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Challenges of building entrepreneurial ecosystems in peripheral places

Zimu Xu and Stephen Dobson

Introduction

It is widely acknowledged that entrepreneurship brings value to local and national economies as well as generating social and community-level impact: "It drives innovation, creates jobs, develops human potential and satisfies new customer demands" (Jaén et al., 2013, p16). As such, entrepreneurship is accepted globally as an important element of national development strategies (Pretorius et al., 2005; Bosma et al., 2006; Gibb and Hannon, 2006). It not only contributes to wealth and job creation but also potentially connects the region to a worldwide economy. The level of entrepreneurial activity in some studies is found to be positively correlated with GDP growth (Ács et al, 2014), with high-growth Small and Medium-sized Enterprises (SMEs) seen to positively contribute to the majority of job creation worldwide (Yeung, 2015). Entrepreneurship is considered an essential part of this and has become an increasing focus for industries, government and academics resulting in the establishment of numerous support programmes; although the full effectiveness of many of these initiatives is questioned (Henry et al 2017; Dobson et al 2018). In studying how to best support entrepreneurship and maximise the chances of high-growth SMEs, the entrepreneurial ecosystem concept has emerged as an important factor (Mason and Brown, 2014).

However, if we explore the role of entrepreneurship in rural or developing country contexts, a somewhat different picture emerges. For example, Total Early-stage Entrepreneurial Activity (TEA) levels in Sub-Saharan Africa are extremely high (c40%) (GEM Data) compared to the UK or US, yet GDP contribution in these developing economies does not match this level of activity (Valliere and Peterson, 2009; Van Stel et al., 2005). Here, we may consider 'subsistence' or 'necessity' entrepreneurship (Acs, 2006) as a symptom of market failure and a result of high unemployment levels. Research into the optimum ecosystems necessary for a thriving environment of opportunity-driven entrepreneurship points toward high levels of institutional and infrastructural support (Isenberg, 2010; Mason and Brown, 2014). Therefore, the more notable entrepreneurial ecosystems are understandably reported in major urban centres such as New York City, Boston, London, Shanghai, Berlin and Paris. While many rural policy makers have attempted to drive economic growth through entrepreneurship with limited success, little attention has been placed on rural or peripheral areas in building an entrepreneurial ecosystem. In this paper, 'peripheral places' are defined as rural or marginal regions (e.g. smaller/dispersed urban areas, towns, areas of low density population) rather than major cities or centres for development.

In comparison with major urban centres, peripheral places often exhibit scarcity in resources, fewer key institutions, lack of infrastructural connectivity (transport and/or informational), low skilled labour or lack of labour diversity (Henderson, 2002; OECD, 2016). It is this absence of many critical ecosystem characteristic which subsequently poses often insurmountable challenges for local entrepreneurship development (North and Smallbone, 2004; OECD, 2016). Moreover, Aryal et al. (2018) find that urban businesses is better at capitalizing their resources in comparison with peripheral areas. High growth SMEs are particularly rare due to the limited existing resources and the impaired ability of entrepreneurs to acquire then externally. These

barriers are formed due to the lack of business centrality in network of connections. Partnerships between public and private sectors have a crucial role in bringing resources from both sectors to better serve the society (Zhang and Chen, 2013). Private sector resource investment is invariably profit driven, and therefore investment in this area is rare unless with clear returns for the investing firm (Economic Insight, 2015). However, public sector investment is often driven by the need to increase national competitiveness and reduce regional inequalities (Duffy-Deno and Eberts, 1989; Tao et al, 2010). Public policy support may seek to influence these objectives through a variety of forms, such as funding, training and education programmes, incubation or acceleration programmes, taxation or other business support policies. Thus, this paper conceptualises how public policy can support the development of entrepreneurial ecosystems in marginalised, peripheral places to ultimately support the reduction of regional inequalities.

Entrepreneurial Ecosystems

In aiming to understand the role of externalities upon entrepreneurial activity, research has shifted emphasis from more traditional behavioural or characteristics-based approaches (Gartner, 1989) due to the perceived lack of consideration for environmental context. Many studies therefore seek to consider the importance of the wider environment within which entrepreneurs are situated in (Dodd and Anderson, 2007; Spigel and Harrison, 2018). Earlier research either contributed or established initial frameworks on how entrepreneurs and their ventures can be impacted by socio-cultural, economic and political factors (Dubini, 1989; (Spilling, 1996; Malecki, 1997; Neck et al, 2004; Spigel and Harrison, 2018). Isenberg's (2010) seminal work The big idea: How to start an entrepreneurial revolution in the Harvard Business Review was one of the most influential publications that drives the rising popularity of the ecosystem concept. Other publications such as Feld's (2012) book Startup Communities also contributes an increased appreciation of the importance entrepreneurial environments amongst policy practitioners and academics. In these studies, there is an acknowledgement of the co-evolutionary relationship between entrepreneurs, institutions and other actors within the ecosystem which supports local economies and start-up rates. An appreciation of the entrepreneurial ecosystem is now widely considered an important means of fostering economic growth often with focus on driving employment and high growth firms (Mason and Brown, 2014; Spigel & Harrison, 2018). Therefore, practitioners and academics has focussed much on understanding the characteristics of the ecosystem and how this should be best nurtured and supported. Governments have paid considerable attention to the creation of favourable environments which lead to the emergence of entrepreneurship ecosystem [1] concept (Zacharakis et al, 2003; Isenberg, 2010; Malecki, 2011; Mason and Brown, 2014). Entrepreneurship is at the core of the entrepreneurship ecosystem and can be defined variously. For instance, Ferrante (2005) defines entrepreneurship as: 'the ability to discover, select, process, interpret and use the necessary data to take decisions in an uncertain world and then to exploit market opportunities' (p169). Sahlman and Stevenson (1991) suggest that:

> 'entrepreneurship is a way of managing that involves pursuing opportunity without regard to the resources currently controlled. Entrepreneurs identify opportunities, assemble required resources, implement a practical action plan, and harvest the reward in a timely, flexible way' (p1).

[1] 'Entrepreneurship ecosystem' and 'entrepreneurial ecosystem' have been used interchangeably in reviewed literature, thus the two phrases are treated as synonymous.

Audretsch (1995; 2003) and Kao (1993) regard the act of generating change or innovation as the essence of entrepreneurship. In defining entrepreneurship, some attention has been focussed it being a process of identification and exploitation of opportunities (Corbett, 2005; Wempe, 2005; Ardichvili et al, 2003; Eckhardt and Shane, 2003). Dubin's (1978) theory building framework underpins much thinking in this area whereby opportunity identification is seen as resulting from a combination of personality traits, social networks, and prior knowledge. Interest in the psychology and traits of the entrepreneur have given rise to work focussing on cognition and learning (Corbett, 2005; Zahra et al, 2005).

The lack of consensus about entrepreneurship reflects its multidimensional nature (Audretsch, 2003) and so it is unsurprising that a variety of definitions of entrepreneurship ecosystems exist. A selection of definitions on the entrepreneurship ecosystem is presented in Table 1.

Insert Table #1 here

Although the definitions of the entrepreneurship ecosystem are varied, four key properties can still be derived from the above table. Firstly, there are various actors and resources involved in the ecosystem such as entrepreneurs, customers, firms, venture capitals, universities, culture and market. Secondly, it is essential for actors within the ecosystem to maintain continuous healthy and dynamic interaction. Thirdly, the ecosystem needs to be productive, with productivity potentially realised in different forms such as jobs or revenue growth. Last but not the least, whilst ecosystems may vary in size, there should be an element of spatiality/locality.

Entrepreneurial ecosystem and sustainable regional development

Traditionally, entrepreneurship studies have tended to focus on entrepreneurs as individuals and their intrinsic characteristics (Shane, 2003; Borissenko and Boschma, 2016). However, criticism of emphasising individual traits has resulted in an increase of attention on the wider socio-economic environment that the entrepreneurial activities are undertaken within (Dodd and Anderson, 2007; Borissenko and Boschma, 2016; Spigel and Harrison, 2018). As a result of the shift from individual to a more systemic context described above, entrepreneurship literature has seen an increase in studies considering the role of regional resources and conditions in supporting entrepreneurs and entrepreneurial activities (Neck et al, 2004; Mason and Brown, 2014; Stam, 2015). This emphasis on locality and regions is reinforced in entrepreneurial ecosystem studies (Isenberg 2010; Frenkel and Maital 2014; Mason and Brown 2014) and the long-term sustainability of a region may be seen to depend on its ability to response and adapt to changes and shocks (Christopherson et al 2010). This ability is referred to by academics and policy makers as 'regional resilience' (Christopherson et al, 2010; Pike et al, 2010). So, whilst entrepreneurship may be considered a driving force for innovation and job creation, entrepreneurial ecosystems are particularly seen as an important factor in building resilient economies (Mason and Brown, 2014; Szerb et al, 2015; Spigel, 2017; Spigel and Harrison, 2018). Regional economic development can be significantly affected by various externalities such as a changing political system and new policy implementation, economic recession, socio-cultural shifts, industrial and technological change (Palekiene et al, 2015) and environmental disaster. Thus, resilience plays a key role in the sustainable development of the region in the long run (Palekienea et al, 2015). The importance becomes more visible when the place is experiencing or recovering from some kind of external shocks (Palekienea et al, 2015). Three main principles are summarised from the literature in building a diverse and coherent

entrepreneurial ecosystem to support regional resilience. These are: 1) transitional causes; 2) recycling of outcomes and outputs, and; 3) interaction of factors.

Model Evaluation

Various models have been proposed in studying the concept of entrepreneurship ecosystems (e.g. Isenberg, 2011; Vogel, 2013; Mason and Brown, 2014; Stam, 2015) which may be broadly classified into two types: 1) flat structure or 2) causal. Isenberg's (2011) influential flat structure model stressed the uniqueness of nine dimensions which are offered as equally-weighted 'ingredients' of the ecosystem. These are: policymakers and public leaders; Financial actors; Culture impactors; Support organisations, event organisers; Educators and developers of human capital, and; Corporations. In comparison, Stam's (2015) model focuses on capturing the causal relations within the whole ecosystem. Stam criticizes the effectiveness of the entrepreneurial ecosystem approach and provides an alternative model by unifying key elements, outputs and outcomes as shown in Figure 1. The elements that Stam includes in the systemic and framework conditions resemble much what presented in Isenberg's model. The framework endeavours to provide explanation 1) how value is created through transitional causes; 2) how the outcomes and outputs can be recycled into those fundamental conditions, and; 3) how different factors within the system can interact with each other (Stam, 2015).

Insert Figure #1 here

While the above models are valuable in understanding the components of a successful entrepreneurship ecosystem, there are other critical aspects that those models do not sufficiently consider. For instance, how do various factors influence the development of the ecosystem over time? Are those factors equally important in the evolution process? Is there a basis by which stakeholders within the ecosystem may raise the ecosystem to the next level as may be considered in the notion of Transformational Entrepreneurship (Ratten and Jones, 2018; Schoar, 2010). In this sense the evolutionary and dynamic nature of entrepreneurship ecosystems is of direct importance to those wishing to operationalise them (Mack and Mayer, 2016).

Evolutionary Ecosystems

Whether we subscribe to a flat structure or a causal model of the ideal entrepreneurial ecosystem, it is equally important to understand how those ecosystems may evolve over time. A dynamic and self-sustaining ecosystem cannot be immediately implemented and often involves decades of continuous and collective effort (Neck et al, 2004; Mason and Brown, 2014; Mack and Mayer, 2016). The history of Silicon Valley for example may be traced back to as early as the 1970s, and development of Zhong Guan Cun (China's Silicon Valley equivalent) started in early 1980s and will not be where it is today without a serial of government supports. Some scholars divide the evolution process into several stages which broadly map to an organismic model used to describe firm growth, containing the phases of birth, growth, sustainment and decline (Mack and Mayer, 2016). Different forms of support for the ecosystem are acknowledged throughout this lifecycle with the emergence of an entrepreneurial ecosystem often thought to be closely linked to geographic locality to which talent is attracted (Mack and Mayer, 2016). During this 'birth' stage, the area can expect to witness rapid increase of start-ups for a relatively short period. Depending on the local conditions, constraints which can hinder business development are revealed relating to the factors identified above (i.e. how value is created through transitional causes; how the

outcomes and outputs can be recycled into those fundamental conditions, and; the presence and interaction of systemic factors) (as shown illustrated in Table 2).

As ecosystem evolve over time, activities such as spin-offs and entrepreneurial recycling are taking place more and more frequently (Mason and Brown, 2014). Entrepreneurs may also benefit from networks which start to form within the ecosystem (Mack and Mayer, 2016). Support demanded in this stage also start to shift priorities and often involves aspects such as network development, scale-up funding, and talent specialisation. This is a critical time for the newly emergent ecosystem and resilience to shocks from the internal and external environment (such as technology, industry or market change, or sudden removal of support from policy and/or finance) may lead to decline or complete collapse of the ecosystem.

However, it is important to stress that each ecosystem (or potential ecosystem) should be considered as distinct, which unique characteristics and as such requires location-specific programmes and support. For example, Isenberg (2010) urged governments to "stop emulating Silicon Valley" but "shape the ecosystem around local conditions." To recover from the economic downturn in 1990s, and encourage venture creations in the early 21st century, one of the barriers that Japan needed to overcome was the lack of knowledge about entrepreneurship and the negative cultural perception of start-up. Canada's thriving games industry benefited greatly from government tax incentives which attracted large industry players like Ubisoft to relocate to the country, becoming an anchor organisation for the industry of the region.
So, whilst a matured and well-functioning entrepreneurship ecosystem is the result of an evolutionary process (Neck et al, 2004; Mason and Brown, 2014; Mack and Mayer, 2015). However, much of the attention has been given to the components of a successful ecosystem while limited discussions are on its evolution process over time (Cohen, 2005; Mack and Mayer, 2015).

Mack and Mayer (2015) attempt to contribute to this subject by studying Phoenix in Arizona as an example. Their conceptual model of ecosystem evolution contains four stages: birth, growth, sustainment and decline. Features of each stage are further explained from eight aspects: firm entries and exits, policy, finance, culture, support, human capital, markets and policy implications.

Insert Table #2 here

Similarly, Mason and Brown (2014) believed that locations, where talent workers are attracted to, play an essential role when an entrepreneurship ecosystem first emerges. The process of spin-offs and entrepreneurial recycling activities are regarded as key in growing and developing an ecosystem. Changes of internal and external environment, such as technology advancement, may hinder the ecosystem development process (Mason and Brown, 2014). Mack and Mayer's (2015) model comprises Mason and Brown's (2014) explanation to some extent. For instance, they both identified the evolution nature of an entrepreneurial ecosystem and classified it into several stages, though the exact classification may vary. The spin-offs and entrepreneurial recycling activities cover various aspects as indicated in Mack and Mayer's (2015) model such as the re-investment of wealth which can be coined into the increase of finance. In addition, Mason and Brown (2014) provide an example with detailed explanations of reasons for the decline phase where Mack and Mayer (2015) discuss the outcomes. Specifically, in the decline phase, Mack and Mayer (2015) outline the situation where firm death rate increases dramatically; market, support, financial capital become unviable and

culture also shifted away from entrepreneurial oriented. In comparison, Mason and Brown (2014) point out that an ecosystem could periodically or even permanently cease if not it is not able to sufficiently respond to industry or technological change. Moreover, Mack and Mayer (2015) argue that the various components carry different weights in the ecosystem development process. For instance, market opportunities, human resources, finances and culture are seen to be critical at the birth phase; whereas cultivated support programmes and policies are more important in development and sustainment phase (Mack and Mayer, 2015). When it begins to reach the decline phase, stimulation for the restoration process starts to become crucial (Mack and Mayer 2015). While acknowledging its positive impact, the significance of venture capital in the initial stage has been questioned Saxenian (1994), Feldman (2001), Garnsey and Heffernan (2005) and Mason and Brown (2014). For instance, Brown and Lee's (2014) report claims that only 4.8% of UK HGFs benefited from venture capital in their funding stage. A Kauffman report looks at Kansas City also reviews that only a small portion of HGFs out of the INC 500 companies had access to venture capital or angel investors (Motoyama et al, 2013). However, it is worth noting that the examples mentioned above have generated data and based their argument on HGFs in general, i.e. it is not clear whether those firms are in any entrepreneurial ecosystems. Nevertheless, it still provides valuable insights for the subject.

Challenges of building an entrepreneurial ecosystem in peripheral places

Finance

Finance is an important component for an entrepreneurial ecosystem. However, a great number of literature has shown that a company's geographical location affects its financing capability where innovative and growth-oriented companies tend to be influenced the most (Henderson, 2002; Brown, 2018). In particular, non-obvious localities such as peripheral and rural areas with "sparse bank branch" are seeing the worst impact (Brown, 2018). One of the main reason is caused by the operational distance defined as the distance between local borrowers and the decision-making centres such as HQ (Alessandrini et al, 2009; Brown, 2018). Various studies have shown the increased operational distance has hindered the SME's financing ability (Alessandrini et al, 2009; Flogel, 2016). There is also lack of equity funding providers in rural areas (Markley, 2001; Henderson, 2002). For instance, in the UK, venture capital and business angel focus their attentions mainly in central parts of the country such as London and South-east of England (Mason and Pierrakis, 2013). However, limited evidence has been presented on whether or to what degree traditional financing options such as debt finance has been affected by companies' geographical location (Brown, 2018).

OECD (2012) believe that substantial investments can be attracted if the importance of peripheral areas to national economies can be recognised. In fact, the documented annual GDP growth per capita in OECD rural areas is at 1.7% during 1995 to 2011 period which is higher than the urban rate at 1.5% (OECD, 2016). Take the "green economy" initiatives as an example, over USD 1 trillion have been invested by OECD countries in green energy technologies where a large proportion is located in rural areas (OECD, 2016).

Talents

Talents, especially those with high skills, is an essential driving force behind business (Henderson, 2002) and economic growth (Venhorst et al, 2010). However, the skill and education level of entrepreneurs in non-obvious localities is on average lower than major urban cities at least in some countries (Henderson, 2002; OECD, 2016). This lack of skilled workers can lead to higher production cost and less competitive advantages (OECD, 2016). On the other

hand, while it is well accepted that people with higher education levels is associated with higher level of spatial mobility, specific situations vary depends on local conditions and subject to individual restrictions (Van Ham et al, 2001; Venhorst et al, 2010). For instance, young skilled French workers leave the rural areas for employment (Detang-Dessendre, 1999) whereas unskilled rural Turkish workers are found to move to urban cities for jobs (Kirdar and Saracoglu, 2008). Female university graduates showed higher mobility level in UK (Faggian et al, 2007) and Italy (Coniglio and Prota, 2008). Thus, it is important to understand location conditions in developing an entrepreneurial ecosystem.

High potential individuals are often opportunity-driven and therefore more likely to move in seeking of better opportunities (Venhorst et al, 2010; Lekhanya; 2018). In comparison, peripheral areas tend to provide fewer opportunities which subsequently suffers from net loss of human capital (Venhorst et al, 2010). Thus, policy makers are keen to find ways to keep local university graduates to stay in the region as well as attract talents from outside (Venhorst et al, 2010). In addressing the skills gap, various training and educational programmes have been established by government and non-profit organizations (Henderson, 2002). Some have close relationships with local colleges or universities in various forms such as specific technical or general entrepreneurship degrees (Henderson, 2002).

Socio-cultural environment

Entrepreneurship development requires a supportive socio-culture environment (Dabson, 2001; Isenberg, 2010). For instance, Naminse et al (2018) found a stronger positive relation between a supportive socio-culture capabilities [2] and entrepreneurship growth than education or economic capabilities among Chinese rural farm entrepreneurs. Particularly, earlier researchers (e.g. Granovetter, 1985; Johannisson and Nilsson, 1989) showed that culture plays an important role in supporting the success of economic actions. Similarly, various researchers (e.g. Knack and Keefer, 1997; Cooke and Wills, 1999; Temple, 2002; Westlund et al, 2014) argued that social capital is key to economic success especially in the long term. More recently, Fortunato et al (2016) revealed that higher entrepreneurship communities regard creating a supportive local culture at much higher importance level than lower entrepreneurship communities by comparing data from six communities in three US states. Rooks et al (2014) found that social capital varies among different cultural contexts. While social capital is important for entrepreneurs, it should not be viewed individually (Rooks et al, 2014). Thus, understanding local conditions of whether it hinders or encourages entrepreneurial activities is valuable for regions that are keen to build an entrepreneurial ecosystem.

However, there tend to be less recognition of entrepreneurial activities in peripheral places compared with major cities (Henderson, 2002). Poorer social-cultural environment for entrepreneurship in peripheral places can also come from the policy-makers' lack of understanding on local conditions. Various attempts have been made and can be made in raising entrepreneurship profile in the local communities such as organising business or entrepreneur training courses, awards, press releases and competitions (Henderson, 2002; Isenberg; 2010; North and Smallbone, 2006). In particular, North and Smallbone (2006) believe that it is important to offer a more inclusive entrepreneurial training programme that can particularly benefit the self-employment groups. Equally such programmes need to be coordinated to avoid duplications or gaps.

[2] Socio-cultural capabilities of farm entrepreneurs include a democratic environment (freedom of expression), transparency in the management of village issues, and openness in decision-making processes (Naminse et al, 2018).

Infrastructure

The emphasis on infrastructure requirements differ depends on the nature of the business. For instance, the needs of businesses that primarily serve the local community (e.g. café, restaurants, shops) is different from businesses that are digital based and aim to serve national or international clients (e.g. e-commerce, digital gaming). Peripheral places tend to suffer from poorer transport infrastructure like frequent buses, trains or flights (Henderson, 2002). Such conditions pose barriers on goods transportation and knowledge sharing process and hinder the process of developing critical masses (Henderson, 2002) which in turn make it challenging to build an ecosystem where business concentration and effective floating of information and resources are key.

Internet is widely used in today's business world and played an essential role digital businesses (Grimes, 2003). However, despite the high internet coverage, peripheral localities are still lack of high-speed broadband compared with big urban cities which make it difficult to both attract digital business to locate in peripheral places and hinder the development of such businesses (Henderson, 2002, Grimes, 2003). The costliness for peripheral located start-ups and SMEs to gain high-speed internet access imposes a competitive disadvantage to its urban competitors especially in the digital economy and potentially widen the gap between peripheral and urban areas (Grimes, 2003). In the meantime, affordable access to broadband telecommunications infrastructure should be supported by necessary skills and services to uncover the maximum potential (Grimes, 2003).

Markets

The economic and entrepreneurial potential of each peripheral places vary depends on many factors like available resources (exploited or untapped), industries distribution, geographical characteristics, changing needs and short-term trends in or outside the community (Henderson, 2002; OECD, 2016). For instance, locations with exquisite natural scenery attracts tourism related business (Henderson, 2002). Some rural areas may already have business with lower start-up cost such as restaurants (Henderson, 2002). North and Smallbone (2004) point out that there the rural areas should work on diversifying the farming and land-based industries in order to adapt to the changing market. Statistically, agriculture is no longer the main source of employment and income in many peripheral areas (OECD, 2016).

Other geographic characteristics such as population, distance to other communities, transportation infrastructure, internet accessibility or education institutions can also affect the entrepreneurial activities and the responsiveness to market in peripheral places (Henderson, 2002; OCED, 2016). For example, quality internet accessibility is a fundamental infrastructure requirement for digital businesses. It also provides a way for entrepreneurs in peripheral places to access the global market (North and Smallbone, 2004). Due to the generally low population density and small local market, businesses located in peripheral places need to look out for larger market (OECD, 2016). The digitalisation enables the marginal located businesses to response to the outside market and develop own competitive advantages in surviving the global environment (North and Smallbone, 2004).

Policy

It is crucial to take the local condition into consideration when supporting entrepreneurship activities in peripheral places (North and Smallbone, 2004; OECD, 2016) as well as building an entrepreneurial ecosystem (Isenberg, 2010). While non-obvious localities may face similar

challenges in terms of lack of resources, each place is different and have its own circumstances. Entrepreneurship policies are commonly realised in form of tax relief or credit and financial aids (Assibey-Yeboah and Mohsin, 2011). For instance, the Swedish Business Development Agency views investment tax credits, venture capital funds, seed and risk financing as critical elements in supporting early stage entrepreneurship activities; seed funds intend to commercialise university-based R&D outputs are provided in countries such as Australia, Netherlands and UK (Lundstrom and Boter, 2003; Lundstrom and Stevenson, 2005). While the pressure for measuring the effectiveness of those policies are increasing, it is also accepted that such effects can only be shown in a long term because aspects such as culture embeddedness and transformative influence require time to show the outcome (Szerb et al, 2007; Tominc and Rebernik, 2007; UNCTAD, 2012; Figueroa-Armijos and Johnson, 2016).

However, it is commonly found that many entrepreneurship policies are made based on policy makers' understanding or their assumptions on market inefficiencies which is questionable on how well those presumptions reflect the real situation (Assibey-Yeboah and Mohsin, 2011; Brown and Mason, 2014; Figueroa-Armijos and Johnson, 2016). For example, the tax credits which are commonly used to support technology invention or more risk inherent research (Wu, 2005; Figueroa-Armijos and Johnson, 2016). Although it is designed to provide support to the formation, growth and survival of the businesses against market competition and failure, both scholars and policy makers have presented conflicting views and evidence namely increased competition and inequality among businesses and reduction of government income etc. (Fritsch and Mueller, 2004; Mueller, 2008; Assibey-Yeboah and Mohsin, 2011; Hicks and LaFaive, 2011). As Johnson (2007) argues that local circumstances such as culture, existing businesses, market, funding accessibilities are all great influencers toward entrepreneurship development, same or similar policies may receive distinct results. For instance, research on the tax incentives provided by Michigan Economic Growth Authority (MEGA) Credits to businesses during 1995 and 2002 did not find any positive effect on employment and income at county-level (Hicks and LaFaive, 2011). In comparison, various tax credit incentives together with other supporting programmes are commonly regarded as key towards South Korea's advancement in entrepreneurship, particularly in the technology sector (Gilbert et al, 2004). Therefore, in recognising the significance of geographical characteristics, the 'one size fits all' approach needs changing (Brown and Mason, 2014; Mirzanti et al, 2015).

Conceptual Framework of Building Entrepreneurial Ecosystems in Peripheral Places

As discussed in earlier sections, peripheral located communities often suffer from limited social, cultural and economic resources and lack of critical mass which are building blocks for entrepreneurial ecosystems. Thus, in order to build a well-functioned sustainable entrepreneurial ecosystem, peripheral regions need to overcome those barriers through collective efforts and holistic approach. As shown in Figure 2, in the process of developing a nascent community with potential into a matured entrepreneurial ecosystem, various aspects need to be addressed such as finance, talents, socio-culture environment, infrastructure, markets and policy.

Insert Figure #2 here

Three principles for building an entrepreneurial ecosystem

1. Adopt a collaborative approach

A number of attempts have been made to conceptualize a successful entrepreneurial ecosystem (Isenberg, 2011; Vogel, 2013; Mason and Brown, 2014; Stam, 2015). Whilst opinions vary on the precise components of an ecosystem, actors and elements can be broadly grouped into cultural, social, and material (Spigel 2017). In this case, a supportive culture may be considered as encouraging entrepreneurial activities and contributing to the sustainability of the region (Fritsch and Storey, 2014; Spigel, 2017). Social resources are described by Spigel as including network, venture capital, talents, mentorship and dealmakers (Spigel, 2017). Material elements comprise of the local institutions and organizations which support entrepreneurship (e.g. universities, incubators or accelerators, legal, infrastructure, public policies and programmes). However, for an effective ecosystem, it is not sufficient to simply have all the resources in isolation (Mack and Mayer et al, 2017). It is essential for different actors to work collaboratively in performing and supporting entrepreneurial activities (Roundy et al, 2017; Malecki, 2018).

2. Local context is central

There are no two regions with identical conditions and so an underlying principle of any ecosystemic approach should be that even the smallest of differences at the local level may combine to create complex and uncertain outcomes over time and at the broader scales. Merely try to copy "best practice" that worked successfully in other places without considering local context (e.g. socio-cultural environment, local networks, available resources and physical conditions) is more likely to cause problems than bringing in any tangible benefits (Isenberg, 2010; Mason and Brown, 2014; Motoyama et al, 2014). For instance, the "one size fits all" philosophy used by some policy-makers in developing entreneurship policy has been questioned and criticized by various scholars (Brown and Mason, 2014; Mirzanti et al, 2015). Entrepreneurship policies are formed based on incomplete understanding and assumptions made about market inefficiencies and so it is debatable as to whether these match expectations and local realities (Assibey-Yeboah and Mohsin, 2011; Brown and Mason, 2014; Figueroa-Armijos and Johnson, 2016). As Johnson (2007) points out that individual local conditions vary in aspects like culture, market, funding, infrastructure are all potentially fatal influencers on the region's entrepreneurship development, same or similar policies may well result in vary different outcomes. Therefore, it is key take specific local context into consideration when building an entrepreneurial ecosystem particularly in peripheral areas (Isenberg, 2010).

3. Time (Having a long-term vision)

A well-functioned sustainable entrepreneurship ecosystem does not appear overnight, there is a long evolutionary process involved (Neck et al, 2004; Mason and Brown, 2014; Mack and Mayer, 2015). Indeed, Feld (2012) believes that it requires minimum 20 years with continuous and appropriate collective efforts to build such an ecosystem in a place. During this long journey, various aspects need to be addressed like culture, key actors, resources, networks and systems (Isenberg, 2010; Mason and Brown, 2014). In order to survive and grow in this dynamic world and response to the ever-changing market, key stakeholders within the ecosystem need to response wisely to changes, may it be internal or external. As shown in Table 2, support mechanism' priorities change as the ecosystem evolve at different stages: talents, market, finance and culture are key at the birth stage; carefully designed support programme and policies that suits local needs are essential at later stages (Mack and Mayer, 2015). However, it also worth noting that, while government plays a key role in nurturing an entrepreneurial ecosystem in a peripheral area, long-term sustainability is the goal which implies that policy-makers should be carefully to develop an ecosystem that can gradually grow out the potentially over reliance on public subsidize (Isenberg, 2010). In this process, success

can build on success: a successful "role-model" like company can not only contribute to the ecosystem in turns of attracting resources but also having the spill-over effect.

Case Study: Unpacking the dynamic evolutionary conceptual framework

As an illustrative case to support the conceptual development of this paper from the literature, we will now explore the developing entrepreneurial ecosystem in the case of a digital gaming cluster in Guildford, a town with in the UK. The main reasons of choosing gaming industry are three folded. Firstly, it is a fully digitalised industry and therefore can demonstrate the potentials and opportunities that digital economy brings. Secondly, gaming businesses do tend to concentrate a geographical location over time and demonstrate the dynamic evolutionary process of an emerging entrepreneurial ecosystem. Last but the least, the industry has a high requirements on talents and needs coherent support like legal, accountancy, investment and policy and therefore a good example to put theories into context.

The early development started in the 1980s with one person, Peter Molyneux, who co-funded the Bullfrog Productions Ltd and then brought a leading publisher, Electronic Arts (EA), on board back then (Heritage, 2014; Batchelor, 2015). After developing several hit titles, the studio was then acquired by EA in 1995 which then triggered a growth period of the region with more studios established in the early 1990s. Later, various acquisition activities took place in the region. With this initial concentration of talents and companies, game developers then started to move between companies or set up their own ventures in Guildford. For instances, companies like Lionhead Studios, Mucky Foot Productions, Media Molecule, Intrepid Computer Entertainment, Big Blue Box Studios and 22Cans were all originally set up by game developers who previously worked at Bullfrog. Echoed with Ruggill et al's (2016) work, the development of the Guildford's gaming ecosystem benefited from the larger companies spill-over effect and the resources recycling processes. The expansion of the original companies started with initial investment which then attracted right talents into the region. When talents are present in the region, their entrepreneurial behaviours can be triggered for various reasons. As Mason and Brown (2014) suggested that the decisions could be more proactive as entrepreneurs decide to take the risk and set up new ventures to explore opportunities. In the contrast, it may be a more passive action that employees are forced to response to unfavourable situations such as businesses contraction or closure (Mason and Brown, 2014). For instance, it is reported that Peter Molyneux founded the Lionhead Studios because of his frustration on focusing too much on the commercial side of the business in his previous position. It also worth noting that developing global-recognised successful games is at the heart of this development: it is owing to previous successes, continues resources can be attracted to the company and subsequently the region.

As the regional ecosystem become more successful and increasing recognised in the global market, resources started to be attracted to the region such as funding and talents. In Guildford case, funding comes from places like US, China, Japan and Korea. With sufficient finance, studios then able to hire more people and naturally grown the community over time. Gradually, a supportive socio-cultural environment is developed. As Batchelor (2015) writes "such a high centration of developers has created a friendlier community than you might expect. While rivalries exist, they never escalate into animosity." However, to achieve further growth, a more coherent and holistic support mechanism are demanded (Isenberg, 2010; Mason and Brown, 2014). For instance, in order to retain and enhance Guildford's global reputation as a significant games development hub, this entrepreneurial ecosystem still need to work on training, retaining and attracting right people to the region, accessing more funding opportunities, providing

appropriate professional support and accessible and convenient infrastructure (Hurley, 2017). In a digital age, a lot of the resources can be sourced beyond the local region and look at in a global context. In case of Guildford, it may not too far to think about bring investment companies into the region, but it has already attracted investments from outside the countries like US, China and Korea benefiting from the increasing connected digital economy. Similarly, while it may be most convenient for businesses if professional supports like legal or accountancy located nearby, businesses can still get required services from providers located outside the region. Therefore, in developing an entrepreneurial ecosystem in peripheral places, it is important to realise that many resources that are lacking locally can potentially be accessed nationally or internationally in this digital age.

A matured and sustainable entrepreneurial ecosystem in peripheral places may look different than the ones in major urban cities. Due to the relatively low population concentration, it may never have all the players desired (e.g. investors, marketing or PR) located in the same area. However, resources can be accessed globally if the appropriate infrastructure and support mechanism were set up. Thus, it is key to understand the local potential and approach the region with a flexible mindset. In case of Guildford's developing entrepreneurial ecosystem, unique competitive advantages come from the traceable reputation on producing quality and popular games. In maintaining and exploring such advantages, the fundamental local resource is talents. Other aspects such as finance, socio-cultural environment can follow after. However, governments and policy play an unneglectable role in shaping the ecosystem. For instance, broadband and transport infrastructure development and upgrade rely primarily on government efforts.

Discussion

A well-functioned sustainable entrepreneurial ecosystem consists of various actors and resources that located in a close proximity (Isenberg, 2010; Masson and Brown, 2014). Rich in resources such as finance, human capital, socio-culture capital, infrastructure, supports and demand is an essential characteristic of an entrepreneurial ecosystem (Isenberg, 2010; Masson and Brown, 2014, Stam; 2015; Spigel and Harrison, 2018). However, peripheral places are often suffer from lack of finance and right talents (Henderson, 2002; Brown, 2018). Low entrepreneurial profile region are often associated with less supportive socio-cultural environment (Fortunato et al, 2016). Peripheral places tend to have poorer transport infrastructure (Henderson, 2002) and quality broadband coverage (Grimes, 2003) which poses challenges for the regions to develop their own competitive advantage and compete in the global market. Governments play an important role in developing an entrepreneurial ecosystem (Mason and Brown, 2014). However, there are various challenges to develop appropriate supportive policy that best suits the particular peripheral place. For instance, local governments need to change their mindsets and work on diversifying the land-based businesses profiles (North and Smallbone, 2004; OECD, 2016). To do so, governments need to be able to recognise the potentials that emerge from the local region and nurture it to grow into a potentially entrepreneurial ecosystem. However, in many parts of the world, politicians still has a reputation for developing policies and programmes out of assumptions which later become more damaging than supportive (Assibey-Yeboah and Mohsin, 2011; Brown and Mason, 2014; Figueroa-Armijos and Johnson, 2016). But it should be well recognised that right policy interventions can become the engine of entrepreneurial ecosystem development in peripheral areas and it should be. For instance, the "green economy" initiative brings in large bulk of a USD 1 trillion investment in rural areas (OECD, 2012). Zhong Guan Cun's development is

resulted from the Chinese government's initiative to develop a technology-driven entrepreneurial ecosystem.

As illustrated in the conceptual framework, peripheral place can take advantage of the digital technology and building an entrepreneurial ecosystem of its own kind through a holistic collaboration to tackle issues around finance, talents, socio-culture environment, infrastructure, markets and policy. Exiting urban entrepreneurial ecosystems (e.g. Silicon Valley, Boston, New York, Shanghai) tend to have all key resources concentrate within the region. However, this strong regional focus can be challenged in this digitalised era. With the help of digital technology, resources can be obtained beyond the local region to support entrepreneurship activities and subsequently the development of entrepreneurial ecosystems in peripheral places. It is also critical to understand that those resources should not be situated in isolation but integrates and collaborate as a whole to offer a coherent and holistic supporting environment for entrepreneurs and businesses to grow (Mason and Brown, 2014). For instance, in case of Guildford's gaming industry, talents attract investments and investments then bring in more talents which then build the foundation of the emerging ecosystem. However, it would not be the case if appropriate infrastructure was not set up and the wider global market was not accessed. Governments' recognition of the importance of the industry also helps the development of the ecosystem.

As Neck et al (2004), Mason and Brown (2014), Mack and Mayer (2016) argued, the entire maturity process of an entrepreneurial ecosystem takes decades. In this evolutionary process, activities and interactions are dynamic and change over time which requires actors within to react accordingly particularly the policy makers. In peripheral places, critical observation and carefully crafted support programme are the foundations of growing with its growing ecosystem. In case of Guildford, the initial development requires appropriate infrastructure so that development activities can take place. However, as the ecosystem evolves, emphasis start to focus on how to not only train and attract right talents but how to keep them particularly under the uncertainty brought by Brexit. As the ecosystem keeps growing, requirements on infrastructure evolves as well. For instance, more and possibly larger office space is demanded as companies grow which signals that there is need to review the town planning to meet the growing needs. Thus, it is essential for policy makers and other actors within the ecosystem of peripheral places to take the local context into consideration and plan with a long-term evolutionary and critical view.

Conclusions, Limitations and Future Research

Peripheral places face many challenges in building well-functioning, sustainable entrepreneurial ecosystems due to its remoteness and lack of resources. However, as illustrated in the conceptual framework, coherent and holistic efforts to develop finance, talents, socio-cultural environment, infrastructure, markets and policy can help foster vibrant ecosystems. However, stakeholders and policy-makers, need to consider the three main principles of building an entrepreneurial ecosystem: adopting a collaborative approach; grounding interventions in the local context; and building with a long-term vision. This conceptual framework of building an entrepreneurial ecosystem in peripheral places integrates research on the increasingly popular concept of the ecosystem with the specific contextual issues of peripheral places.

The paper discusses characteristics of an entrepreneurial ecosystem and identifies challenges that peripheral places face and the possible ways to address these. The focus has been on

developing a conceptual framework to inform future empirical research with data from peripheral places. Potential research avenues may also look at how digital technology can transform peripheral places and support entrepreneurial ecosystem growth and development. Moreover, specific conditions of peripheral places vary dramatically, thus a further typological work will enhance our understanding of impacts of local context.

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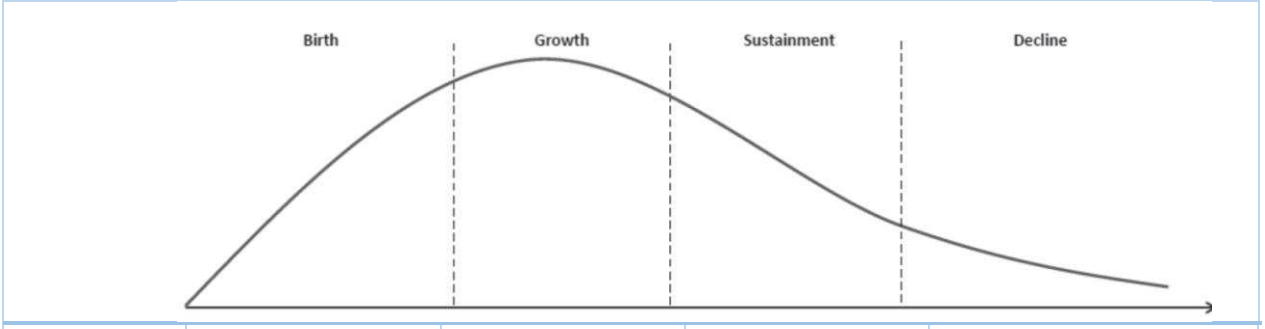
Author	Definition on Entrepreneurship Ecosystem	Key properties
Isenberg (2010, 2011: 3)	'environments that nurture and sustain entrepreneurship' and they 'consists of a set of individual elements-such as leadership, culture, capital markets and open-minded customers-that combine in complex ways' and together these elements can form an integral system which stimulate economic growth and venture creation at specific location.	Various conditions needs to be met to form an entrepreneurship ecosystem
Acs et al (2014: 479)	'a dynamic, institutionally embedded interaction between entrepreneurial attitudes, ability, and aspirations, by individuals, which drives the allocation of resources through the creation and operation of new ventures'	Emphasis on the dynamic and interactive nature of the system
Mason and Brown (2014: 5)	*'a set of interconnected entrepreneurial actors* (both potential and existing), entrepreneurial organisations (e.g. firms, venture capitalists, business angels, banks), institutions (universities, public sector agencies, financial bodies) and entrepreneurial process (e.g. the business birth rate, numbers of high growth *firms, levels of "blockbuster entrepreneurship", number of serial* entrepreneurs, degree of sell-out mentality within firms and levels of entrepreneurial ambition) which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial *environment'*	Entrepreneurial ecosystem helps emergence of HGFs
Stam (2015: 5)	'a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship'	Emphasis the output: productive entrepreneurship
Audretsch and Belitski (2016: 4) adopted from Levie and Auio (2014)	'a dynamic community of inter-dependent actors (entrepreneurs, suppliers, buyers, government, etc.) and system-level institutional,informational and socioeconomic contexts'	Dynamic nature

Table 1. List of key Entrepreneurship Ecosystem definitions



Firm entries and exits	Birth rates > death rates	Birth rates > death rates	Birth rates < death rates	Birth rates < death rates
Policy	Traditional economic development focused	More entrepreneurship focused	Widespread and targeted policies for entrepreneurship	Favouritism in entrepreneurship decline and maybe shifted to other fields
Finance	Becoming available but limited	More trust build and easier to access	Harder to access as trust weaken	Decline
Culture	Few success stories and figures; lack of tolerance to risk and failure	Networks gains recognition; social norm may change to favour EE[3]	Success stories is essential as more firms close down	EE favoured culture deteriorated
Support	Emergence of early support institutions	Non-governmental supports becoming entrepreneurial oriented	Non-governmental supports diversify possibly away from EE	Support decline and disappear
Human capital	Only general degrees are available; no serial entrepreneurs	Serial entrepreneurs and targeted programmes emerge	Decline of serial entrepreneurs	Entrepreneurs not regarded as viable career path
Markets	Not yet developed	Regional, national and international opportunities start to develop	Decline of market opportunities and networks	Vanish of market opportunities and networks
Policy implication	Lower barrier for venture creation; form entrepreneurship-favoured support	Rising support on finance and networking opportunities	Networks enhancement	Loss of EE actors as they avert to stay in the EE

Table 2: Ecosystem Evolution Model (summarised from Mack and Mayer 2015: 2122)

[3] EE stands for 'entrepreneurship ecosystem' here.

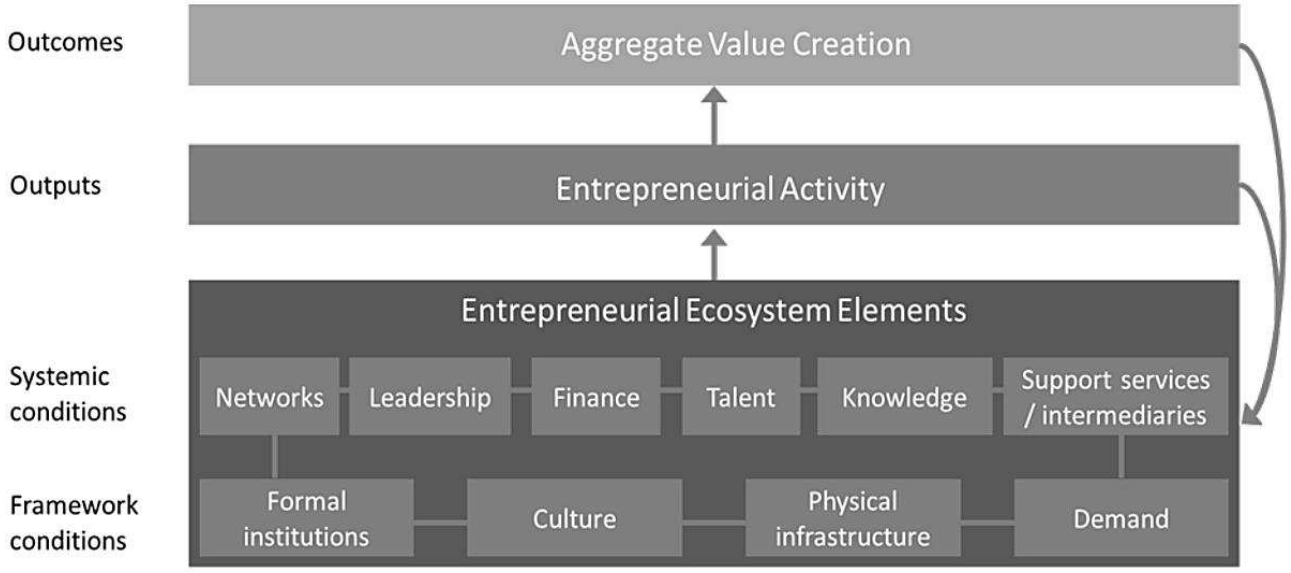


Figure 1. An Entrepreneurship Ecosystem (Stam 2015)

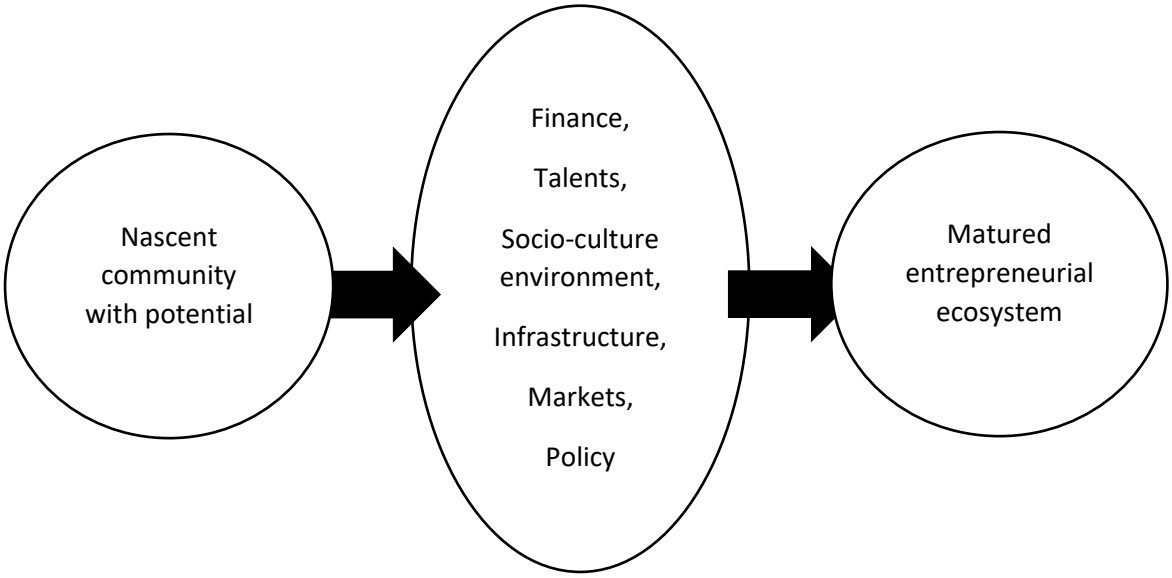


Figure 2: Conceptual Framework of the Entrepreneurial Ecosystem in Peripheral Places (Authors' own)