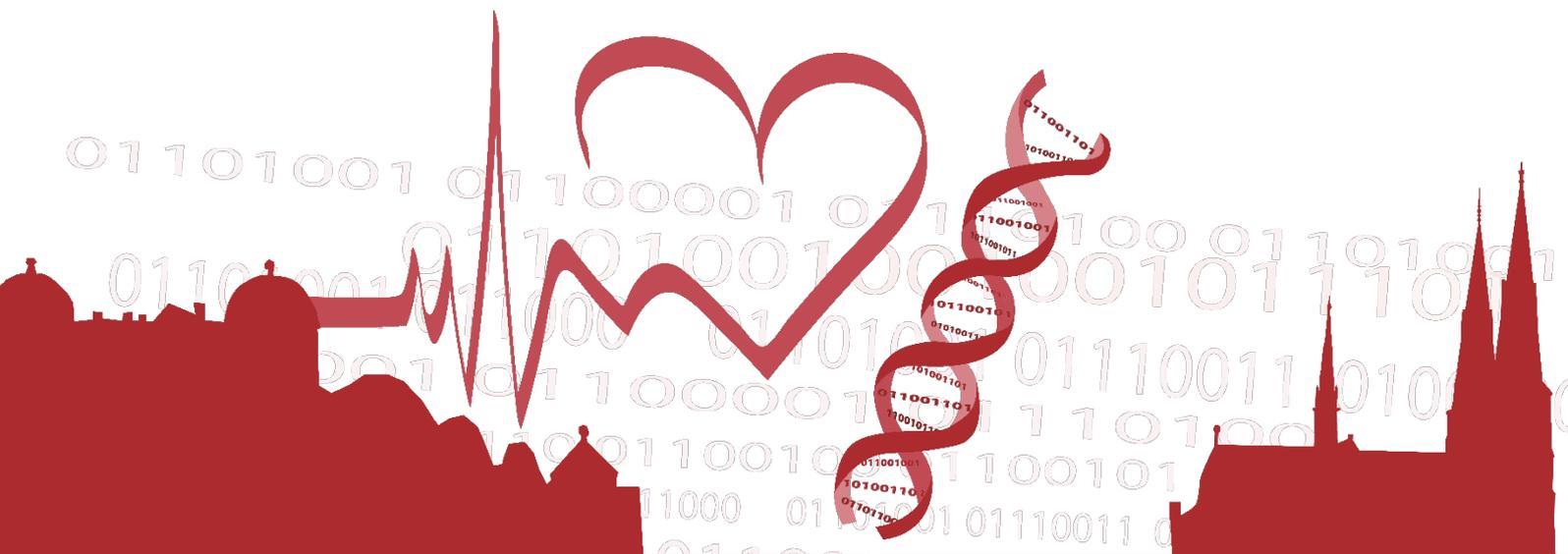


State of the Swedish Innovation Support System 2020

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Jan 2020



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I. Introduction

There is a need and necessity for a country to be successful with innovation in order to achieve sustained growth. This sustained growth can either be achieved through growth of already established companies or through the creation of new ones. Since roughly half of new employment is attributed to small and medium sized enterprises (SMEs) creating jobs broadly across sectors, the wellbeing of the sector is essential. The fact highlights the necessity of entrepreneurship being a driver of regional growth. These statements hold true for a variety of different sectors. However, this study focuses mostly on the life science sector. That being said, the points and questions raised are applicable to the innovation supports system throughout.

This is a study on the state of the Swedish innovation support system and how it serves to fulfil the needs that start-ups and SMEs have in their paths of growth. It is a study project performed during a master's degree. The scope of the study was a 10-week project and aimed to explore what the innovation support system does well and intends to open up questions that could warrant further investigation.

When discussing the addition of jobs through entrepreneurship one must bear in mind that everyone has different wants and needs as an entrepreneur and company. Most small companies hire between 1-2 people and have no intention to expand. Consequently, when discussing the function of the innovation support system, this paper works on the assumption that company wants and needs to grow.

The study was performed through interviews with various stakeholders from within the innovation support system. From the answers provided by the interviewees, positive forces and challenges at each growth stage have been highlighted for the reader to gain an understanding of the benefits and pitfalls that start-ups face when navigating the Swedish innovation support system. Furthermore, at the end of each chapter, questions have been opened up for further thought. These questions are "instant openings" from the results and can be answered immediately or may require more effort, leaving the aim of them to open the questions for thought.

2. Methods

The methods utilised for the study were based around semi structured interviews of various stakeholders in the Swedish innovation support system. The majority of the research was conducted in the Stockholm – Uppsala region and was supplemented with data from the leading life science clusters in Sweden, broadening the geographical scope to a national level. Furthermore, to gain a holistic understanding of the gains the innovation support system offers to start-ups, interviews were conducted with multiple companies with different stages of maturity and paths through the innovation support system.

The interviews were transcribed and analysed for common themes mentioned and highlighted by the interviewees. Once common themes had been identified, secondary interviews were performed to cross reference the accuracy of statements. From the themes identified, a representative story of how the innovation support system looks like to a start-up entering it was generated highlighting the common strengths the system has in addition to the possible shortcomings that it may have.

3. Key Questions in the Story of the Start-up

3.1 Understanding the Structure of the System

The innovation system around Sweden comprises of a vast number of different actors. For sake of simplicity, they can be divided into ones providing strategic support and ones providing financing. Figure 1 is an example of some of the actors operating in the system but is by no means limited to all of them.



Figure 1. Actors within the Swedish Support System

When considering the country as a whole, the actors are similar throughout. Consequently, the differences in the regions does not come from who is there, but rather what they do. Separate organisations help companies throughout their growth journey from an idea to a fully operational growth company. They are designed to tend to issues faced at different stages of the growth journey and answer challenges that are specific to those stages. The growth journey will be discussed in the following chapters.

3.2 Starting Up

The decision to start up a company is a large one for the entrepreneur and is not without its pitfalls and difficulties. However, without optimism and objectives the journey would never start. The objectives that the entrepreneur has at this stage is to crystallise the idea they have and perform initial work to start. From the idea, the entrepreneur decides the company structure, registers the business, sorts legal issues with registration, potentially performs market research and begins developing the product or service. Furthermore, an apt entrepreneur may start to build their team, decide on the location for operations and start working on protecting potential intellectual property (IP). Starting up is a process of great agility and is driven by personal attributes of the entrepreneur and the ambitions that they have.

However, some of the concerns that the entrepreneur may face include the risk of taking the leap into trusting one's own venture, and especially the question of whether others find the need for it. In addition, shortness of funding may be an issue, especially when considering the administration costs in running a start-up. Naturally, differences exist with the need for funding depending on the business model with biotechnology or hardware requiring large upfront payments. Furthermore, the issue of finding a team and necessary competences has been highlighted by multiple participants in the study.

Positive Forces

To aid in the process of starting up, many supporting actors have been established, covering most of the needs for new entrepreneurs. Here credit is due for the university innovation offices, who go out and advertise the possibility of commercialising research performed. Within the work performed, specialised events such as AIMday and Mentor4Research (in Uppsala, with similar ones around the country) are held to support aspiring entrepreneurs in building networks, finding the team, and to aid in starting up. There was a consensus with the start-ups involved that the university innovation offices provide well needed help for companies starting up like help with legal issues, patent searches, and overall assistance with evaluating the business model. The main priority that was raised by the companies starting up was the matter of the services at this point being free. It would be improbable that as many companies would be starting up at this phase unless the support was free or charged at a small nominal amount.

With individuals coming from outside academia, whom which university innovation offices do not reach, several offices such as Drivhuset and NyföretagarCentrum have been established to aid in similar ways as university innovation offices. These also offer consulting, business courses and mentorship opportunities for aspiring entrepreneurs and a consensus of sufficient help was also heard from participating start-ups.

A strong force that can be utilised in driving individuals from academia towards entrepreneurship is the low level of risk to the researchers included in the option of exploring the possibility of commercialising the research being performed. An aspect linked to the low level of risk is the inclusion of professor's privilege where the researcher owns the research and subsequent IP. This is a factor that is and should be used as it allows for testing of the viability of the business idea without "taking a leap into the unknown". They usually stay in their positions in academia for some time using the laboratory space and staff while working on the start-up too, using the tenure as a safety net.

In summary, the process of establishing one's own company has been made easy for individuals planning to start up. There is ample support available independently of the background being within or outside academia. Furthermore, there does not appear to be any major difficulties in navigating the environment, despite no organisation being solely responsible for catching the entrepreneur. The positive response may be due to the simplicity of what is needed by the entrepreneur as most needs are similar in setting up and complexity and specialisation of services provided is low.

Challenges

A common theme found throughout the interviews with the start-ups was that many (but not most) had not heard of the existence of the university innovation offices until by chance they ran into one of their representatives, albeit there being variations to the answers between regions. It is a surprising find as the presence of the innovation offices is ubiquitous in the universities with strong research performed. This raises the question if more work should be done to reach more researchers. Within this question one must still balance the effort and resources required. The point of the innovation offices is still not to reach every researcher but rather those that want to start their own companies.

There were, of course, differences with the responses in relation to which incubators were more prominent in their universities than others. However, points could be made for the system as a whole, including both university incubators and local public actors, that more could be done in efforts in reaching the potential entrepreneurs. This could be done for example by organising events designed to boost entrepreneurship by creating a spark within the ones that could be likely to try it.

Furthermore, a point that is to be mentioned is the necessity of focusing on scalability. As the company is most flexible for change in early stages, building the foundations for scalability is best done already here. However, not every company can scale and by no means should every

company be required to. The question becomes how to draw the line in how much to push for scaling because, as mentioned earlier, the growing companies are ones to create employment.

1. Can more work be done to create a spark with individuals not knowing they want to be entrepreneurs?
2. Should we create a base for the necessity to scale for growth for every entrepreneur?

3.3 Business Model Generation and Validation

Once the entrepreneur has a registered their company the next logical step is start running the business. One of the main focuses in this step is to define the business model and validate need for the product from the customers. Flexibility is again imperative and customer segments may change. Business model generation and validation is defined by experimenting with what works and pivoting is more of a rule than an exception. In addition, the idea and product or service is further developed to match the customer need.

Positive Forces

For companies looking for support within the early stages of growth, they can apply to one of the business incubators, that are operational around the country. These usually divide their programmes tailored to specific maturity and stage of growth the company is and are available to participants both within and outside academia. In general programmes range from early stage preparation like business model generation and validation to commercialisation and growth acceleration in the later stages. Participants are currently or who have been in one of the programmes have mostly positive feedback with the work that is being done.

One of the main benefits mentioned to be performed by the incubators is the coaching. With it, individuals learned in business help in challenges that the participating companies face. A factor that has been found especially important is the push for pivoting. It is the move from one idea to another, rather than sticking to one that has been found not to work. With entrepreneurship, success can be defined more by the attributes on the entrepreneur than how good the idea is. Not all business ideas work, but at this stage one can change course towards a model that does work, with a new customer group or new idea entirely. Thus, the need for pivoting and incubators should help the entrepreneur figure it out if their business idea does not work by themselves at an early phase.

Secondly, incubators, offer access to investor networks with their programmes. This has been described to be a large beneficial attribute of the incubators as access to funding offers significantly more flexibility and allows for focus on building the business. However, regional differences exist with considerably more funding available in western Sweden compared to the East and North. This could be due to proximity of international investors in Denmark and Norway but it could also signal to the way the networks are managed. A recommendation would be to reflect upon whether all is done to syndicate existing local investors and attract foreign capital.

Furthermore, mentor networks offered by the incubators have been praised. These mentors are individuals who have worked in managing start-ups, larger companies and potentially had exits during their careers. The mentors provided are from various backgrounds within industry and are tailored to the needs of the companies, depending on what skillsets are needed. The mentors spend time to converse with the companies and are assigned for a specified amount of time, a couple hours a month, usually free of charge or for a consulting fee. The mentors bring insights into how to run their companies and tackle challenges, especially for first time entrepreneurs. The transfer of skills in such a way, has been identified to be of great value to the competitiveness of Swedish innovation.

In addition, the safety of professor's privilege is strongly prevalent with companies in this phase. Especially during the validation of a business model, the security of having a place to fall back and being employed by the university may enable risk mitigation and persuade some to work on their start-ups on the side. For entrepreneurs outside academia, this luxury is not available.

Finally, with entrepreneurs there is a consensus that help is there if you want it. While it may not always be free, the fee required is low enough that it is attainable by companies strapped for cash also.

Challenges

One of the major overlooked factor within the incubators is that they may function as a system of validation. The incubators have gained a positive impression and multiple stakeholders mentioned that finding sources of funding becomes significantly easier once they have entered a university incubator. This can be seen as a positive attribute as funding is a common concern in companies throughout their start-up and growth phase. However, if we turn the concept around, as the incubators do not have the resources to accept every company in, what happens to the ones left out? There is a concern of the company being regarded as less attractive to investors as they did not receive the validation of being a good enough company from the

incubators. The incubators pride themselves with the investor networks that they are in contact with, which can function as an echo chamber of money flowing into the opportunities the incubators are taking part in and leaving the others left outside stranded. Thus, the question becomes how to ensure that equal investment opportunity is ensured for everyone?

Within some regions with only one incubator the decision makers, of which companies to take into the programmes, can function as “gatekeepers”. The validation is done by looking at certain attributes such as scalability of the business model and the team running the start-up. Due to the power of deciding who is in and out, individuals evaluating whether the companies can enter the programmes become key decision makers. Not all companies, of course deserve the position but it is good for the incubators to be aware of the power that they may possess. The power of the gatekeepers whether it be wanted or unwanted raises the question whether multiple incubators or equivalent support programmes would bring benefits in having more diverse evaluations of the companies? Would local competition raise the bar that incubators hold themselves to?

Secondly, during the start-up phase the foundations of the company are laid in preparation to growth and scale-up. The incubators interviewed all offer mentor programmes where an entrepreneur or individual experienced in business management would provide assistance with issues the company faces. The majority of mentors are either free or receive a nominal payment in relation to their hours spent consulting the company. The financial payment raises the question if it is best suited for the long-term interest of the company. Why not use remuneration programmes such as a small equity stake in the company? As the largest benefits to employment are seen once the company grows to a reasonable size, everyone should be incentivised to build the company in a fashion that enables sufficient profitable growth. The equity stake would provide the mentors with so called skin in the game that drives the best long term benefits.

Furthermore, especially in the early stages of the life of the start-up redundancy in aid received is necessary as business models are not fully developed it is impossible to decide which companies should receive support and which should be let go. However, in the later stages, a question that can be raised is if all companies should be supported? Should we let markets decide which ones are worth keeping depending on the willingness of people to invest? There have been comments about having too few early stage quits. It would be beneficial to kill one’s darlings and spend effort in a new and better idea and as stated earlier, the entrepreneur is the decider of success, not the idea. Counterproductivity comes from funding ideas destined to fail and risk increases the longer they are funded. Currently, the innovation system inadvertently steers by funding ideas they deem to be worth funding. Should there be holistic steering or should market forces be allowed to make decision of which companies are funded?

Finally, the professors privilege offers a form of safety for the entrepreneur as they can be employed at university while still working on their start-ups. One might speculate to what extent the professors privilege can be overused. There is risk in taking the step from a steady pay to being self-employed but a necessary one required for the success of the company. The safety net provided might be a hindrance to growth ambitions as staying in steady employment reduces time and effort placed in the company at the expense of progress. Should the use of the privilege be curbed by the incubators in increasing risk for the entrepreneur with the benefit of maximising effort put into the success of the company?

1. How do we provide incentives for maximal long term horizons?
2. How do we decide which companies to support and how do we monitor and review this process?
3. Should entrepreneurial risk taking be incentivised more potently?

3.4 Scale up

The scale up stage is a phase of rapid growth and simultaneously a phase where the company must prove itself. The scale up phase is one where help is needed to manage the rapid growth and associated changes such as added headcount with specialised tasks and responsibility centres, establishing processes, and expanding customer base. Consequently, the scale up phase is one where assistance, especially for first time entrepreneurs is essential in managing growth of the company.

From the view of the innovation support system the needs of companies become more unique and specialisation with support offered increases. Furthermore, the funding needs of companies change significantly and ticket sizes quickly increase to 10x compared to before.

Where does the money come from?

Positive Forces

The scale up phase is still supported to a good extent by the current incubators, offering mentor networks, business coaches and support with financing. A strong force that is to be utilised is the transfer of knowledge from larger established companies to the start-ups. Again, discrepancies between the scale of knowledge transfer is prevalent between regions, with most

efforts being performed around industrial clusters and hubs. The clusters allow for strategic collaborations, which are especially important to scale-ups as they offer potential customer bases and access to resources not necessarily available with the assets of a scale up. Furthermore, in lines with knowledge transfer, mixing junior and senior personnel within scale ups would provide a base for optimal skill sets and is a factor that should be emphasised when building the team.

The pre-requisite of scalability to enter the incubators can be seen as more of a positive than negative aspect. If the company has no ambition to grow, funding would be better directed to ones that are, when thinking from the view of the public good, bringing the point of added employment back.

Challenges

A challenge that is faced during the scale-up phase is the simple one that some companies do not have the aspirations to do so. This can be due to personal traits of the entrepreneur, or the business model not allowing for rapid scale up (i.e. consulting scales as fast as new employees are hired). When working on the assumption that only companies that can become scale-ups are selected for incubator programmes, what is needed is input on the ambition of the team and the financing needs from the start, well before the business enters this stage.

A risk with current funding is that the companies seeking for investments must provide a pitch that shows a hockey stick growth curve with exponentially increasing revenues. This is due to investors requiring higher rates of expected return from their investments as start-ups are notoriously risky, and many fail, leaving the ones succeeding bearing the majority of returns to the risk seeking portfolio. The necessity of such a pitch may have gone to a point where companies not willing to do so still project such growth as the investors require such high returns. An issue with such a setting is that it may lead to some companies being forced to adopt unwanted business models, or worse, not fulfil their statements and disappoint the investing parties.

However, some companies that truly want to expand, an aspiration that has been established by the entrepreneurial team from the beginning. With these companies a question that must be answered in the scale up phase is where to find the talent necessary to expand? Some companies require very special skillsets, for example regulatory affairs or a specific programming skill. In addition, standard needs that often appear to be lacking are marketing and sales professionals and people for product development. Moreover, many identified the need for “soft skills” i.e. business management, to be harder to acquire than technical competencies. Where do we find them and how do we ensure competitiveness on an international level?

Importing skills from international markets is unlikely as the attractiveness of a region on a global scale requires more than attractive work opportunities. It is built by infrastructure, social contexts, local policy, taxation and many more. Furthermore, attracting people using high salaries is improbable as funding is already mostly scarce. Thus, a more likely approach is to develop the skills locally. The two ways to achieve this are to influence policy and drive for universities to teach skills of the future, and a faster approach to build them in house. For building the skill sets necessary we once again come back to knowledge transfer. It is imperative that we use the experience from individuals for staffing and business coaching purposes from ones who have been a part of the growth journey in larger established companies. What makes it harder to do than to say is that the truly successful individuals are unfortunately wanted on global markets and consequently unavailable for use locally.

Finally, funding has been a constant theme throughout and it is especially prevalent in the scale-up phase. Figure 2 functions as an example for potential funding sources throughout the growth journey of the start-up. One can see that funding needs grow exponentially as the company matures and the source of funding changes with it with bigger tickets being offered by public equity and venture capital. Especially interesting is the scale up phase as funding needs are large but the company is not mature enough for the established large actors.

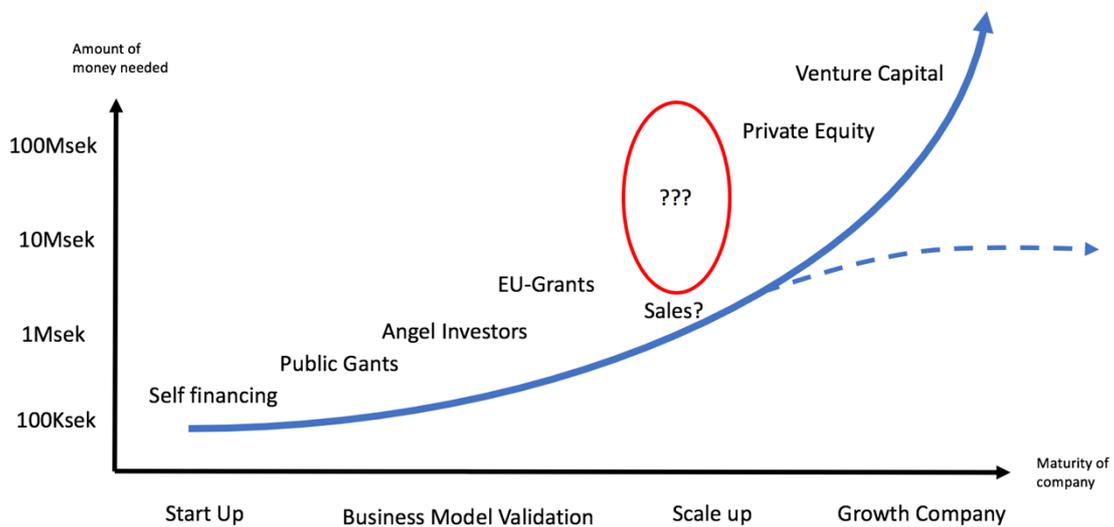


Figure 2. Exponentially increasing funding needs

Furthermore, a characteristic of public funding such as Almi loans, is that they may require partial self-finance for example in a 50/50 ratio. When considering the large financial needs, it

may be excessively difficult for companies to acquire half of the funding from equity financing. On the other hand, if markets are not willing to support the company by investing is the company worth funding at all?

In addition, many called out for the need for intelligent capital. With this it is expected that funding comes with the skills and competencies as established above. Intelligent capital is patient enough to carry company through the scale-up phase and establish itself as a growth company and does not focus on quick multiplication of invested capital. It also provides experience of the scale-up process and aids in avoiding common pitfalls.

1. How to get the talent and competencies required for scaling up?
2. Where to find the intelligent, patient capital required to fill the funding gap?

3.5 Growing the Company

When discussing growing the company, we are leaving the concept of a start-up. Here, large scale manufacturing may already be present, logistics and supply chains established and organisational structure defined.

Positive Forces

As an innovation support system, we are performing well in having the companies started, despite some of the previous questions raised, but an issue that remains is how to get them to stay and grow? The core concept in having a growth company is that a sustainable business has already been built and efforts go into raising incoming revenues and staff.

The reason for getting companies to start cannot be attributed to only one point but rather a sum of components such as entrepreneurial culture, innovation support, policy regulation and well-functioning welfare system. The companies are thus well protected in their early days when risk of failure is high. However, once they start approaching the growth phase, the level of support starts to dwindle.

One can argue that it is a positive attribute that companies are expected to stand on their own. It is unreasonable to think that support is available indefinitely, especially assuming that

requirements get more complex and expensive as the company grows. Consequently, the question becomes whether we are doing enough to prepare the companies for this part of their growth journey. Are the companies supported too much in their early stages to prepare for the challenges that they may face when they leave the support system? For example, sales should be prioritised especially heavily in the early stages of company establishment. Sales are ultimately the most important source of financing for a company and the heavier sales are pushed from the beginning, the more likely the company culture develops into a sales centric one. This would enable the company to be prepared for the competition in international markets. The balance between helping finance the companies and pushing for them to supply their own funding for operations requires thought.

Challenges

A large challenge that has been mentioned to be prevalent with companies in the growth phase is that exits happen too soon. These can be through trade sales to international companies, strategic partnerships or initial public offerings (IPOs). One can speculate to the reasons to why it is but several hypotheses can be made. Firstly, there could be an issue of incentivising. As mentioned earlier, mentors are not fully incentivised for long term planning within companies by offering stake in the company. This could reduce the drive for long term establishment within the company. Secondly, the investors that do enter the risk assets early on are looking for returns quickly and as revenue grows so does the motivation to liquidate the position. The issue can be answered with patient capital that is willing to sit on the positions for longer and in an ideal case at the same time offering skill assets to mentor with growth.

In addition, when considering industries that require heavy up-front investments such as biotechnology, medical technology or manufacturing industries the process of getting to the market is considerably expensive. Consequently, IP is often sold to an international actor with deeper pockets, which opens the possibility of the benefits of having the company being established left only to the financial aspect. While the money gained from a sale is inherently a benefit, when looking at it from a local point of view, the employment gained by establishing a company in a region has benefits that money only cannot provide.

1. What can be done to incentivise long term commitment into establishing local companies?
2. Are there alternative funding paths to prevent investor reactive exits?

4. Comments on the System as a Whole

The innovation support system is complex, there is no way around that. However, the multiple pieces in system appear to generally function well together. This means that the companies that enter the system are well nurtured and have the needs that they may have addressed both on a strategic level with mentors and financially through funding bodies.

However, the complexity of the system has its drawbacks. Comments were made that navigating the system may get difficult at times and due to the complexity, frustration occurred. Especially with the funding bodies, the volume of them providing small ticket sizes meant that unproportional amounts of time may be spent in grant applications with small payoffs. In addition, the question of who to approach with funding issues and the different criteria for accepted applications caused dissatisfaction with some stakeholders.

Moreover, the complexity of the system raises another issue, that is efficient capital expenditure. With the multitude of actors within the system one cannot but think whether things could be optimised. For example, by further merging the functions of funding bodies to provide larger ticket sizes. Can the current actors be incentivised to collaborate more closely together and prevent the challenge of the complexity of the current system? Another suggestion could be to have steering on a national level, which however, brings more questions than answers regarding the complexity of the system so it shall be left as a note.

Finally, to come back regional differences within the system, a point that is to be made is the amount of communication between the regions. There is no doubt that regional differences within the innovation support system exist, and they occur naturally with specific industries in different areas. However, there is evidence of the regions competing against each other for, for example, collaboration with specific international bodies. Sweden as a country is too small to be competing against internal actors, and more effort is to be made in unifying both the strategy of regions and the story that is to be sold to external stakeholders.

1. Does the support system advocate and prepare companies for international markets?
2. Is the field too fragmented to enable a globally competitive ecosystem?

5. Summary and Recommendations

In summary, the ingredients for a globally competitive start up ecosystem in Sweden are here. We have highly educated people performing high quality research. In addition, safety and security is provided to allow for entrepreneurial individuals to take the leap into starting their own company. The innovation support system closely supports start-ups throughout the early phases whether it may be with funding, mentors or business coaches. The support can in fact be so well managed that it provides an impediment to the ones not receiving it.

With recommendations for the entire system, thought must be taken to ensure that long term thinking is encouraged and a base for a sustainable business built from the very beginning. In addition, prioritising sales as a source of funding may provide benefits to counter the current funding gap. In addition, for the actors it is recommended that the country needs a unified strategy for its innovation support activities, in order to become more competitive in an international setting. Should there be more steering by another body or can the current actors perform that on their own is a question that remains to be answered.

To conclude, the system works well but success can be the killer of progress and I hope this study can provide points of reflection to whomever may read this.

Thank you

I would like to thank everyone who took part in the study and due to some requesting anonymity with their responses I have decided to leave them out for guessing. You know who you are. However, without the generous, honest opinions of individuals from within the system around the country and start-ups navigating the system, the study would not have been possible so thank you again. I would also extend my gratitude to Björn Arvidsson who provided valuable feedback throughout the study while leaving me with free hands to take the project to which it eventually turned out to be.

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