared they have invested in cleantech companies. In 2017, SEK 73 million was invested in cleantech, solely from state and foreign players[[82]](#footnote-83).

There is a clear major city concentration in venture capital investment. Only state funds invested in identified, portfolio companies in rural areas. However, as only a small part (31%) of foreign funds’ portfolio companies could be identified, no statements can be made on the geographical spread of their investments.

If the gender distribution in the identified portfolio companies is studied, only 14 percent of the portfolio companies have a woman as the highest executive. This gender distribution becomes even more distorted if studied on the basis of investment volumes for the identified portfolio companies. Only 7 percent of that investment volume in 2017 went to portfolio companies with a woman as the highest executive. Consequently, the portfolio companies run by women received on average less risk capital than those run by men. This distortion of the distribution is also affected by the fact that the portfolio companies run by women are to a greater extent found in the early investment phases; 94 percent of the portfolio companies whose highest executives were a woman were in the seed and startup phase, which can be compared with the corresponding proportion in the early investment phases of 74 percent for the portfolio companies whose highest executives were a man.

**Private Equity**

There are primarily five Swedish state-controlled and financed trustees who carry out company financing with equity. For the program period 2014-2020, the EU has indicated an increased investment in so-called revolving financial instruments. Nearly sixteen percent of the regional fund's budget (ERUF) is invested in venture capital in the form of eight regional investment funds in Sweden, a fund-in-fund project, and a green fund. The goal is to invest the funds in small and medium-sized and green companies.

**Public Funding**

There are four public authorities where it is possible to apply for specific funding for early stage/startups/ business development; Arbetsförmedlingen, Jordbruksverket, Vinnova and Tillväxtverket, some of this funding is in form of grants with no need for co-financing or return of investments.

Almi Företagspartner AB is owned by the Swedish state and is the parent company of a group consisting of 16 regional subsidiaries and the Almi Invest AB subgroup. This organization provides the most complete support to entrepreneurs throughout all phases. They provide a mix of different funding possibilities including grants and loans.

**Angel Investors**

Not many studies have been conducted in Sweden on angel financing and business angels are generally considered difficult to map (Silver, 2008, Avdeitchikova, 2008, Månsson and Landström, 2006). According to the studies, angel investors are an heterogenous group both in terms of who they are, what they finance and to what extent. Connect Sweden have 450 angels in their network (Sweden’s largest network) of whom 250 are active. According to a recent study 30% of the angels were women and 70% men. There is an association for actors within private equity (Buyout & Venture Capital) and angel financers networks; Swedish Private Equity & Venture Capital Association, SVCA[[83]](#footnote-84) (). Locally, and in particular in Stockholm there is strong networks of angel investors often dating back to joint educational backgrounds such as the Stockholm School of Economics. Such a network is for instance Stockholm Business Angels that labels themselves as a ‘Venture Finance and Competence House’ (Stoaf.se). They are particularly active in high-tech start-up scene of Stockholm.

**Crowdfunding**

Crowdfunding is becoming increasingly popular since the late 2000’s in Sweden. There are several companies on the market with the pioneering Kickstarter and Funded By Me, as the major ones. Kickstarter for instance has funded more than 155 000 projects (2019) with over 4 billion dollars since the company was funded 2009 (foretagande.se). Crowdfunding is generally divided according to either projects focussing on supporting an original innovative idea or crowdfunding as a way to fund a ‘pure’ business project. In the first case, the funder is often rewarded by either take part of the product early on or get promotional value by being connected to the product. In the second case, crowdfunding is functioning as an avenue for alternative risk capital. The importance of crowdfunding is steadily growing in the tech-scene of the major cities of Stockholm, Malmö, and Gothenburg, although in the overall picture crowdfunding is still a minor component in comparison to other forms of funding.

**5.4 Financing Technological Entrepreneurship in Norway**

To start with, the equity finance market is relatively small in Norway, compared to nearby countries. The main reason is the heavy focus on few industries in the country, where the oil industry has played a significant role. Overall, there has been very little investments made in women’s businesses. This has mainly been explained by the focus on traditionally male-dominated industries (primarily the oil industry, and later on the IT-sector) (Ljunggren & Foss, 2012).

**Public Funding**

Innovation Norway

The most important public actor is Innovation Norway. This is usually where a new tech business would start to search for funding (and other forms of support) and they have a major impact on the “financial landscape” for startups in Norway. Their mission statement is: *“INNOVATION NORWAY creates value by stimulating to profitable business development throughout Norway. Our programmes and services are intended to create more successful entrepreneurs, more enterprises with capacity for growth and more innovative business clusters”[[84]](#footnote-85)* The organization is owned by the Ministry of Trade, Industry and Fisheries (51%) and the 15 county authorities (49%). They offer a wide variety of services, targeting startups, growth companies and clusters, as well as companies that are aiming for an international market. Many services are related to the development of the business, through knowledge and networking. Their financial services include low risk loans, innovation loans, grants and guarantees[[85]](#footnote-86).

Innovation Norway is also playing an important role in assisting Norwegian businesses to grow internationally. They are represented in all counties in Norway, and in more than 30 countries worldwide[[86]](#footnote-87).

SkatteFUNN

SkatteFUNN is a tax incentive scheme, which gives all Norwegian firms tax deductions for R&D costs. Small and medium sized enterprises can get 20% deduction and large enterprises can get 18%. There is no requirement that the firm actually pays taxes, the only requirement is that it is registered in Norway. SkatteFUNN plays an important role in the financing of new tech businesses in Norway, as this helps to reduce the risk for new firms. However, the scheme is a legal right for all companies in Norway, not only for startups. (Alsos et al. 2007)

Siva

Siva is a public enterprise owned by the Norwegian Ministry of Trade and Fisheries. Siva is collaborating closely with Innovation Norway, the Norwegian Research Council and the Norwegian Patent Office and is part of the public funding agencies for innovation, even though they do not primarily offer financial capital. Siva works to “facilitate innovation by building, owning and developing infrastructure for industry, startups and research environments”. (www.siva.no). Siva invests in real estate and commercial property and have ownership in innovation companies across the country. They work with knowledge building, incubators and connect firms to regional, national, and international networks. Several thousands of entrepreneurs and startups get supervision and support through Siva every year.

According to Roger Sørheim[[87]](#footnote-88) there are three ways to find soft funding for startups within tech industries in Norway, and these three are equally important; 1) Innovation Norway, 2) the Norwegian Research Council and 3) a number of different EU-programs. (Sørheim, personal interview 26th of September 2019).

VCs

The institutional venture capital market has always been small in Norway, and it is even getting smaller, with few actors. Today, there is only a handful of active actors. Traditionally, VCs have invested in oil and IT sectors, where the absolute majority of investments have been made. Very few firms in these sectors are operated by women, therefore, the proportion of women securing venture capital is probably smaller in Norway compared to many other countries (Sørheim, interview Sept 26th, 2019).

The Norwegian Venture Capital and Private Equity Association involves around 30 equity funds, but far from all of these play an active role. Only few are targeting startups. Most of them target later-stage and buyout-companies. (www.nvca.no). However, Ljunggren & Foss (2012) in their overview of the VC industry in Norway found that approximately 94% of the employees in the industry in Norway were men.

**Angel Investors/Angel Investor Groups**

NorBAN, the Norwegian Business Angel Network, is the leading network in Norway. NorBAN is also member of EBAN – The European Trade Association for Business Angels, Seed Funds, and other Early Stage Market Players. (www.norban.no). However, according to Sorheim (Ibid), there are very few well-functioning Business Angel Networks in the country, and NorBAN plays in reality only a small role in the equity market. There are a number of active business angels, but the majority operate in informal ways. There are many informal business angels, who are willing to invest small amounts of money (500 000 – 1 million NOK) in cooperation with the different incubators. Some of them are active in mentoring and knowledge sharing, others are more passive and are only interested in investing capital. The connection between business angels and incubators is thus becoming more and more important in Norway today. (Sørheim, Ibid)

**Crowdfunding**

Crowdfunding plays a relatively small role in Norway, even though it is growing[[88]](#footnote-89). There are a number of crowdfunding platforms available, such as Kickstarter (kickstarter.com/no) and Kameo (kameo.no).

The reward-based crowdfunding is the most common form, and thereafter loan-based crowdfunding. Both forms are of very little (basically none) relevance for tech-based industries. Equity based crowdfunding may play some role for technological startups (NOU 2018) and can be a good starting point for a firm to reach equity *one* time. To try to get equity a second or third time through a crowdfunding campaign may send negative signals to the market and is therefore less relevant. Crowdfunding campaigns may generate something like 4-5 million NOK and plays altogether a small role for the funding of tech startups in Norway. (Sørheim, Ibid.).

**Private Equity**

The market for private equity funding is still small, although growing. There is a large number of emissions outside the stock exchange to private companies (NOU 2018), however few by professional owners. Something pointed out by Sorheim (ibid) is the role of Corporate Investors, where large companies, such as for example Equinor, invest in new/small companies. There are a number of large companies, but also medium sized companies, who are active investors, and they seem to play some role on the equity market for new firms in Norway. However, there is very little knowledge on their relevance and function (Sørheim, ibid).

**5.5 Conclusion**

Since financing is one of the most important aspects of technological entrepreneurship, it was important to outline in this report the country specific characteristics of the financial landscape in the respective ecosystems. These landscapes are indeed very country specific, therefore only a few particular characteristics are listed below[[89]](#footnote-90):

Due to the continuing “seed gap”, it remains difficult for early stage technology startups to obtain funding in Ireland, which will most certainly be exasperated by external factors. For the majority of early-startups, public funding from *Enterprise Ireland* is the first port of call followed by attracting angel funding. The top sectors funded in Ireland are fintech, health/medical industries and enterprise solutions. Venture capitalists and angels are the strongest players in the financing arena of Ireland, whereas crowdfunding and private equity are the weakest players. The sector mostly funded in Norway is IT with public funding being most prominent (Innovation Norway and the Norwegian Research Council). Private equity and crowdfunding are at a beginning stage in Norway.

Fintech and IT are the sectors funded most in Sweden, with venture capital as the leading type of finance. Crowdfunding in Sweden is still in its beginning stage.

In Israel venture capitalists contribute close to 88% of funds raised by Israeli high-tech companies. Recently an increase in the growth stage of technological enterprises can be found. The top sectors funded in Israel are software, AI and cyber security and fintech companies. In terms of diversity Israeli venture capital funds lack behind. In Israel the distribution of the various types of financing is rather even – a major strength of the Israeli financing scene is the rather high involvement of international multinationals. A centre-periphery divide concerning startup financing can be observed in all the four countries with the bulk of activities to be found mainly in the respective urban centres.

In Ireland, Sweden and Israel promoting gender in investment schemes is part of the strategy of the leading agents promoting technological entrepreneurship (*Enterprise Ireland, Vinnova and the Innovation Authority*).

The Covid- 19 pandemic initiated a drop in investment globally, triggering an economic contraction. Following the Global Startup Genom report[[90]](#footnote-91) global investment venture capital investment took between 1 to 3 years to get back to the pre-crisis level. While it is not yet possible to estimate the failure rate of startups, the need for venture capital is critical and a dearth in financing could be fatal for many startups and ecosystems alike.

The Irish government and Enterprise Ireland have initiated supports to aid business during the Covid-19 pandemic. These supports are outlined in EI’s Covid-19 Supports document. The supports include a €180m ‘Sustaining Enterprise Fund’, which will be administered by EI to support manufacturing and internationally traded services sector. Other supports include a €450m ‘Covid-19 Working Capital Loan’ and a €200m ‘Future Growth Load Scheme’ as well as a new €5,000 ‘Covid-19 Business Financial Planning Grant’. The recovery map outlined is based on three stages – “Stabilise, Reset, Recover”.

The supports available are numerous and varied depending on the business character. However, in terms of specific EI technology startup supports. EI has introduced a HPSU ‘Sustaining Enterprise Fund’ enabling €50,000 co-investment. This is open to HPSUs that have already obtained an EI seed stage equity investment. Alongside this is an 800k ‘Innovative HPSU Fund’ for companies developing or commercialising new and improved technologies. Lastly, EI has introduced a ‘Lean Business Continuity Voucher’, which will support enterprises that have identified and wish to implement new measures to ensure operational continuity for critical goods and services.

Norway has initiated a guarantee scheme for bank loans to enterprises, with a total volume of NOK 50 billion. The Norwegian government guarantees 90 % of each loan. This measure has been realized since March 2020. Additionally, the Government Bond Fund has been reinstated, in order to increase liquidity and access to capital with an investment budget of NOK 50 billion. Finally, the government increased the funding for Innovation Norway’s innovation loan scheme (NOK 1.6 billion)[[91]](#footnote-92)In Sweden *Vinnova* is in total directing 350 million SEK to 29 incubators that support knowledge intensive companies. Due to the current Covid-19 pandemic crisis, *Vinnova* is additionally directing an extra 33 million SEK to companies located within these incubators. Additionally, the Swedish government will enable loans in US dollars against collateral via the Riksbank and will also lend up to SEK 500 billion (about EUR 46 billion) to companies via the banks. Swedish government will take on 75% of the cost for employees’ reduced work hours of businesses and make sure that people who are laid-off will receive salary of about 90%[[92]](#footnote-93).

Following the CEO of the Innovation Authority, Israel’s tech industry has already been “significantly afflicted” by the coronavirus lockdown and is expected to see a drop of around 25% in private capital investments and about a quarter of the total revenues[[93]](#footnote-94). Therefore, the Israel Innovation Authority, will fast track some NIS 500 million ($140 million) to small and medium-sized startups that have been affected by the coronavirus pandemic. This will be done in cooperation with VC firms and additional investors. This s track will especially support companies in early stages of growth and in development stages, based on the technology, potential cash-flow et.al. The process is planned to continue for a month, with an immediate funding deposit of 50 % provided at approval, matching complementary funding secured by the start-up itself. Additionally, the Authority invests an initial amount of NIS 50 million (~$13 million) for the R&D and demos of systems, products or technological solutions designed to cope with the challenges of the Covid-19.

**6: Comparative Conclusions**

Each of the four countries discussed in this report has a well-developed technological entrepreneurship ecosystem in terms of innovation and competitiveness. In 2019 all four were ranked with in the top 15% of 149/141 countries measured.

Comparatively across the four countries, Sweden and Israel rank highest for technological entrepreneurship and innovativeness. Sweden’s economy was originally centred around multinational companies, such as IKEA or Ericsson, but in more recent times, it has become a major global player in terms of its innovative ecosystem. Policy makers in Sweden have been fostering innovation and entrepreneurship as part of developing and maintaining the social-democratic welfare state. Generally, policies in Sweden emphasise cooperation between industry and government as well as cooperation between industry and research.

Israel has been labelled “the startup nation”. The country has undergone a process of transformation from developmental to a neoliberal model, configurating a specific version of national neoliberalism (Krampf, 2018). Its innovation policy is used as a national strategic pillar to increase its competitive advantage in the international arena. One outcome of its policies has positioned the entrepreneurial high-tech ecosystem in Tel Aviv at the top of international competitive rankings. Innovation policy, together with additional market-oriented policies, initiated by the government, have brought about a stable and relative high growth to the Israeli economy. However, the model of economic growth is based almost exclusively on the high-tech industry and has generated increasing economic inequalities (Rosenfeld, 2018). This is one explanation for the relative low performance of Israel in other international rankings, such as the Human Development Index.

Ireland and Norway rank lower on technological entrepreneurship and innovativeness, but nonetheless invest resources and prioritize the development of technological innovation in their country’s respective strategies.

Concerning gender equality, Sweden and Norway rank 2nd and 3rd respectively on the Gender Equality Index, with both regarded as ”women friendly” states, that ”would not force harder choices on women than on men or permit unjust treatment on the basis of sex” (Hernes, 1987: 15). In both countries, policies and programs targeting women entrepreneurs exist, mainly targeted towards ”opening-up” strategies, including minority and migrant women. Ireland and Israel rank lower on the Gender Equality Index, although Ireland has recently moved up to 9th position. Israel has a very heterogenous population comprising many groups (e.g. Israeli Jews and Palestinians), all considered traditional and religious. Gender equality is a target only in the secular, highly educated sector of the country, which remains a minority in the country (Fogiel-Bijaoui, 2016). Ireland and Israel both have dedicated female entrepreneurship programs, with the extent to which the programs are targeting high-tech startups to be investigated in the next stage of the GENRE project.

All four countries have a centre-periphery divide, impacting the technological startup ecosystems. In Ireland data show, that the capital city of Dublin received 70% funding in 2019 compared to regional counterparts. EI’s 2019 Powering the Regions strategy report seeks to action previous targets regionally to ensure “optimal economic balance” between various regions, cities, and urban centres. Also the Israeli Innovation Authority – concerned with the highly centralized ecosystem located around Tel Aviv - launched a national strategy to promote an innovation-driven economy in the periphery, which should benefit both the regional economy. These policies are explicitly aimed to deal with the geographical gap between center and periphery, in an attempt to strengthen the periphery.

In Sweden, three metropolitan areas of Stockholm, Gothenburg and Malmö are clearly dominating in terms of number of start-ups and incubators and in Norway Oslo is very much the center of the developing technological entrepreneurial ecosystem. The implications of the center-periphery divide have yet to be investigated.

*Enterprise Ireland,* *Innovation Norway*, Sweden’s *Vinnova* and Israel *Innovation Authority* are public, governmental organizations aimed at promoting entrepreneurship and innovation ecosystems as part of a national strategy. Policy makers in Ireland, Sweden and Israel recognise the importance of addressing the gender gap and increasing the number of female entrepreneurs as key concerns. Therefore, in these countries dedicated women focused programs exist. Norwegian policies have moved towards mainstreaming gender, and terminated most gender specific programs promoting entrepreneurship.

Technological business incubation is considered an important policy tool supporting entrepreneurship in general and technological entrepreneurial growth in particular. Incubators enable the interaction of public and private players and thereby facilitate technological innovative processes. In all four countries technological incubators are an integral part of the entrepreneurial ecosystem. Whereas it was difficult to retrieve detailed and exact data as to the role of women founders, investors and incubator managers in all four countries, the overall impression is that women are underrepresented in the incubation systems of all four countries.

Venture capital markets differ in scope and characteristics between the four countries, although a common issue concerns the fact that policies in all four countries include efforts to expand funding for startups, which constitutes also the most common policy action taken by governments. These policy actions intended to increase access to financial capital are correlated with greater levels of early-stage funding in ecosystems. Whereas – up to the Covid-19 pandemic crisis – venture capital scenes in Sweden and Israel were well advanced, in Ireland and Norway the venture capital markets were rather immature, with Ireland specifically experiencing the existence of ’seed funding void’. In Ireland, Sweden and Israel promoting gender in investment schemes is part of the strategy of the leading agents promoting technological entrepreneurship, acknowledging underrepresentation of women in the venture capital arena.

The Covid- 19 pandemic already caused a dramatic drop in investment globally, triggering an economic crisis. While it is not yet possible to estimate the failure rate of startups due to the crisis, obviously the need for venture capital is critical and a drought in financing could be fatal for many technological startups and ecosystems alike. The consequences of these developments have yet to be seen.

**Section 7: Final Remarks and Recommendations**

The aim of this report was to provide contextual information concerning the technological entrepreneurial ecosystems in the four countries participating in the GENRE project as background to enable a better understanding of the persistent under-representation of women. As evidenced in this report, academic and policy interest in entrepreneurial ecosystems is expanding rapidly. However, empirical evidence explaining how and when variation by gender might apply differentially is absent from most discussions of entrepreneurship ecosystems. Addressing this lack of empirical investigation is the focus of the next stage of the project.

Interestingly, a close look at the four reports comparing ecosystems worldwide reveals, that the gender issue is not considered of importance. The Start-up Genom published a short report dedicated to women in 2019, but did not include the data in the general ecosystem report. When it comes to ranking entrepreneurial ecosystems, women are obviously not of relevance. The four reports analyzed in part one of this report rank ecosystems on a variety of indicators (see table 3) but do not investigate or mention the under/representation of women. Whereas in dedicated reports analyzing entrepreneurship data worldwide – such as the Missing Entrepreneurship Report and the GEM Report, trends and forms of women entrepreneurship is a major issue, gender is not considered relevant when it comes to measuring eco-systems, innovativeness and competitiveness. This fact might be worth investigation in the future.

The unexpected global Covid-19 pandemic and subsequent lockdowns have impacted economies on a global scale. The business environment has changed and the next couple of years will be challenging for start-ups, established businesses and governmental agencies alike. How and to what extent the pandemic will impact the countries under investigation here is still unclear, but technological entrepreneurship ecosystems will definitely be impacted. Whereas the inherent innovative and international character of these ecosystems may establish an advantage when dealing with lockdowns via online alternatives, the worldwide increasing national tendencies in terms of actually and virtually “closing borders” may have negative consequences.

The recently released OECD Report[[94]](#footnote-95) related to this issue acknowledging the COVID-19 crisis is reducing the creation of startups, challenging their survival, and limiting their growth. It already has impacted founders and startups by impeding or completely shutting down daily business processes and revenue streams. It has impacted incubators in that their buildings have emptied and work has now continued online. Furthermore, continued social distancing will limit available space within incubators investments in that investors may now enter a period of cautiously conservative frame of mind concerned with assessing the long-term viability of potential new investments.

Government policies dealing with the pandemic differ substantially. Israel is already in the midst of a second wave and at the verge of a second lockdown, with civil discontent in light of 1 million people out of work and with no income or subsidies. While in Ireland governmental supports are welcome, interest group Scale Ireland has criticized the government for not doing enough and has advocated for “emergency liquidity supports” for indigenous high-growth innovative startups and scaleups struggling within the Irish ecosystem. Norway and Sweden – please add a sentence or two!

In applying a gender lens, there is anecdotal evidence to suggest that the COVID-19 pandemic is creating a crisis of inequality, as it affects men and women differently. There is also a long-standing literature [suggesting](https://www.nature.com/articles/s41562-019-0558-x.pdf?draft=collection) that mothers have systematically higher childcare responsibilities than fathers, which can in part explain gender differences in the labour market. With the majority of children now taken out of school, it is possible that this asymmetry could amplify the impact of the crisis on women entrepreneurs. While the evidence suggests that women’s employment opportunities will suffer severely during the crisis, we also see causes for optimism over the longer term. In response to the pandemic, many businesses are adopting work-from-home and telecommuting options on a wide scale for the first time. If these arrangements persist, they will disproportionately benefit working women, who struggle to combine their careers with childcare needs.

Based on the preceding analysis, we put forth the following areas of interest/recommendations:

**Recommendations (Des’ Suggestions):**

**Policy**

* Fostering women’s presence in technological entrepreneurial ecosystems should be an explicit country policy strategy.
* Coalitions and productive collaborations between key stakeholders are essential as they increase awareness of the under-representation of women in technological entrepreneurial ecosystems.
* Parental policies, related to maternity leave and childcare provision, directly impact upon female participation in technological entrepreneurial ecosystems; therefore, it is imperative that policy makers ensure appropriate maternity leave as well as affordable and accessible childcare. Such policies are especially relevant to Israel and Ireland.
* Dedicated public innovation agencies are pivotal players in developing national startup ecosystems; therefore, it is important for governments to increase support and funding of these.
* Where a national ecosystem suffers a centre-periphery imbalance, it is important for government to consider implementing a dedicated national strategic strategy to ensure competitiveness and an economic balance between all regions by leveraging each regions inherent and unique productive qualities and strengths. It is also recommended that tailored supports be considered and developed for female founders and other under-represented minorities located in peripheral locations.
* Where gender mainstreaming is not yet integrated into national policy strategies, programs targeting women technological entrepreneurship are required.
* To aid a cohesive startup ecosystem, it is recommended that a national ecosystem assembly be convened where participants (i.e., state agencies; stakeholders’ groups, founders; incubator management teams; and investors) can interact, communicate and debate policy, best practice as well as diversity and inclusion issues. In such a forum, current policy programs can be assessed in relation to their effectiveness at the grounded level of the ecosystem; thereby aiding reforms and alternatives to be proposed by varied interests at different levels of the ecosystem. European level assemblies could be convened to enable transfer of knowledge and best practice.

**Incubator**

* All incubators should create an action tailored internal diversity and inclusion policies, especially incubators based on university campuses, who tend to adopt pre-existing university diversity and inclusion policies.
* Alongside diversity and inclusion policies, incubators should employ a dedicated “Diversity and Inclusion Officer” within the incubator to ensure policies are enacted, to monitor diversity and inclusion parameters as well as to research, propose and action new developments in best practice.
* All incubators should ensure formal transparent procedures for the selection of tenants into the incubator. Such procedures should ensure a gender-balance in all interview selection panels.
* All incubators should aim to reach a 50/50 equal split between male and female tenants each year. Where such a quota is not met, the management team and current tenants should discuss the introduction of gender/diversity specific supports and programs to encourage higher participation of under-represented gender groupings.
* It should be up to each incubator management team to determine if comprehensive gender/diversity specific supports, services and programs are required. Such actions should be made in consultation with all tenants within the incubator at regular intervals. Such arrangements should be outlined in the diversity and inclusion program and monitored by a dedicated diversity and inclusion officer regularly. A national incubator management conference should be convened each year to communicate ecosystem sector developments and best practices. Female participation and diversity as well as inclusion generally should be a key issue on the conference agenda.

**Funding**

* It is important that venture capitalists keep active in the early seed startup scene, especially considering the impact of the coronavirus pandemic and the possible oncoming global depression. The setting up of tailored university or female-founder startup funds would be beneficial for going forward in such uncertain times.
* The coronavirus pandemic has severely impacted startup ecosystems across the globe by creating societal lockdowns and a significant global economic shock. This situation has left start-ups in a precarious position, particularly in relation to seeking and obtaining funding. National governments should consider the implementation of new funding schemes and grants to alleviate the disruption caused and enable startups to manage their re-entry into the “new normal”. Such funding supports will enable sustainability of startups in the short term, adaptation in terms of business processes and productivity, as well as the possibility of product development for a new era. With that said, if the pandemic creates numerous lockdowns, governments may need to consider longer-term “emergency liquidity supports”.

**Covid-19**

* With the advent of the coronavirus pandemic, it is imperative that governments propose specific Covid-19 supports (relating to maintaining exports and competitive edge, developing new processes and products) to aid companies to adapt and evolve their businesses to remain active and competitive in the “new normal” instigated by a viral pandemic and subsequent societal lockdown, which has detrimentally impacted both national and global economies.
* Following the OECD, policy interventions should tackle short-term and long-term challenges.

Short-term challenges concern supporting short-term liquidity and availability of funding. Additionally, these interventions should address the ability of start-ups to proceed new business opportunities that may appear during and after the pandemics.

Long-term challenges should be tackled by policies that decrease obstacles to entrepreneurship, offer incentives for start-ups, and increase entrepreneurial opportunities.

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