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Local-Global Design: Entrepreneurial Ecosystem Approach for Digital Gaming Industry

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Abstract

The notion of the entrepreneurial ecosystem has gained considerable traction in recent years. Ecosystem approach is considered as a useful mechanism in supporting entrepreneurial activities, regional economic development and addressing sustainable development goals. This paper explores the entrepreneurial ecosystem concept and its applicability in the context of the gaming industry. By looking at Brazilian gaming industry, this paper explores the variations in entrepreneurial ecosystems that are favourable for technology-dependent industries such as gaming, especially in developing economies. The paper follows a qualitative approach using document analysis and attempts to develop a Local-Global (LOGO) framework that examines current evidence in the digital gaming ecosystem. Findings of this research suggest that, depending on the ecosystem maturity, components of an ecosystem play either a dominant global role or a weaker local role in supporting entrepreneurial initiatives. When serving a global market, ecosystems change and mature, so do the roles played by their components. The proposed conceptual framework re-visits the entrepreneurial ecosystem approach and its role in the development of the gaming industry. The paper contributes by extending the current theory pertaining to ecosystem approaches and suggests practical routes for ecosystem components to work effectively in scaling from a local to a global market.

Keywords: Entrepreneurial Ecosystem, Digital Gaming, Business Growth, Brazilian Gaming Industry

Introduction

Sustainable regional development combines the concepts of regional development and sustainable development to achieve a balance between economic growth and the environment (Clement, Hansen and Bradley 2003; Gibbs 2010). Previously, the mechanism used to support regional development and reduce regional inequality is through infrastructure development and upgrading, as well as inward investment (OECD 2018). However, this approach has achieved limited success despite receiving a considerable amount of public funding (OECD 2018). As a response, entrepreneurial ecosystem approach has emerged as a regional economic development strategy and attracted increasing interests from both academia and policy practitioners during the past decade (Mason and Brown 2014; Spigel and Harrison 2018). In the United Nations' 17 Sustainable Development Goals, Goal 8 and Goal 9 bring out the topics on economic growth, industry, innovation and infrastructure (United Nations 2018).

Traditionally, entrepreneurial ecosystem has a strong regional focus (Isenberg 2010; Frenkel and Maital 2014; Mason and Brown 2014). In the information era, the concept of the digital economy has also gained worldwide recognition, particularly due to the opportunities it brings to businesses (Anderson and Wladawsky-Berger 2016). As the world becomes increasingly connected making long-distance communication much easier, the nature of ecosystem components and the roles they play change accordingly. However, in a tech-heavy industry such as gaming, there is lack of evidence on how ecosystem can measure and support firms to operate locally and globally with ease. Recognised as a source for innovation and social-economic development, creative industry has drawn increasing attraction from researchers and government leaders (British Council 2011). Digital gaming industry is one of the representatives of creative economy (Florida 2002). In addition, digital games are multimedia products which comprise not only knowledge creation and transfer but also business

application (Vogel 2000; Pilon and Tremblay 2013; Rezaei et al. 2020). Thus, with a natural global reach and high reliance on technology, digital gaming industry represents a complex entrepreneurial ecosystem that extends from traditional regional focus. However, current ecosystem literature has been primarily focusing on the regional level (e.g. Isenberg 2010; Frenkel and Matal 2014; Mason and Brown 2014; Garousi Mokhtarzadeh et al 2020). There is a need to extend the current research landscape by linking the regional focus with a global view. So far, literature around digital gaming industry has been mainly focused on aspects such as specific technical advancements, psychological or social influence, or used as educational or training tools (e.g. Dana 2011; Feijoo 2012; Anguera et al 2013; Greitemeyer and Mugge 2014; Rogers 2014; Heineman 2015).

To date, few academic studies have looked at digital gaming industry from a holistic ecosystem perspective, particularly in developing economies. Meanwhile, Brazil has witnessed a booming digital gaming industry in recent years: Latin America is the 2nd quickest emerging gaming market where Brazil alone account for 30% (Lai.com 2017). Brazil's digital gaming market has experienced a compound annual growth rate of 29% in 2017 (Lai.com 2017a). In 2018, Brazil is ranked as the 13th largest gaming market worldwide with 75.7 million players and \$1.5 billion spending (Newzoo 2018). Furthermore, the Brazilian government has announced to invest R\$35.25 million (est. \$8.4m) for the development and marketing of video games and additional R\$10 million (est. \$2.4m) in supporting accelerators in December 2018 (Gov.br 2018). Thus, there is also a timely need in studying the Brazilian gaming industry and possible support mechanism or principals during the transition period.

This paper explores the entrepreneurial ecosystem approach as a contributor to regional economic development with a particular focus on the digital gaming industry and the Brazilian market. As 'born-global' firms, digital gaming companies naturally sit in a Local-Global

(LOGO) governance structure and are important contributors to regional development. This paper aims at understanding how ecosystem components respond when operating at the LOGO interface and more specifically how these components scale up or shrink down when it comes to supporting and developing gaming firms geared to both local and global arenas. The paper is structured as follows, the initial section charts the literature around the digital gaming industry, Brazilian context, and entrepreneurial ecosystems approach. The mid-section explains the research approach used in this paper and the last sections list the results and discussion with a conclusion on the limitations and contributions. Recommendations follow with particular consideration of the North-South cooperation framework.

Literature Review

The regional focus of entrepreneurial ecosystem exists since its nascence. Traditionally, entrepreneurship studies have extensively concentrated on individual characteristics of entrepreneurs (Shane 2003; Borissenko and Boschma 2016; Jafari Sadeghi, Kimiagari and Biancone 2019). As this personality approach being increasingly criticised, discussions evolved into examining the broader socio-economic context in which entrepreneurial activities take place (Dodd and Anderson 2007; Borissenko and Boschma 2016; Spigel and Harrison 2018; Sadeghi, et al. 2019b). Under this shift, researchers start to explore ways in which entrepreneurs and entrepreneurial activities are supported by regional or local resources and conditions (Neck et al 2004; Mason and Brown 2014; Stam 2015; Sadraei et al. 2018; Gurau and Dana 2018). During which, various studies on entrepreneurial ecosystem have started to emphasise on the notion of locality (Isenberg 2010; Frenkel and Maital 2014; Mason and Brown 2014; Xu and Maas 2019; Arenal et al. upcoming). Entrepreneurial ecosystem has thus been seen as an effective way to drive regional socio-economic growth (Stam 2015). In particular, the ability to adapt and respond to changes or shocks has become one of the

determinant factors for long-term regional sustainability (Christopherson, Michie and Tyler 2010). Academics and policymakers sometimes frame this ability as “regional resilience” (Christopherson, Michie and Tyler 2010; Pike, Dawley and Tomaney 2010). While entrepreneurship has been widely regarded as a key driver for regional development, entrepreneurial ecosystem is considered as a vital mechanism for fostering economic resilience (Mason and Brown 2014; Szerb et al. 2015; Spigel 2017; Spigel and Harrison 2018). As external factors including recession, industry shift and technology upgrading can impose significant impact on regional economy, resilience plays an indispensable role in the long-term sustainable development of the region, especially during the suffering and recovery stages of external changes (Palekiene 2015). Through producing and strengthening resilience, the entrepreneurial ecosystem can aid sustainable regional development especially in economic aspects.

The entrepreneurial ecosystem in context: Digital gaming industry

Since the first commercial video game published in the mid-nineteen century, the digital gaming industry has experienced rapid development and evolution (McGregor 2013). The traditional view portraying teenage antisocial boy playing violent fighting or shooting games is undoubtedly untrue (Kirriemuir 2002). The digital gaming industry has become increasingly diversified and multi-disciplined with very high reliance for skills and technology (UKIE 2015). For instance, other than shooting, fighting games, there are games designed for educational and training purposes. Games can be played in various forms as well such as mobile, console, PC, VR and AR. The diversification is also reflected on gamers’ profiles. According to Newzoo (2017) report, 48% of the gamers are female and 52% are male among active UK mobile players. The average age of the console gamer is 37 years old in the US (Marchand and Hennig-Thurau 2013). The business models in the gaming industry are also diversified which include pay-to-play, free-to-play or hybrid models (Davidovici-Nora 2014; Rayna and Striukova 2014).

As the industry evolves over time, the expectations of games quality become higher which have led to greater skills requirement and division of work (Ruggill et al. 2016). Particularly in big AAA¹ type of development projects, common roles and skillsets include programming, art, designing, producing, quality assurance, audio, and business (Ruggill et al. 2016). When it comes to commercialisation, supports such as marketing, PR, legal and accountancy are often required.

Rise of the digital gaming industry has often been associated to the advancement of technology-driven, creative, or multimedia industries, such as software development or filming (Mateos–Garcia, Bakhshi and Lenel 2014; Darchen and Tremblay 2015). On the one side, to better utilise local resources, clustering has increasingly become a common practice in digital gaming industry (Pilon and Tremblay 2013; Ruggill et al. 2016; Xu et al. 2019). This concentration of location allows firms to access valuable local resources including spill-over, skilled labour, as well as formal or informal networks already in place, which enhances knowledge exchange and information sharing (Dana et al. 2001; Ruggill et al. 2016). On the other side, in the era of globalisation, the trend to collaborate and exchange knowledge virtually is on the rise, breaking regional, national, and even continental boundaries (Cabras et al. 2016). For instance, studios can work with investors or publishers around the globe to develop and publish new games. Developers located across various regions and nations are able to work on the same project together. Distribution channels of gaming businesses also indicate their ‘born-global’ nature. Platforms such as Apple App Store, Google Play Store, and Steam have revolutionarily made game distributions faster and more hassle-free: a game can reach its customer from around the world via a just simple click. In turn, the LOGO crossings have been amplified by this ‘born-global’ nature. Which facilitates the forming of a LOGO structure that blurs the line between

¹ AAA, or Triple A, games refer to games developed with a massive budget both during the development stage and the marketing stage.

local and global resources and support. The regional lens traditionally adopted in studying ecosystems is unable to capture the key entrepreneurial transitioning activities of such an industry. There is a need to further advance research by examining local foci and extending it to a global context. This work looks at this LOGO facet and examines ways in which components of the entrepreneurial ecosystem measure up to sustain the industry.

Brazilian Digital Gaming Industry

The digital gaming industry normally consists of two groups of actors: publishers (large, medium or small-sized) and development studios (large, medium, small or independent) (Heineman 2015; Sadeghi and Biancone 2018). While it is widely acknowledged that digital game development can be costly and risky, the overall sector-wide profit has witnessed a steady growth in the last 10 years or so (Heineman 2015; Egenfeldt-Nielsen 2016). In particular, benefiting from the rapid development of internet and globalisation, independent (indie) games have grown to be an important part of the video game industry in the last decade (Santiago 2015). Indie gaming companies may be small in size typically containing only one or a few developers, and often tight in budget, they nevertheless still have the opportunity to get funded by publishers or investors as well as achieving great success (Santiago 2015). While being an increasingly important trend, there are fewer academic studies focusing on this specific group of gaming companies (Santiago 2015). As the gaming industry gains more popularity, an increased volume of academic studies has also been witnessed (Heineman 2015). Literature can be found in various disciplines such as psychology, education, computer science, software development, social sciences (Feijoo 2012; Anguera et al. 2013; Greitemeyer and Mugge 2014; Rogers 2014; Heineman 2015). However, only a limited amount of academic literature focus on the business side of the industry. Specifically, the Brazilian gaming industry is rather fragmented with many small indie types of studios located across the country (Buffa 2018). There is very few national blockbuster titles and no Brazilian AAA companies (Mittelbach et

al. 2014). Nevertheless, Sao Paulo is seen as the largest digital gaming concentration in Brazil and indeed where the industry first started (Partridge 2016; Buffa 2018). For instance, both the Brazil Game Show and BIG Festival (Brazilian Independent Games Festival) taking place in Sao Paulo attract thousands of visitors every year (Johnson 2017; Buffa 2018). While Brazil's gaming industry is experiencing rapid growth in the past few years, research has not focussed on how the gaming industry manages the global outlook with a local focus. In such context, this research therefore aims at examining how ecosystem components interact, scale and function within a LOGO interface.

Research Approach

Positioned as an exploratory qualitative study, this paper utilises document analysis to approach and investigate the Brazilian gaming industry. Thanks to its high efficiency, cost and time-effectiveness, document analysis has been adopted by scholars as either a complimentary or standalone method in data collection (Gaborone 2009). Documents are especially useful for gathering background information, covering wide range of data, and enhancing understanding of the important yet often overlooked context of the target research field (Bowen 2009). It also enables the researcher to interpret current information and perceptions on the topic and sets the scene for future research. In this paper, documents are selected based on whether containing relevant information related to the Brazilian gaming industry from a business perspective. Types of documents include journal articles, green papers, white papers and industry reports. Fifty-three documents were selected based on the following search criteria, "Gaming", "Digital Gaming", "Gami*", "Gaming*", "Brazil Gaming", "Brazil Gam*". The review process is given in Table 1.

"[Insert Table 1.]"

Table 1. The review process summary
(author's own compilation)

Thematic Analysis

This paper applies thematic analysis to the collected documents which allows key themes to emerge from the text. The coding of the data is given in Table 2 and the resultant themes are explored in six different sections.

“[Insert Table 2.]”

Table 2. The first level of thematic coding
(author’s own compilation)

Theme 1: Talents

Brazil has a strong academic and game studies community where students or colleagues at universities are often seen to work together and start game development companies (Mittelbach et al. 2014). Brazilian indie developer, Johnny Andrade responded to an interview, “We have proved that we have chances to grow, but it has not changed efficiently the Government’s perspective. [.....] We currently have the manpower in abundance, but we do not have employment demand. Never in the history of Brazil were there so many universities and graduation options in the Game Development area, which unfortunately has not been valued at all by employers. I also wish a little more awareness on the part of studios to encourage, hire and help in the training of new professionals, an attitude that we rarely see nowadays in Brazil.” (Rohn 2016). Similarly, Javier Entelman also says in an interview that “We’re realising it’s going to be country by country, step by step. You can’t address Brazil immediately. You can’t yet open some markets that need to be developed. But it’s an amazing place. There are lots of teams, a lot of cool projects. We just need to bring them good operations principles, good techniques, good production schedules, so they can work with publishers without being scared, without feeling overwhelmed. They’ll know how to talk to publishers, how to get money for

their projects. That's the work we're doing." (Takahashi 2018). However, on the commercialising side, there are a very limited number of game publishers in Brazil as most digital games circulated in Brazil are published by oversea companies (TechinBrazil.com 2014).

Theme 2: Policy and Government

Government and policy support have been a major driving force behind the rapid development of the Brazilian digital gaming industry (Johnson 2017; Buffa 2018). For example, the BGD export programme funds Brazilian game developers to participate in major industry events and conferences such as the Game Developers Conference (GDC) in the US and Gamescom in Germany (Johnson 2017). Many international collaborations happen with the aid of such programmes. For instance, through the BGD programme, Kokku based in Recife/PE-Brazil secured the collaboration deal and working on the 3D modelling on the hit game tile, Horizon Zero Dawn, with Guerrilla Games based in Amsterdam (Kokkuhub.com 2018; Johnson 2017). Those collaborations not only help to establish the business but also help develop the industry as a whole: developers are able to learn and acquire knowledge and skills from big established companies and take what has been learned wherever they go next (Johnson 2017; Sadeghi, et al. 2019a). Agency of National Cinema (ANCINE) is another nation-wide programme where selected games are offered to fund with hope of profit return in the future (Johnson 2017). Other government support programme includes local state agency. Those programmes not only helped the business financially but also motivate young talents and support developers to grow to be professional in the business side of game development (Johnson 2017).

However, indie game developer Johnny Andrade argued that the lengthy process and bureaucratic involved made access to certain tax incentives unfeasible (Rohn 2016). Rigid labour law is also seen as a major barrier to the development of the industry (Rohn 2016). As Johnny Andrade responded in an interview: "In fact, our national industry has colossal potential

for development, but bumps and clashes with the corruption of the government, which imposes high tax rates, one of the largest globally, as well as labour laws that make it difficult to hire professionals, which eventually prevents studios from having many employees to grow the way that the triple-A market demands. Plus, all this only serves to keep away big world companies from coming to open branches here” (Rohn 2016). There are rare cases where Brazilian studios get AAA status but then either sold to a bigger company overseas or relocate outside the country in seeking lower tax and improved the working environment (Rohn 2016). Indeed, being able to bring international talents together and having major studios located in a region is one of the most common ways to grow the industry quickly.

Theme 3: Support Programmes

There are some existing programmes and organisations that support the development of Brazilian gaming industry such as game jam, game shows and festivals, social gatherings and meetings, game association groups. Table 1 shows a selection of support programmes with specific examples. Game jams are popular programmes in Brazil such as Global Game Jam, Super BR Jam, Pack of Horrors and Spjam (Mittelbach et al. 2014). For instance, in 2014, as a major participant for Global Game Jam, Brazil had the largest jam site of around 350 developers and ranked 2nd in terms of the number of sites with a total of 58 locations (Mittelbach et al. 2014). The 6th BIG Festival hosted in Sao Paulo and Rio de Janeiro is a free event for the public with over 20,000 visitors and promotes the global indie community (Buffa 2018). According to Eliana Russi, executive director of BIG, \$2.5 million worth of contracts were signed at the event in 2016 (Venturebeat 2017). Those events offer opportunities for game developers to meet with publishers and investors to develop potential funding deals (Buffa 2018). The Brazil Game Show 2017 had gathered 30,000 Brazilian gamers and industry big players such as Sony and Microsoft in Sao Paulo (Johnson 2017).

“[Insert Table 3.]”

Table 3. Support programmes and examples in Brazil
(adopted from Protasio 2014)

Theme 4: Taxation and Piracy

Brazil has incredibly high taxes on electronic goods such as mobile phones, tablets, PCs and game consoles (Mittelbach et al. 2014). Even locally manufactured electronic goods and games are charged with high tax (Rohn 2016). Table 4 shows the price differences in the same products between the US and Brazil after import taxes. Many of those electronic goods are essential tools to play digital games such as smartphone, PCs and game consoles. The high price makes it harder for gamers to purchase the equipment. While the high import tax is causing problems for the growth of the digital gaming industry, the local Brazilian market responds with piracy, colons and illegal imports. In 2015, the taxation is still believed to have caused more than 70% price rise on games without even taking into account distribution cost (Teixeira 2015). Similar to the rest of the world, with the rise of digital distribution channels such as Apple App Store, Google Play Store and Steam, the indie development community start to grow and develop in Brazil as well (Mittelbach et al. 2014). Mobile and PC games have since seen fast adoption (Teixeira 2015). In the last decade or so, the digital distribution has also contributed to improving this situation by providing comparatively more affordable price and wider distributions across the country (Mittelbach et al. 2014).

“[Insert Table 4.]”

Table 4. Electric goods and game price comparison
(Adopted from Mittelbach et al (2014) and Teixeira (2015))

The heavy taxation has discouraged many big digital gaming companies from entering or staying in the market due to the difficulty in products distribution despite high-interest level

from the consumers (Souza 2012; Teixeira 2015). Piracy and illegal imports started to emerge as a result since the 1990s and still persist today due to lack of products and high retail prices (Teixeira 2015). Despite the disturbing situation created, some believe that piracy and clones nevertheless contribute to the flourish of Brazilian digital gaming industry in some ways (Partridge 2016). It at least provides a way for the population to access and play digital games as well as enabled developers to get into the industry and leave their mark through modifying and adding local flavour into the cloned game (Partridge 2016).

Theme 5: Culture

Language and culture are seen as another barrier in developing internationally recognised games as well as the local industry. This is not only because of the generally low proficiency in English but also because of the low self-esteem - Brazilians tend not to value games made locally but rather prefer American or European made games (Mittelbach et al. 2014). This phenomenon has roots in both history and perception. Historically, most influential games were imported from countries such as North America, Japan and Europe and therefore Brazilians perceive games from those countries at a higher value (Mittelbach et al. 2014; Partridge 2016; Ardis 2018). On the other hand, when a Brazilian game was developed in English with an international audience in mind, local citizens become suspicious about the trustfulness of the developers as the value of their culture were perceived not being reflected (in form of language) in those games (Mittelbach et al. 2014). At least partially, the development of such culture can find close root in the early development of the Brazilian games market where original games were expensive and hardly available, and localised pirated versions dominated the market. As a result, there is a low demand for Brazilian locally developed games which also contributes to the challenge of having few employment opportunities as discussed in Theme 1. Such narrowed development opportunity, coupled with the strict labour law and lack of appropriate policy

support for small businesses (Rohan 2016) have in turn contributed to talent loss and posed challenges in retaining the development teams within the country.

Theme 6: Localisations and International Collaborations

Many AAA games have localised version in Portuguese such as Call of Duty, World of Warcraft and Halo3. For indie games, online communities are seen to be the major force behind localising non-Brazilian games whose effort has been recognised both by developers and gamers (Mittelbach et al. 2014). According to a research conducted by Sioux and Blend, New Research revealed that 72% of players have purchased games in Portuguese and 53% react positively to the translation and dialogue dubbing in Brazil in 2015 (Teixeira 2015). The indie game studio is found to tend to produce games in English in order to tap into the wider market and the localisation process often takes place either too early or too late (Mittelbach et al. 2014; Venturebeat 2017).

Traditionally, Brazilian gaming companies mainly serve advertisement companies who offer funding to support the development (Mittelbach et al. 2014). In searching for greater market share and revenue streams, many companies started to internationalise their games (Mittelbach et al. 2014). This trend has contributed to increasing international collaborations in Brazil. International collaboration has become increasingly common in Brazil in the last decade or so (Mittelbach et al. 2014). For instance, TowerFall and Rogue Legacy were both co-produced by a Brazil artist with other international developers (Mittelbach et al. 2014). Stock market listed British game publisher Team17 signed a game deal with Brazilian indie developers in 2017 (Dring 2017). BIG has been establishing their international presence and creating opportunities for Brazil developer to establish international collaboration opportunities by organising developers to attend major industry events in various countries such as Game Connection in America, External Development Summit in Canada and Game Connection Europe and Gamescom in Germany, China Digital Entertainment Expo & Conference (Venturebeat 2017).

Discussion

Academics have attempted to conceptualise the notion of successful entrepreneurial ecosystems (Isenberg 2011; Vogel 2013; Mason and Brown 2014; Stam 2015). Although consensus has not been achieved on the exact comprising elements of regional ecosystems, Spigel (2017) argues that different actors or resources can be broadly categorised into cultural, social and material aspects. A supportive culture encourages entrepreneurial activities and contributes to sustaining the long-term regional development (Fritsch and Storey 2014; Spigel 2017; Xu and Dobson 2019). Whereas networks, venture capital, talented or gifted workers, mentorship, and dealmakers fall into the social resource category (Spigel 2017; Mokhtarzadeh et al. 2020). And material capitals include local supporting actors for entrepreneurship such as universities, research institutions, other organisations (e.g. incubators, accelerators, legal or accountancy advising bodies etc.), infrastructure, as well as public policies and programmes (Spigel 2017). However, having all the actors or resources in isolation is not sufficient for an ecosystem to work effectively (Mack and Mayer 2017). Essentially, different actors have to work collaboratively in order to carry out and support entrepreneurial endeavours (Roundy, Brockman and Bradshaw 2017; Malecki 2018). Owing to long-term trust and supportive culture, an effective resilient ecosystem such as Silicon Valley has a dense social network where entrepreneurs are well connected with other actors (Cohen 2006). On the contrary, an ecosystem with abundant resources but weak networks is more likely to show low resilience level in the time of crisis (Spigel and Harrison 2017). Take the Scottish oil and gas driven economy Aberdeen as an example. With high rates of entrepreneurial ventures and success, the intensive rivalry culture makes knowledge sharing difficult which leads to weak networks (Spigel and Harrison 2017). In the case of industry decline, resources such as funding and

talents are more likely to exit the region and the ecosystem may bear the risk of dying down (Spigel and Harrison 2017).

There are no two regions with an identical environment. The differences in culture, resources, local networks or even physical location imply that simply imitating best practices from other regions without adjusting to local circumstances is most likely to fail (Isenberg 2010; Mason and Brown 2014; Motoyama et al. 2014). For example, criticisms have been placed on the “one size fits all” approach in entrepreneurship policy formulation (Brown and Mason 2014; Mirzanti, Simatupang and Larso 2015). Additionally, entrepreneurship policies formulated on the basis of policymakers’ assumptions on market inefficiencies remain contested as those presumptions do not sufficiently reflect the actual reality (Assibey-Yeboah and Mohsin 2011; Brown and Mason 2014; Figueroa-Armijos and Johnson 2016; Jafari-Sadeghi et al. 2020a). As specific local circumstances including culture, existing companies, market, and funding availability place considerable yet varied impacts on entrepreneurial development, same or similar policies may see very distinct outcomes across different localities (Johnson 2007). For example, research shows that tax incentives offered by the Michigan Economic Growth Authority (MEGA) to local businesses between 1995 and 2002 have failed to generate positive results on employment or income at a county-level (Hicks and LaFaive 2011). On the contrary, a wide range of tax incentives and other supporting programmes have been regarded as important factors stimulating entrepreneurship in South Korea’s technology industry (Gilbert, Audretsch and McDougal 2004). Therefore, it is clear that the ‘one size fits all’ approach needs to be transformed to acknowledge the significant impacts brought by locational characteristics (Brown and Mason 2014; Mirzanti, Simatupang and Larso 2015), and critical to build and foster an ecosystem by considering and respecting local conditions (Isenberg 2010).

A matured and well-functioning entrepreneurship ecosystem places premium on the so-called evolutionary process (Neck et al. 2004; Mason and Brown 2014; Mack and Mayer 2015), which according to Feld (2012), may require decades of continuous effort to accomplish. During this prolonged process, appropriate culture, actors, resources, networks and systems need to be put in place (Isenberg 2010; Mason and Brown 2014). In the ever-changing market and environment, it is necessary for actors within an ecosystem to proactively respond to any internal or external changes. For instance, emphasis of support may need to shift as the ecosystem evolves over time: during the birth phase, pivotal are the market opportunities, human resources, finances, and culture; whereas in the development and sustainment phase, tailored support programmes or policies become essential (Mack and Mayer 2015; Jafari-Sadeghi et al. 2020b). For an ecosystem to be self-sustainable in a long term and not overly rely on public sector investment and support, it is necessary to stimulate and inspire the community to generate a self-sustained and organic flow of entrepreneurial endeavours (Isenberg 2010). A local success story having a motivational impact on the community not only represents a form of setting a “role model” but also reveals the spillover effect in terms of knowledge and resources recycling within that particular region (Isenberg 2010; ; Jafari-Sadeghi 2020; Mason and Brown 2014; Sadeghi and Biancone 2017).

While exploring the ecosystem components that can support the global ambitions of the gaming companies, it can be seen that a local digital gaming industry concentration often starts from an existing technology-driven or creative industry cluster such as software development or filming (Mateos–Garcia, Bakhshi and Lenel 2014; Darchen and Tremblay 2015). The emergence of the local digital gaming ecosystem can benefit from the continuous spill over and resources recycling process (Ruggill et al. 2016). The ready existed industry cluster is often rich in specialised qualified skilled workers that can be easily recycled into games development companies (Ruggill et al. 2016). This talent recycling process can take place for different

reasons. The decision can be made with the proactive and more risk-taking attitudes of the entrepreneurs or other members of the companies who are committed to invest their time, money or skills into a new venture (Mason and Brown 2014). Contrastingly, to a passive mode, where the decision is triggered by other events such as company contraction and in need of finding either new employment or starting own ventures (Mason and Brown 2014). Nevertheless, a local talent pool suited for the industry starts to emerge in the nascent stage of the ecosystem, which then becomes a magnet for the region to attract more talents and resources and further grow the ecosystem.

As the ecosystem first starts to emerge, the supporting mechanism is often incomplete. Supportive culture, community and policy need to be built to nurture entrepreneurial activities (Isenberg 2010; Mason and Brown 2014). For instance, during the birth stage, an ecosystem may face challenges such as limited funding or market opportunity, lack of support programmes or organisations, low recognition in the community and more traditional economy-focused policies (Mack and Mayer 2015). In the case of the digital gaming industry, studios often need support services such as legal and accountancy for commercialisation and receiving revenues. Sometimes, specialised knowledge and support are required which may not be locally situated. Funding opportunities may also be limited locally at the start where there are either no venture capitalists around or that they are not ready to invest in the business. In searching for required support and resources, game studios may take advantage of the digital age and reach out to a wider audience beyond the local region. It is a common phenomenon for a game studio to be funded by overseas investors or publishers. For instance, Coatsink Game Studio in the UK have been working with Oculus Rift Facebook on several game titles. Swedish game publisher Raw Fury has been supporting developers from overseas countries such as Brazil. Professional support in areas such as legal or accountancy can also be sourced beyond the region.

In a matured and self-sustaining entrepreneurial ecosystem, actors and resources are well-developed and balanced. The recycling process is self-reinforced during the ecosystem evolution and the talent pool is continuously strengthened over time (Mason and Brown 2014). As this stage, an encouraging culture and supportive community have been built; a range of entrepreneurial policies have been developed and implemented; and various support providers are established in the region (Mack and Mayer 2015). As the ecosystem grows, more funding may become available. However, due to increased competition and possibly weakened trust in the area, entrepreneurs are likely to experience hardship in accessing funding overall (Dana et al 2005; Mack and Mayer 2015; Sukumar et al. 2020). Digital gaming businesses may still seek certain support outside the region. While professional services such as investment, legal, accountancy, PR or marketing may now be obtained locally, businesses still have the option to work with providers outside the region where necessary. As the ecosystem gains its reputation, talents are continuously attracted into the region; external resources providers such as investors also start to take a positive approach in exploring investment decisions, which may still be a very competitive process. Figure one depicts this transition of ecosystem components during different stages in the evolution of the entrepreneurial ecosystem.

“[Insert Figure 1.]”

Figure 1. LOGO - Conceptual Framework of the Digital Gaming Ecosystem
(author’s own compilation)

Through document analysis, it is apparent that the Brazilian digital gaming ecosystem is still at a nascent stage. Human resources wise, a local talent pool starts to emerge. Universities have just started to offer games related degrees. The Brazilian government has also started to provide incentives and support to the industry. Although the local economy still experiences the

aftermath of heavy-taxation and wide-spread piracy, more supportive culture is emerging. For instance, the increasingly popular events such as BIG, games jams, IGDA meetings and various game association together form an emerging dynamic and supportive community. Recognising and acknowledging the potential of the Brazilian digital gaming industry, overseas support has been received (e.g. investment or publishing deals) and international partnerships formed.

With noticeable progress made, it shall also be recognised that the Brazilian digital gaming industry is also facing various challenges. For instance, the emerging local talent pool is still at an early stage and generally lacks of experienced staff. The Brazilian industry is primarily composed of a small indie type of studios located across the country (Buffa 2018). Very few national blockbuster games were developed over the years and there is no Brazilian AAA game (Mittelbach et al. 2014). The general gaming culture and language barriers still persist as a challenge for local games developers to grow. The nation-wide policy environment such as strict labour law, bureaucracy, and unfavourable tax regulations for small businesses still challenge the further development of the Brazilian gaming industry. Thus, to transit into a matured ecosystem, a stronger local talent pool needs to be built, balanced local and global support required, a supportive culture and policy environment much needed.

Contribution

From a theoretical perspective, this paper extends knowledge on the entrepreneurial ecosystem approach. Current understanding is related to what the components are, how they interact, and how conducive the ecosystem is to the growth of entrepreneurial initiatives. This work goes beyond that and contributes to a maturity framework that looks at how local companies scale up to global ambitions and how the components of the ecosystem change their role and focus to support the global outlook. The LOGO framework contributes to identifying the ecosystem components and where they sit in the LOGO interface. The framework can be used to measure how existing components of the ecosystem stand and develop interventions that can support

the global ambitions of local firms. The framework can also be practically used to identify talent gaps in the ecosystem. As a fundamental actor in the ecosystem, it is important to retain and attract talents to the region. Learning from established countries, this issue can be addressed from various perspectives. Firstly, Brazil has been offering a number of games education degrees. However, those fresh talents are lack of experiences and in need of further training. If left unsupported, it may take decades to cultivate those talents to become veteran developers, providing that they stay in the industry and in Brazil. A proven practice in the gaming industry is to engage with “anchor institutes” - big companies located in the region(s) - so that the region can benefit from spill-over effects and easier access to knowledge. Those overseas talents may or may not stay in Brazil for long, but the skills and knowledge they share with the local community are valuable and will be recycled for future development. In order to do so, the favourable environment needs to be created to attract and retain those companies. For instance, heavy taxation on imported or locally manufactured electronic goods needs to be alleviated to ensure cost-effectiveness to do business locally. The LOGO framework also addresses the policy implications, for the industry to survive and make a sustainable contribution, suitable policies that support entrepreneurial efforts are needed. It is likely to be more discouraging than encouraging for the local industry when a Brazilian studio finally grows big and decides to either relocate elsewhere in the world or be sold to a big company overseas. It again demands a holistic approach from government for favourable policies such as tax alleviation, legal, accountancy and other support programmes for the gaming industry.

Conclusion

This paper has discussed the entrepreneurial ecosystem concept in the digital gaming industry with a particular focus on Brazil. While it provides an overview of the Brazilian digital gaming industry by adopting documents analysis, there is a limitation to this approach. Document analysis as a method firstly has its own disadvantages on accessibility and quality of the data,

and secondly is not immune to bias in the content of documents (Bowen 2009). For instance, some of the data presented in the documents have limited explanations on the process of data collection, others even contain inconsistent views or results. Furthermore, as document analysis is used as a standalone method here, data triangulation has not been possible to further strengthen credibility. The developed framework has the scope to be tested quantitatively, especially using regression and correlation techniques.

Furthermore, this paper has not been able to review documents in Portuguese due to the language barrier which could potentially have excluded some useful information. For future research, these limitations should be addressed through obtaining empirical data from not only media sources but also game developers, policymakers and other stakeholders in the industry. Strengthened evidence can help test the applicability of the LOGO conceptual framework. As a ‘born-global’ type of business, the digital gaming industry would benefit significantly from a North-South cooperation framework. As comparisons with countries such as the UK have only been mentioned very briefly, further research should explore ways in which different economies can learn from each other to facilitate growth.

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Availability of data and material: This research does not use any existing data repository. However, the documents analysed can be provided if required.

Code availability: This research uses Nvivo 12 for document analysis.

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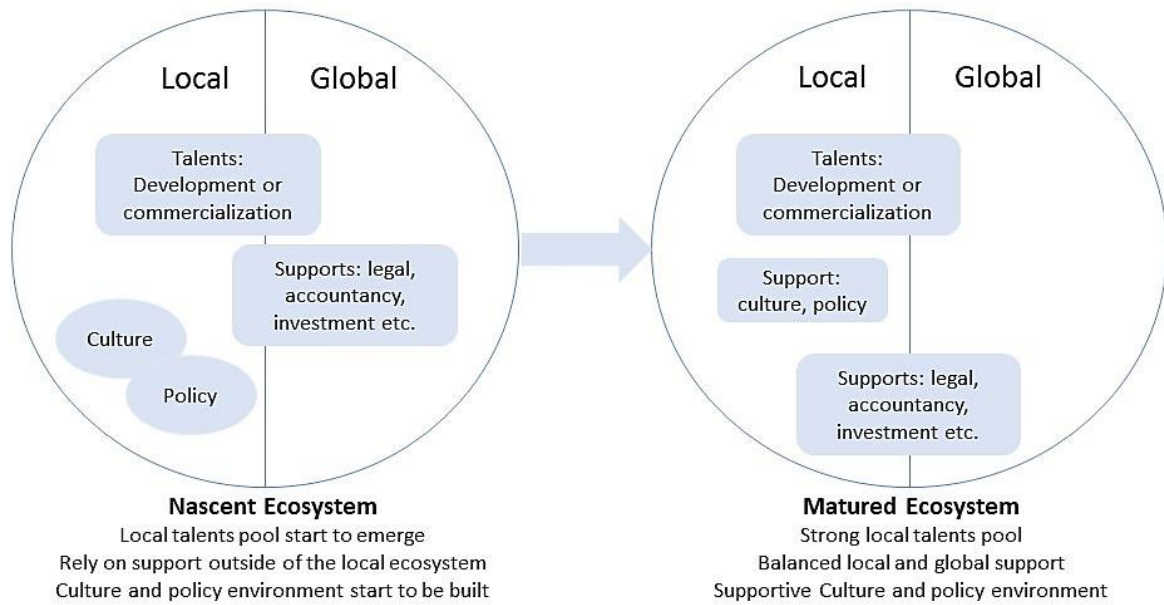


Figure 1. LOGO - Conceptual Framework of the Digital Gaming Ecosystem (author's own compilation)

Table 1. The review process summary

| Stage | Description |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | The researchers used both generic search browser Google Chrome and academically targeted search engine Google Scholar to identify key documents (including journal articles, green papers, white papers and industry reports). |
| 2 | 54 documents were identified and selected based on the following search criteria: “Gaming”, “Digital Gaming”, “Gami*”, “Gaming*”, “Brazil Gaming”, “Brazil Gam*” |
| 3 | The documents were imported into narrative coding software (NVivo). A thematic analysis was conducted by coding documents. |
| 4 | The researchers reviewed the documents in NVivo and identified six key themes: talents, policy and government, support programmes, taxation and piracy, culture, localisations and international collaborations. Documents were coded against each theme accordingly. |
| 5 | The researchers then documented the frequencies of each theme. |

Table 2. The first level of thematic coding

| Theme | Passages coded | % of coded data |
|----------------------------------------------------|-----------------------|------------------------|
| Talent (T) | 47 | 20% |
| Policy and Government (PG) | 32 | 13.7% |
| Support Programmes (SP) | 48 | 20.6% |
| Taxation and Piracy (TP) | 38 | 16.3% |
| Culture (C) | 45 | 19.3% |
| Localisation and International Collaborations (LI) | 23 | 9.8% |

Table 3. Support programmes and examples in Brazil

| Support Programmes | Examples |
|---------------------------|----------------------------------------------------------|
| Game Jam | Global Game Jam, Super BR Jam, Pack of Horrors and Spjam |
| Game Shows/Festivals | Brazil Game Show, BIG Festival, SBGames Festival |
| Social/Meetings | IGDA meetings, SPIN |
| Game Association Groups | Abragames, Acigames, ADJRS, IGDA |

Adopted from Protasio (2014)

Table 4. Electric goods and game price comparison

| | US Price | Brazil Price |
|---------------------------------------|-----------------|---------------------|
| iPad Air | US\$ 499 | US\$ 760 |
| PlayStation 4 | US\$ 399 | US\$ 1740 |
| Batman: Arkham Knight (Xbox one game) | US\$ 18.70 | US\$ 66.29 |

Adopted from Mittelbach et al (2014) and Teixeira (2015)