Project "GEEmap": Literature review, recommendations for visualisation and bibliography

Executive summary

After consulting the relevant academic literature, this paper recommends that the Geelong entrepreneurial ecosystem mapping project – GEEmap – uses nine pillars as the basis of its visualisation. Three of them are prioritised: accessible markets, talent and skills, and funding and finance. The remaining six are networks and engagement, government and regulatory frameworks, support services, education and training, regional culture and physical infrastructure. These pillars then input into the design of data collection instruments to map Geelong's entrepreneurial ecosystem.

Literature review

Research into entrepreneurial ecosystems has been undertaken for around twenty years, with (Spilling, 1996), one of the first authors in this discipline, providing the following definition:

> "the complexity and diversity of actors, roles and environmental factors that interact to determine the entrepreneurial performance of a region or locality" (p. 1)

Although later authors (Stam, 2014, Porter, 1998, Cohen, 2006) have sought to refine this basic definition, its main tenets have stood the test of time - the ecosystem is defined both by its **elements**, and the **relationships** between them. Further, an ecosystem is not static – it is **dynamic**. It evolves over time, organically or through intervention. Thus, an assessment of an ecosystem can only ever be a 'point in time' snapshot (Cukier, Kon, & Krueger, 2015).

THE ELEMENTS OF AN ENTREPRENEURIAL ECOSYSTEM

Several authors have attempted to capture and categorise the definitive elements of entrepreneurial ecosystems. Although there is no generally accepted taxonomy here, there is significant overlap in many of the previous approaches. This is welcome; it makes the task of designing a questionnaire to gather data on the Geelong entrepreneurial ecosystem more straightforward.

(Spigel, 2015) provides a useful top-level view, categorising elements into cultural, social and material attributes. Cultural attributes include the disposition of the local area towards entrepreneurialism – for instance whether entrepreneurialism is seen as an esteemed career choice - and narratives of success – those who have followed the entrepreneurial path and 'made it big'. Social attributes relate to interpersonal and relationship based elements, such as social networks, investment capital, mentors, human capital and 'deal makers'. Interestingly, Spigel calls out not just hard skills as a factor here, but also mindset-related capabilities such as risk tolerance – required to thrive in entrepreneurial settings. Material attributes include universities, support services and facilities, policy and governance and open markets.

REFER APPENDIX A FOR SPIGEL'S VIEW OF ENTREPRENEURIAL ECOSYSTEM ATTRIBUTES

Echoing much of the above, (Foster et al., 2013) list accessible markets, human capital / workforce, funding and finance, support systems / mentors, government and regulatory framework, education and training, major universities as catalysts and cultural support as their pillars of the entrepreneurial ecosystem. In their work, they identified that entrepreneurs see three of these pillars – accessible markets, human capital / workforce and funding / finance as being of 'pivotal importance'. Interestingly, this

reflects broadly the conclusion of (Roos & O'Connor, 2015) in their work in regional innovation systems in South Australia, who concluded that the most important elements were new knowledge, competent people and an environment conducive to innovation.

REFER APPENDIX B FOR THE WORLD ECONOMIC FORUM VIEW OF ENTREPRENEURIAL ECOSYSTEM ATTRIBUTES

Case and Harris in (Feld, 2012) have a similar view, identifying the nine attributes of leadership, intermediaries such as mentors and role models, network density – a well-connected community, government – supportive policies, talent – skills and universities, support services, engagement – events and opportunities to connect, companies – large ventures that act as anchors, and capital – venture capital, angel funding and other financing.

REFER APPENDIX C FOR CASE AND HARRIS VIEW OF ENTREPRENEURIAL ECOSYSTEM ATTRIBUTES

We then need to synthesise these approaches to arrive at the attributes we want to map in this project.

Given there are so many different attributes covered in the literature, it makes sense to prioritise those that are likely to be of most importance to the ecosystem; if we're unable to capture data on all the relevant elements, then let's capture what is of most value. This leads us to prioritise the elements highlighted by (Foster et al., 2013) and (Roos & O'Connor, 2015) – accessible markets, human capital and talent, and finance.

The other attributes can then be grouped to try and reduce the questions asked of actors in the ecosystem; a questionnaire that is too long or cumbersome to complete is going to have a lower completion rate. For example, role modelling and mentorship, cited as important by (Stuart & Sorenson, 2005) and (Motoyama & Watkins, 2014), is essentially a support service, overlapping considerably with offerings such as legal and financial advice. The important role of universities in the entrepreneurial ecosystem, called out by both (Graham, 2014) and (Harrison & Leitch, 2010), can be folded into the the broader education and training pipeline.

(Stam, 2014) calls out the need for 'third spaces' - such as makerspaces and co-working spaces that provide a natural home or meeting place for entrepreneurial activity. This sits naturally with physical infrastructure.

(Tracey, Heide, & Bell, 2014) investigate how ecosystems themselves are governed, providing a distinction between relational governance in dense clusters, and hierarchical governance in more centralised systems. This element on first glance may seem to sit neatly with the rubric of government and regulatory frameworks, however these are *external* to the ecosystem; this factor is more closely aligned with networks and connectedness of the ecosystem itself. The 'informal network' element called out by (Cohen, 2006) merges naturally here too.

Both (Spigel, 2015) and (Isenberg, 2010) call out cultural attributes of an entrepreneurial ecosystem – noting that early, visible success serve as a beacon to those budding entrepreneurs earlier in the pipeline, reducing the perception of risks and barriers and highlighting tangible rewards.

By adding the social, material and cultural classification of (Spigel, 2015), we also provide a basis for 'layers' of an entrepreneurial ecosystem map.

SUGGESTED ATTRIBUTES TO MAP IN THE GEELONG ENTREPRENEURIAL ECOSYSTEM

High priority attributes on which data should be captured			
CLASSIFICATION	ATTRIBUTE	DESCRIPTION	SUGGESTED DATA TO CAPTURE
Material	**Accessible markets**	The availability of, and ability to identify, reach and sell to a market or market segment.	What markets (local, domestic, international) the startup sells to, or would like to sell to.
Social	**Talent and skills**	The availability of, and ability to attract and retain highly skilled people with the right mindset for entrepreneurial activity.	What roles the organisation currently has, what roles are difficult to fill or retain talent in, what specific skillsets are lacking in the labour market.
Material	**Finance and funding**	The availability of, and ability to access grants, venture capital, angel investment, seed funding and other forms of capital needed for initiation and growth.	Where the funding and capital for the startup was sourced, whether the organisation offers funding, difficulties encountered in obtaining funding and investment.
Medium priority attributes on which data should be captured			
CLASSIFICATION	ATTRIBUTE	DESCRIPTION	SUGGESTED DATA TO CAPTURE
Social	**Networks and engagement**	The richness and vibrancy of networks and inter-relationships in the entrepreneurial community and the opportunity to meet, interact and build new relationships. This element also concerns the governance of the ecosystem itself.	What inter-relationships exist, and their quality, and what opportunities exist for cross-pollination in the entrepreneurial community. What governance mechanisms are used by the ecosystem, if any, and what are their characteristics.
Material	**Government and regulatory framework**	The degree to which government policies, frameworks and incentives foster or inhibit the initiation and grown of entrepreneurial activity.	What government services and regulatory frameworks are fostering or inhibiting entrepreneurial activity.
Material	**Support services**	The availability of, and ability to access legal, financial, real estate, consulting and related services, including mentoring and role models.	What services exist in the ecosystem specific to entrepreneurial activity and the level of satisfaction from startups with those services.
Social	**Education and training**	The availability of, and ability to access entrepreneurial and related education and skills development, technology transfer processes and the quality of the labour force pipeline.	What education and training institutions and offerings exist in the ecosystem specific to entrepreneurial activity, including technology transfer, and the level of satisfaction from startups with those offerings.
Cultural	**Regional culture**	The region's attitude and cultural inclination towards entrepreneurial activity; tolerance for risk and failure; narratives of success that serve to inspire others	The perceptions of regional culture toward entrepreneurialism; incubators and inhibitors in regional culture; anecdotes of success from startups.
Material	**Physical infrastructure**	The availability of, and ability to access real estate, infrastructure such as internet and transportation to enable startup and growth. This includes 'third spaces' - makerspace, co-working hubs, technology parks etc.	The level of satisfaction from the entrepreneurial community with physical infrastructure availability, quality and cost in the region.

ENTREPRENEURIAL ECOSYSTEM MATURITY MODELS AND ECOSYSTEM PERFORMANCE ASSESSMENT

As (Tracey, Heide, & Bell, 2014) identify, the performance of regional clusters is highly variant. How do we arrive at a common evaluation framework for entrepreneurial ecosystems?

In the literature, there is only one example identified of an attempt to develop and validate a maturity model for entrepreneurial ecosystems (Cukier et al., 2015). While this could be used after the Geelong entrepreneurial ecosystem is mapped, in order to help identify continual improvement actions, this model is more focussed on helping map ecosystems comparatively.

One useful take away from this work is the characterisation of ecosystem maturity:

ENTREPRENEURIAL ECOSYSTEM LEVELS OF MATURITY AS DEFINED BY CUKIER, KON AND KRUEGER (2015)	
Nascent	The ecosystem is recognised as a startup hubm, with some startups, a few investment deals and government initiatives to help nurture the ecosystem, but there jobs generation or worldwide penetration is minimal
Evolving	The ecosystem has a few successful companies, some regional impact, job generation and small local economic impact.
Mature	The ecosystem has hundreds of startups, there are a large number of investment deals, and successful startups with world-wide impact, and a wave or generation of successful entrepreneurs who are providing mentorship and re-investment.
Self-sustainable	The ecosystem has thousands of startups and investment deals, and at least a second generation of entrepreneur mentors, who serve as angel investors, couple with a strong network of successful entrepreneurs who drive the maintenance of the ecosystem, as well as many startup events and significant high quality technical talent.

It is evident that Geelong would currently be classified as 'nascent' in terms of its entrepreneurial ecosystem maturity.

(Stam & Nooteboom, 2011) also note that different institutions play different roles in the development of an entrepreneurial ecosystem at different levels of maturity – in an ongoing cycle of exploration and exploitation.

In her work on university-based entrepreneurial ecosystems, (Graham, 2014) also called out the inappropriate measures often used to measure success. Here, she argues for a change to traditional output based metrics, such as commercialisation of research, to those which capture more intangible factors such as culture, connectedness and influence.

PEOPLE AND RELATIONSHIPS ARE IMPORTANT

This leads us to another salient finding in the literature: that people and relationship – the 'interconnectedness' of an ecosystem is important. For example, (Motoyama & Watkins, 2014), in their examination of the St Louis ecosystem, found that entrepreneurs learned the most from other entrepreneurs and from mentors who had entrepreneurial experience, rather than those without. (Feldman, 2014) took this a step further, identifying natural leaders in the ecosystem, terming them "deal makers" - people who

> "live and work in a region and take responsibility for the stewardship of the place"
> (Feldman, 2014, p. 4)

Our ecosystem map needs to identify these natural leaders – or stewards – they provide what Feldman terms the 'character of a place' - a spirit of authenticity, engagement and common purpose.

Adding to the understanding of the roles that individuals play in an ecosystem, (Foster et al., 2013) identify five different roles played by entrepreneurs in the ecosystem, providing a useful lens for examining Geelong's 'stewards'.

ROLES OF ENTREPRENEURS IN AN ECOSYSTEM (FOSTER ET AL, 2013)	
Inspiration	inspiring other individuals to become entrepreneurs
Founder crucible	attracting and developing employees who subsequently found other companies
Employee crucible	attracting and developing employees who subsequently become employees of subsequent early-stage companies
Investment source	using acquired wealth to invest in subsequent new entrepreneurial ventures
Mentor role	providing key support such as advice, encouragement and access to a network

ENTREPRENEURIAL ECOSYSTEMS ARE UNIQUE TO THEIR INDIVIDUAL ENVIRONMENT

Another key theme to emerge from the extant literature is that there is no 'one size fits all' approach to what makes an entrepreneurial ecosystem take root, flourish, or indeed, wilt. Actions to nurture the ecosystem need to harness, and be in alignment with, the local environment and conditions.

One of the strongest voices here is (Isenberg, 2010), who cautions against "looking to economies that are completely unlike theirs for best practices", citing several examples of entrepreneurial activity from unlikely geographic locations – such as Rwanda – where overcoming the region's unique challenges has led to success. (Foster et al., 2013), in their World Economic Forum report, also highlight major differences in entrepreneurial ecosystems across the world, with attributes such as accessible markets, education and training and cultural support for entrepreneurialism varying significantly between geographies.

The key takeaway for this project is that we need to identify what is special, unique and distinct about Geelong, and Geelong's entrepreneurial ecosystem.

THERE ARE SIGNIFICANT GAPS IN ENTREPRENEURIAL ECOSYSTEM RESEARCH

Although beyond the remit of this initiative, the literature highlights several gaps in research; these provide fertile ground for closer academic inspection.

Firstly, the single maturity model identified in (Cukier et al., 2015) has been validated only with a very small sample size; true empirical validation requires replication across a broader subject base. There were no competing (or indeed complementary) maturity models identified in the literature; the field itself would be advanced by proponents of alternative (empirically validated) models. The lack of an agreed taxonomy through which to visualise, analyse and evaluate existing and emerging entrepreneurial ecosystems is a related deficit. This gap is likely to hold back further research in this field; it makes empirically validating or replicating studies more difficult.

Secondly, (Stam, 2014) calls out the lack of research on the effect of role-modelling and/or mentoring relationships in the entrepreneurial ecosystem. While intuitively this attribute would have a positive effect, there is little empirical evidence to support this – at odds with the many entrepreneurial support services who provide 'mentoring'.

Most pressing of all however is the lack of research on the broader nature and effect of relationships between actors and entities in the entrepreneurial ecosystem, identified by (Stam, 2014). Although (Motoyama & Watkins, 2014) explore relationships between entrepreneurs themselves, and (Tracey, Heide, & Bell, 2014) explore 'relational governance' in dense innovation clusters, and (Foster et al., 2013) use the visualisation of connections to great effect, there are gaps in understanding around how to create, foster and sustain productive relationships, and how these relationships influence the ecosystem in part and whole.

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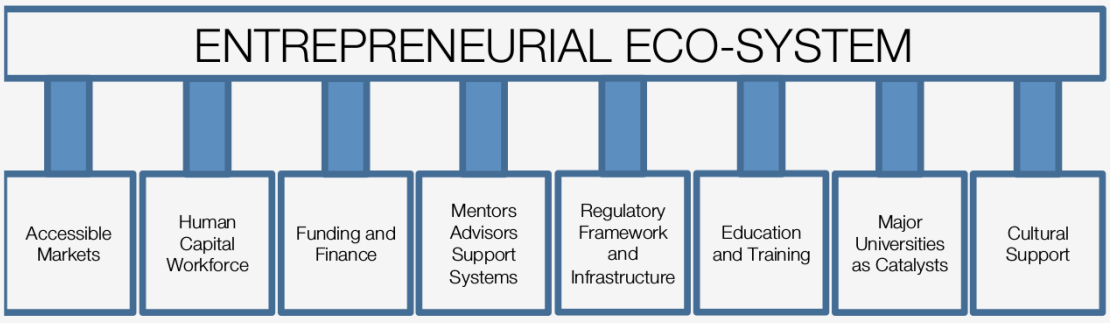
Appendix A – Spigel's view of entrepreneurial ecosystem attributes

Attributes of Entrepreneurial Ecosystems

Type of Attribute	Attribute	Description	Examples
Cultural	Supportive culture	Cultural attitudes which support and normalize entrepreneurial activities, risk taking, and innovation.	Aoyama (2009); Feldman (2001); Julien (2007)
	Histories of entrepreneurship	Prominent local example of successful entrepreneurial ventures.	Nelles et al. (2005); Feld (2012)
Social	Worker talent	Presence of skilled workers who are willing to work at startups.	Arruda, Nogueira, and Costa (2014); Audretsch et al. (2011); Bahrami and Evans (1995); Harrison and Leitch (2010)
	Investment capital	Availability of investment capital from family and friends, angel investors, and venture capitalists.	van der Borgh, Cloodt, and Romme (2012); Kenney and Patton (2005); Malecki (2009)
	Networks	Presence of social networks that connect entrepreneurs, advisors, investors, and workers and that allow the free flow of knowledge and skills.	Dubini (1989); Malecki (1997); Neck et al. (2004)
	Mentors and role models	Local successful entrepreneurs and business people who provide advice for younger entrepreneurs	Feld (2012); Kenney and Patton (2005); World Economic Forum (2013)
Material	Policy and governance	State-run programs or regulations that either support entrepreneurship through direct funding or remove barriers to new venture creation.	Desrochers and Saulet (2008); Isenberg (2010)
	Universities	Universities and other higher education institutions which both train new entrepreneurs and produce new knowledge spillovers.	Audretsch et al. (2011); Dubini (1989); Feldman et al. (2005); Wolfe (2005)
	Support services	Firms and organizations that provide ancillary services to new ventures, for example, patent lawyers, incubators, or accountancies.	Kenney and Patton (2005); Patton and Kenney (2005); Startup Genome Project (2012)
	Physical infrastructure	Availability of sufficient office space, telecommunication facilities, and transportation infrastructure to enable venture creation and growth.	Audretsch et al. (2011); Mack and Rey (2014)
	Open markets	Presence of sufficient local opportunities to enable venture creation and unimpeded access to global markets.	Spilling (1996); World Economic Forum (2013)

Appendix B – World Economic Forum view of pillars of the entepreneurial ecosystem



Appendix C – Case and Harris view of entepreneurial ecosystem elements

Attribute	Description
Leadership	Strong group of entrepreneurs who are visible, accessible and committed to the region being a great place to start and grow a company
Intermediaries	Many well-respected mentors and advisors giving back across all stages, sectors, demographics, and geographies as well as a solid presence of effective, visible, well-integrated accelerators and incubators
Network density	Deep, well-connected community of start-ups and entrepreneurs along with engaged and visible investors, advisors, mentors and supporters. Optimally, these people and organizations cut across sectors, demographics, and culture engagement. Everyone must be willing to give back to his community
Government	Strong government support for and understanding of start-ups to economic growth. Additionally supportive policies should be in place covering economic development, tax, and investment vehicles.
Talent	Broad, deep talent pool for all level of employees in all sectors and areas of expertise. Universities are an excellent resource for start-up talent and should be well connected to community
Support services	Professional services (legal, accounting, real estate, insurance, consulting) are integrated, accessible, effective, and appropriately priced
Engagement	Large number of events for entrepreneurs and community to connect, with highly visible and authentic participants (e.g. meet-ups, pitch days, startup weekends, boot camps, hackatons, and competitions)
Companies	Large companies that are the anchor of a city should create specific departments and programs to encourage cooperation with high-growth start-ups
Capital	Strong, dense, and supportive community of VCs, angels, seed investors, and other forms of financing should be available, visible, and accessible across sectors, demographics, and geography.

Source: Feld, 2012: 186-187