

Coventry University



DOCTOR OF PHILOSOPHY

A Critical Analysis of Business Growth in the UK Digital Gaming Industry

Xu, Zimu

Award date:
2020

Awarding institution:
Coventry University

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A Critical Analysis of Business Growth in the UK Digital Gaming Industry



Zimu Xu

PhD

August 2020

A Critical Analysis of Business Growth in the UK Digital Gaming Industry

Zimu Xu

A thesis submitted in partial fulfilment of the University's requirements for the degree of Doctor of Philosophy

August 2020



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Date of approval:

31 August 2017

Project Reference Number:

P60945

Abstract

Digital gaming has become the fastest growing mass media industry in recent years. In addition to its economic impact, the digital gaming industry is also highly influential in the development of innovation and technology, and in social, cultural and creative spaces. However, as the industry continues to grow, the individual games development companies are facing various challenges, not least that the project-based nature of the industry is often associated with a high degree of volatility. During the game development process, businesses frequently face the difficulties of managing scope and expectations, controlling budget, ensuring timely delivery, and addressing communication and technological issues effectively. In addition, market saturation is becoming of increasing concern in the industry.

Therefore, this thesis aims to critically analyse business growth in small and medium sized UK digital games development companies. In addressing the research aim, an extensive literature review was carried out, and in-depth interviews were conducted with owner-managers and other stakeholders in the industry. Primary data was analysed through thematic analysis and case studies methods. The study finds that the characteristics of the industry has largely shaped the way games development companies are doing their businesses. Other than talents, funding, commercialisation, infrastructure, political environment and general business support, aspects such as clustering and networks, and emphasis on internal growth measures are also key to the survival and growth of the companies.

By synthesizing literature and analysing primary data, this research makes its unique contributions to the development and enrichment of two frameworks, namely the dynamic states framework and the entrepreneurial ecosystem framework. These in turn play a vital role in informing and enhancing understanding of the practices and policies that impact on the digital gaming industry. From a practice perspective, this research is particularly useful in that it can enable less experienced game developers to understand how the industry works and what they should be focusing on for growth in addition to product development. Moreover, these research findings can also support and contribute to future policy development in support of the digital games industry.

Acknowledgement

I would first like to thank my supervisory team for their guidance and support during my PhD journey. They have made this experience particularly memorable and full of meaningful challenges at the same time. I am fortunate to have Prof Gideon Maas as my director of studies who has always been supportive but also constantly pushing my boundaries to reach my best potential. I would also like to express gratitude to Prof Paul Jones and Prof Joan Lockyer who have been great supervisors and supported me in different ways. Although Dr Stephen Dobson has left my supervisory team earlier than expected, I still owe him a great deal for the support he provided.

In addition, I would also like to thank my colleagues and friends who have been extremely caring, helpful and supportive. They have helped me with not only academic work but also life. Moreover, this journey would not be the same without the advice and feedback from my academic encounters from conferences and various other events and visits.

A great deal is also owed to the interviewees who have openly, generously and selflessly shared their opinions and stories with me. Without their generous support and insightful input, the thesis would not have arrived where it is today.

Here, I would also like to thank my PhD examiners, Prof Nigel Culkin and Prof Gerard McElwee, for their thought provoking questions and going extra mile in the entire examination process during the Covid-19 lockdown period to draw the closing mark of this journey.

Last but not the least, I am forever indebted to my dear and great parents who have always cared about me, believed in me and supported me with all their might. The unconditional love they demonstrated in every possible way is something that make what I am and where I am today. I owe them not only for the emotional support but also the precious life experiences they shared with me generously.

List of Publications

The following publications have been produced as direct or indirect result of the research study discussed in this thesis:

As Lead Author:

Journal

Xu, Z., and Dobson, S. (2019) Challenges of Building Entrepreneurial Ecosystems in Peripheral Places. *Journal of Entrepreneurship and Public Policy*

Book chapter

Xu, Z., and Maas, G. (2019) Chapter 2: Innovation and Entrepreneurial Ecosystems as Important Building Blocks. in *Transformational Entrepreneurial Practices-Global Case Studies* (**Peer Reviewed**)

Conferences with full paper presented

Xu, Z., Maas, G., Jones, P., and Lockyer, J. (2019) Digital Gaming Industry in Global-Local Crossings: Comparative Study of UK, China and Brazil, *42nd Institute for Small Business and Entrepreneurship conference*, Crowne Plaza Hotel, Newcastle, UK, 14-15th November. ISBN: 978-1-900862-32-5. (**Nominated for Best ECR Paper Award**)

Xu, Z. (2018) Behind the Game: Survival and Growth of Game Development Businesses, *the 41st Annual Conference of the Institute for Small Business and Entrepreneurship*, Birmingham, 7-8th November

Xu, Z. (2017) Entrepreneurship Ecosystems: Policy Support and Comparison with Innovation Ecosystems, *the 40th Annual Conference of the Institute for Small Business and Entrepreneurship*, Belfast, 8-9th November

Xu, Z. (2017) Antecedents Influencing Business Growth within Digital Media and Technology Sector: Comparison Studies Between China and UK, *China Management Research Frontiers Conference*, Lancaster, 27-28th July

Workshop with full paper

Xu, Z. (2018) Sustainable Regional Development through Entrepreneurial Ecosystems: Case Study of Digital Gaming Industry, *Newton Fund British Council Researcher Links Workshop*, Chapeco, Brazil, 27-31 Aug

As Co-author:

Co-authored journal paper in review process

Arenal, A., Armuña, C., Feijoo, C., Ramos, S., and **Xu, Z.** (under second round review)
Innovation ecosystems theory revisited: the case of artificial intelligence in China.
Telecommunications Policy

Co-authored journal paper in final stage of editing

Ibrahim, M., Salia, S., **Xu, Z.**, and Tingbani, I. (awaiting for final proof-reading returned)
Diaspora strategies and transformational entrepreneurship in Africa: A re-conceptualisation of entrepreneurial ecosystem using opportunity social co-constructionist theory.
Target journal: *Journal of business venturing*.

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List of Abbreviations

AAA games	Refers to high games with high production and marketing budget usually at least in millions of dollars (sometimes billion dollar) budget. In many ways, it analogous to “blockbuster” in film industry.
AI	Artificial Intelligence
AR	Augmented reality
CAGR	Compound annual growth rate
CAQDA	Computer-assisted Qualitative Data Analysis
CWLEPs	Coventry and Warwickshire LEP
DEE	Digital entrepreneurial ecosystems
FTEs	Full time equivalent employees
GVA	Gross value added
HGFs	High- Growth Firms
ICT	Information and Communication Technology
ICTE	International Centre for Transformational Entrepreneurship
Indie developer	Independent developer
IP	Intellectual Property
LEPs	Local Enterprise Partnerships
MOSS	Mini One Stop Shop
NTBFs	New Technology-based Firms
OECD	Organisation for Economic Co-operation and Development
PC	Personal computer
PR	public relations
R & D	Research and development
SMEs	Small and medium sized enterprises
TBFs	Technology based firms
TIGA	The Independent Game Developers’ Association
UKIE	UK Interactive Entertainment
VAT	Value Added Tax
VGTR	Video Games Tax Relief
VR	Virtual reality

Chapter 1 Introduction

This thesis looks at the development of the UK gaming industry by focusing on games development companies. More specifically, it investigates the influencing factors of their business growth, the supporting mechanisms behind the growth, as well as their business life cycles and strategies, with a particular focus on small and medium sized enterprises (SMEs). In the context of the rising popularity of digital gaming industry, this chapter starts by discussing the social, cultural, and economic value of the industry and explaining the rationale of focusing on the business perspective. The discussion then moves on to the relevance of business growth and entrepreneurial ecosystems. The rationale of focusing on UK small and medium sized games development businesses is presented followed by a discussion on the research aim and objectives of this thesis. Finally, the chapter concludes with an outline of the overall structure of the entire thesis.

1.1 Background

1.1.1 The Digital Gaming Industry

When the video game *Grand Theft Auto V*¹ came out in September 2013, it quickly broke six Guinness World Records including the highest revenue generated within 24 hours (\$815.7 million) and the fastest entertainment property to reach \$1 billion in sales (within three days of releasing), previously held by blockbuster movies, *The Avengers* and *Avatar* (Lynch 2013). This achievement is a manifestation of the rapid growth in the digital gaming industry: since mid-1980s, the industry has grown annually by between 10% and 15% (Zackariasson and Wilson 2010; Marchand and Hennig-Thurau 2013; Newzoo 2018). In comparison, the estimated compound annual growth rate (CAGR) between 2018 and 2023 for global entertainment and media industry, which the digital gaming industry is part of, is at 4.3% (PwC 2019).

¹ Grand Theft Auto V is an action-adventure video game published on September 17, 2013 for PlayStation 3 and Xbox 360. Although VI came out, it yet break the record.

The digital gaming industry has become the fastest growing mass media in the recent years (Marchand and Hennig-Thurau 2013; Ahmad et al 2017; BOP Consulting 2017). The global games market is valued at approximately \$135bn in 2018, which demonstrates a 10.9% increase from 2017 according to market analytics company Newzoo (Batchelor 2018). The global games revenue is seven times higher than the global music revenue (\$19.1bn) and over three times higher than the global box office revenue for movies (\$41.1bn)². Moreover, the digital games and e-Sports industry is forecasted to have higher CAGR than cinema and music for the next five years (PwC 2019).

The value of the digital gaming industry also lies in its active involvement with innovation, technology development, social, cultural and creative space (Marchand and Hennig-Thurau 2013; Davidovici-Nora 2013; BOP Consulting 2017). For instance, besides their entertainment purpose, games can also help address social issues and facilitate training and education processes (Stewart et al 2011; Perko and Mendiwelson-Bendek 2018; ESA 2019). Technologies pioneered in digital games have been transferred to other areas or industries, such as military training programmes, molecular biology and products virtual showrooms (Cross 2011). Gamification has also been used as a technique to motivate staff and engage customers by applying psychological game design principles (Zichermann and Cunningham 2011). In addition, digital games have close ties with the trending topic on Artificial Intelligence (AI) for testing and demonstrating new algorithms in the last decade (Yannakakis and Togelius 2018). Moreover, games developers have been utilising AI in both the designing process and player data analysis (Yannakakis and Togelius 2018). Other than being a technology intensive industry, games development is also part of the broader creative industry and carries characteristics that commonly exist in creative industry (Gershenfeld et al 2003; BOP Consulting 2017). The creative industry has also been recognised as a key contributor to the economy and a source of innovation and social-economic development in the UK (UK Trade and Investment 2014; British Council 2016).

²Comparison data is drawn from following sources: IFPI report (IFPI 2019) for music and Statista data (Watson 2019) for movies and films

However, as the digital games industry continues to grow, the individual games development companies are facing various challenges (Petrillo et al 2009; Aleem et al 2016; BOP Consulting 2017). The project-based nature of the industry is often associated with a high degree of volatility where it is common for businesses to rapidly expand and contract as new projects are won or completed (BOP Consulting 2017). During the game development process, businesses face continual difficulties in managing scope and expectations, controlling budget, ensuring timely delivery, and addressing communication and technological issues effectively (Petrillo et al 2009; Aleem et al 2016). In addition, market saturation, which has influence on games development businesses' survival and growth, has become a frequently brought up topic in the industry (e.g. Dreunen 2015; Palumbo 2017; Cohen 2018; Wright 2018).

1.1.2 Business Growth and Entrepreneurial Ecosystems

Despite the value and contribution that the digital games industry has in social, cultural and economic contexts, there is still a lack of research in analysing the challenges that these digital gaming businesses are currently facing (Cabras et al 2017). Extant literature on the digital gaming industry from a business perspective has been mainly focusing on segments of the industry, such as marketing (e.g. Wesley and Barczak 2016), development process (e.g. Aleem et al 2016), social networks (e.g. Kim et al 2014; Claussen et al 2012), business models with emphasis on monetisation strategies (e.g. Zackariasson and Wilson 2010; Davidovici-Nora 2014) or the launch of a particular game (e.g. Ahmad et al 2017).

Literature on business growth is extensive and various studies have discussed the heterogeneity of growth from various aspects such as types, patterns, measurements, perceptions and models or frameworks (Davidsson et al 2005; Dobbs and Hamilton 2007; Wright and Stigliani 2013). As Davidsson et al (2010), Wright and Stigliani (2013) and Abdelshafy et al (2015) point out, while these studies on individual growth variables are useful, there is insufficient understanding of the entire growth process. As a response, stage models (sometimes also referred to as life cycle models) are commonly applied, where influencing variables are often plotted against different stages of growth (Gupta et

al 2013; Abdelshafy et al 2015; Jabłoński and Jabłoński 2016). While the usefulness and contributions of these approaches are acknowledged, criticisms are also raised (Levie and Lichtenstein 2010; Farouk and Saleh 2011; Abdelshafy et al 2015) (further details are discussed in section 2.2.3). In addressing criticisms and deficiencies of the stage models, states theories have been developed (Gupta et al 2013). Because of their influence by citations and the relative completeness of the frameworks, theories developed by Phelps et al (2007) and Levie and Lichtenstein (2010) have been selected to investigate in detail (see section 2.2.3). Based on the above, this thesis critically investigates the theoretical base of business growth in the UK digital gaming industry, with the rationale of focusing on UK presented in section 1.1.3.

Having realised the significance of business growth, both practitioners and researchers have started to pay much more attention to how such growth can be facilitated (Greiner 1998; Mason and Brown 2014; Isenberg and Onyemah 2016) and the entrepreneurial ecosystem concept has emerged as part of that response (Isenberg 2010; Mason and Brown 2014). The entrepreneurial ecosystem is discussed as a favourable environment that supports business and other entrepreneurial activities that take place within it (Zacharakis et al 2003; Malecki 2011; Mason and Brown 2014). The current discussions on entrepreneurial ecosystems have a strong regional emphasis with a critical mass of key actors involved (Mason and Brown 2014; Mack and Mayer 2015). However, the continuous development of digitalisation has freed the interactions among actors and flows of resources (Bruns et al 2017; Colombo et al 2019) from being geographically bounded to potentially operate unfettered on a global scale (Autio et al 2018). Nevertheless, there is still a lack of academic literature on entrepreneurial ecosystems that incorporates the concept of digitalisation (Li, Du, and Yin 2017; Sussan and Acs 2017). This can potentially continue to reinforce the perception of geographical restrictions on the ecosystem framework. As a born-global industry, digitalisation plays an importance part in the development of the digital gaming industry. To address this research gap, this thesis discusses the role of entrepreneurial ecosystems empowered by digitalisation in supporting business growth in digital games development companies.

1.1.3 Rationale for this Research

The UK digital gaming industry is chosen as the study context for two main reasons. Firstly, the UK is currently ranked as the 6th largest market by games revenue, behind China, US, Japan, Korea and Germany (Newzoo 2019; Statista 2019). The market was valued at a record £5.7bn in 2018, up 10.0% from previous year (UKIE³ 2019). As of June 2018, there are 2,261 active games companies in the UK (UKIE 2019). The overall impact of the UK games industry is estimated to have supported 47,620 full time equivalent employees (FTEs), and generated just over £2.87 billion in gross value added (GVA) in 2016 (BFI 2019). The UK digital games industry is also actively engaged in Research and Development (R&D) activities with 40% of the games developers allocated 20% of their turnover as R&D budget (Cabras et al 2017). With the contributions stated, there is to date very limited research in addressing the challenges and issues that UK digital games development companies are currently experiencing (Cabras et al 2017). Thus, there is a need to contribute to filling in this gap by locating the study in the UK.

The second reason is related to my personal background. Growing up as a millennial, I have personally experienced the rising popularity of the digital games industry and the serial changes it has been through. Thus, there is an inherent interest from me to investigate the digital gaming industry in depth. In addition, having spent much of the adulthood in the UK, particularly in the Coventry area, I had the opportunity to interact with the local people and local companies. Particularly, as a major UK digital games cluster, Leamington Spa is home to over 100 digital games related companies. I have visited and experienced the industry before and developed further interest in the sector and its links with this region specifically. Having completed a master's degree in Innovation and Entrepreneurship and subsequently worked in an entrepreneurship centre at a university, it is natural for me to focus the topic on entrepreneurship and businesses related field.

³ UKIE standard for UK Interactive Entertainment and is a not-for-profit trade body for UK's games and interactive entertainment industry.

The reason for focusing on small and medium sized digital games companies lies in the economic significance of the group. Accounting for 99% of UK businesses, small and medium-sized enterprises (SMEs) are regarded as the backbone of UK economy by both scholars and policy practitioners (Beck et al 2005; Robu 2013; Jones et al 2014; Department for Business, Innovation and Skills and HM Treasury 2015; Department for Business, Energy and Industrial Strategy 2016). Particularly, the majority of the UK digital gaming business are SMEs: UKIE (2016a) points out that 95% of these companies are micro or small businesses; TIGA⁴ (2016) reveals that only 2% of the studios have more than 150 staff members. However, the theoretical underpinning of many growth theories have been developed for large companies and they often cannot be applied to smaller enterprises (Davidsson et al 2010; Machado 2016). Thus, this research focuses on small and medium sized digital gaming businesses to investigate the growth and ecosystem concepts.

1.2 Research Aim and Objectives

This section defines the aim and objectives of this thesis. Section 1.1 has introduced the concept of business growth and entrepreneurial ecosystems. It has also discussed the rationale of choosing to study SMEs in the UK digital gaming industry. Within these two broad and complex concepts, the focuses are on the states framework in growth studies and the role of digitalisation empowered entrepreneurial ecosystem framework which are discussed and explored throughout the entire thesis. The aim of this research is therefore to:

critically analyse business growth in small and medium sized
UK digital games development companies.

To support this aim, three objectives have been identified:

- 1) Analyse the digital gaming industry with particular focus on the influencers of growth.

⁴ TIGA stands for The Independent Game Developers' Association. It is a trade association for digital games developers and publishers as well as representing the video games industry in the UK and Europe.

In order to understand how individual business operates, it is necessary to form a comprehensive understanding regarding the broad industry they operate in. Industry characteristics can influence the way businesses work. Thus, analysing the digital gaming industry and evaluating the possible influencers of business survival and growth in general can guide further investigation of individual business and the two frameworks in question (i.e. dynamic states framework and entrepreneurial ecosystem empowered by digitalisation).

2) Investigate the theoretical base of business growth in the UK digital gaming industry

Current digital gaming industry literature focuses mainly on individual segments, e.g. marketing or development process. However, business growth can be influenced by a wide range of factors. Therefore, a need exists to investigate business growth with a holistic view where an appropriate theoretical base can help conceptualise the topic. In particular, the growth stages and states theories are analysed in detail in determining whether any of them can support the conceptualisation of the growth phenomena in the UK digital gaming industry.

3) Evaluate the entrepreneurial ecosystem supporting business growth in the UK digital gaming industry

A supportive ecosystem nurtures the development of innovation and enhances the potential for the growth of entrepreneurial businesses (Jackson 2011; Mason and Brown 2014). In turn, these advancements can feedback to the economy and further facilitate socio-economic development (Szirmai, Naudé and Goedhuys 2011). In order to build such an ecosystem, it is essential to firstly understand what it is, how it works and what is required. Therefore, each of the case studies discusses and presents the businesses from an entrepreneurial ecosystem perspective. Two UK digital gaming clusters, Leamington Spa and Dundee are selected to map out the entrepreneurial activities associated with the clusters and explore the role of digitalisation in the ecosystems. Then, a conclusion is drawn on the necessity to look at the ecosystem from a global level.

1.3 Structure of the Thesis

In addressing the above stated research aim and objectives, this study has been carried out in two main stages and organised into eight chapters. The overall structure of the thesis is illustrated in Figure 1. Its contributions are summarised in the conclusion chapter.

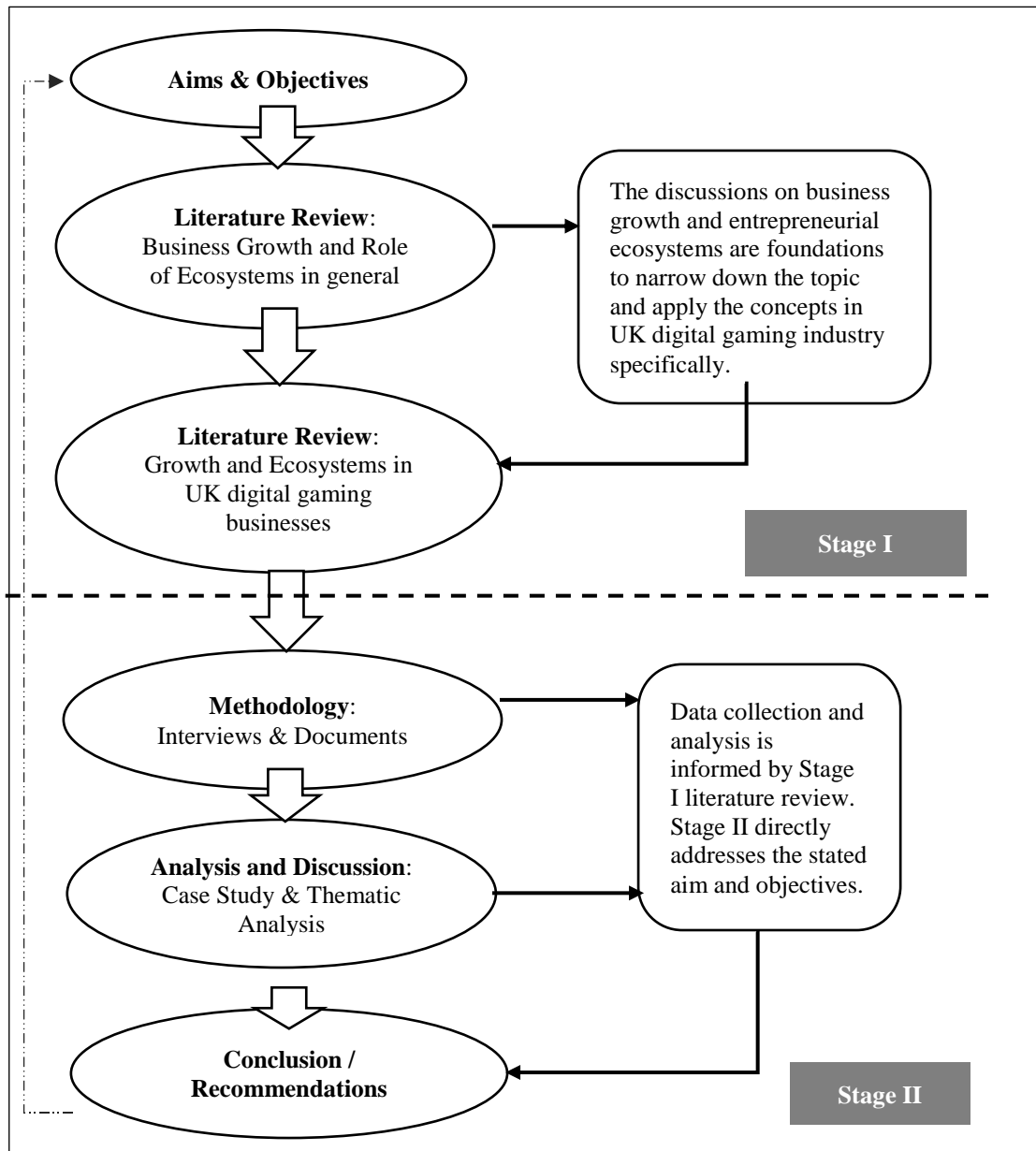


Figure 1. Thesis Structure

The first stage of the research is set to understand the concepts of business growth and the role of entrepreneurial ecosystems through literature review. It comprises three

chapters. Chapter 1 presents the background of the study and draws out the scale and scope of the project. It narrows the study of business growth into the UK digital gaming sector. The aim and objectives and the rationale behind are also discussed to further explain and specify the thesis. Chapter 2 discusses the overall academic landscape on two concepts: business growth and entrepreneurial ecosystems. Chapter 3 starts with discussions on the rationale of focusing on UK digital gaming businesses and then applying the two concepts in the specific industry.

The second stage of the thesis focuses on empirical findings and addresses the research aim and objectives accordingly. Five chapters are produced in this stage. Chapter 4 discusses the research methodology and includes the research philosophy, approach, methodological choice and strategy employed in this project and the underlying rationale. Chapters' 5 and 6 focus on data analysis where thematic analysis and case studies are employed respectively. Chapter 7 discusses the results derived from previous chapters with emphasis on the dynamic states framework and entrepreneurial ecosystems empowered by digitalisation. Chapter 8 pulls together the work by summarising the main findings, re-addressing the aim and objectives, outlining contributions, and discussing limitations and directions for future research.

Chapter 2 Literature Review: Business Growth and Role of Entrepreneurial Ecosystems

Chapter 2 reviews the literature on business growth and entrepreneurial ecosystems. The overall discussion on the two concepts lays the foundations for addressing objective 2) and 3) before discussing the digital gaming industry in Chapter 3. In order to develop a complete picture on business growth, the following section provides an overview of the current research landscape and investigates various growth models and frameworks. It starts with an analysis on the definitions of business growth that are used in various literature. A wide range of influencing factors on business growth is also outlined. The second half of the chapter discusses the concept of the entrepreneurial ecosystem and its role in supporting business operations and growth.

2.1 Definition of Business Growth: a Diverse Conversation

The definition of growth varies significantly among scholars and practitioners (Achtenhagen et al 2010; Machado 2016). For instance, Dobbs and Hamilton (2007) define growth as '*a change in size over any given time period*' (p. 313). Navarro et al (2012) summarise previous literature and develop four growth forms that can be used to define growth: geographical (domestic or international expansion), product (enhancement or new product development), customer (retention and new customer acquisition) and other forms. In comparison, in Penrose's (2009) work, it is argued that growth should not only concern the size but also reflect the internal process of firm development. Penrose (2009) also criticises the traditional belief of the existence of an optimum size for businesses or that there should be a limit of the size of businesses. Adopting Penrose's (2009) idea, Eshima and Anderson (2017) define growth in relation to increase in revenue and assets. Much of the studies written by scholars and practitioners on High Growth Firms (HGFs) focus on employment and turnover (Audretsch 2012; Anyadike-Danes and Hart 2015; Bravo-Biosca 2016). However, Achtenhagen et al's (2010) empirical research highlights the diverse viewpoints between scholars' and practitioners' understanding on growth. The research reveals that the aspects such as the increase in the number of

employees or assets are valued by scholars and policy makers but are often excluded by entrepreneurs.

The definition of growth is therefore, influenced by several factors such as different standpoints of authors, limitations of data and resources (Nichter 2009; Penrose 2009; Achtenhagen et al 2010). However, the rationale of defining growth in a certain way is rarely explicitly explained in much of the literature (Achtenhagen et al 2010). From the above discussion, it seems that the definition is concerned with factors that can be considered to be related to growth which can then result in variations in terms of indicators or measurements. A range of academic articles were therefore reviewed in an attempt to create a better understanding of the topic of growth and its definitions. Table 1 presents a selection of the literature reviewed. It highlights different growth indicators used since the year 2000 in order to capture the relevance to the current discussion and identify any significant changes or emerging shifts. Such indicators refer to the measures that previous scholars used in determining growth in their empirical studies which reflect their positions in defining what growth is. Table 1 aims to be indicative and inspirational rather than a comprehensive list. The selection of articles is based on their citations, year of publishing and general representativeness of the study context. The citations support the credibility of the chosen articles; publishing year (since 2000) ensures the choices stay relatively current; the representation of diverse industry, country and methodology used ensure the coverage of the study.

Results from Table 1 imply that conclusions drawn from current research on business growth tend to be country, industry and size specific. Measurement indicators used at different industries or sectors do vary (Davidsson et al 2010; Kachlami and Yazdanfar 2016). While sales and employment are the two most commonly used indicators, market share and the value of total assets have also been used. The reasons behind diverse opinions on growth definitions can be complex. Further discussions on this topic are presented in section 2.2.2. Nevertheless, it is apparent that views on what is considered to be growth differ among different scholars. While policy makers and scholars often define growth in a way that suits their agenda, there is much less consideration given to how the entrepreneurs define and view growth (Achtenhagen et al 2010). Indeed,

Achtenhagen et al (2010) urge that there is a need to capture what entrepreneurs think about growth and evaluate what they value.

Table 1. Selection of Literature Summary on Business Growth Studies

Author(s)	Indicators	Study Object	Country/Region	Industry	Methodology	Citation ⁵
Almus & Nerlinge (2000)	Employment	Start-ups	West Germany	Technology intensive	Quantitative	232
O’Gorman (2001)	Sales, employment	SMEs	Ireland	Wholesale sector	Case study	180
Goddard et al (2002)	Total assets	Not specified	Japan	Manufacturing; Differentiated among different sectors	Quantitative	181
Lotti et al (2003)	Employment	Small firms	Italy	Manufacturing	Quantitative	336
Morrison et al (2003)	Sales, employment	Small business	Maribyrnong, Australia	Mixed; Differentiated among different industries	Mixed methods	302
Audretsch et al (2004)	Sales	Not specified	Netherlands	Hospitality	Quantitative	354
Calvo (2006)	Employment	Small	Spain	Manufacturing	Quantitative	230
Brush et al (2009)	Sales ⁶	Mixed	England, UK	Mixed; Differentiated among different industries	Qualitative	72
Nichter (2009)	Employment	Small	Developing countries	Mixed; Differentiated among different industries	Review	398
Wiklund et al (2009)	Sales, employment	Small business	Sweden	Mixed; Included industry in propositions	Quantitative	470
Navarro et al (2012)	Sales	SMEs	Spain	Mixed; Considered industry differences	Quantitative	6
Anderson & Eshima (2013)	Sales, market share, employee	SMEs	Japan	Mixed; Considered industry differences	Quantitative	151
Daunfeldt and Elert (2013)	Revenue, employment	Small firms	Sweden	Mixed; Differentiated among different industries	Quantitative	48
Eggers et al (2013)	Sales, employment	SMEs	Austria	Mixed (service or non-service industries)	Quantitative	93
Kachlami & Yazdanfar (2016)	Sales	SMEs	Sweden	Mixed; Differentiated among different industries	Quantitative	3

⁵ Citation extracted from Google Scholar, information true on 28 June 2017

⁶ Though Brush et al (2009) also acknowledge aspects such as “geographical expansion, increase in the number of branches, inclusion of new markets and clients, increase in the number of products and services, fusions and acquisitions” (p. 482) as theoretical growth indicators.

The attempt to define growth has resulted in a much diversified conversation. There is yet no universally agreed definition on what consists of growth. Instead of forcing an apparently diversified conversation into a unified opinion in this thesis, I decided to acknowledge the mixed voices. In particular, it is reflected in the data collection and analysis stage where I investigate what growth measures that the digital gaming industry practitioners consider to be appropriate. Details are discussed in section 4.4.3. Acknowledging the complex nature of business growth studies, the next section provides an overview of the current research landscape.

2.2 Business Growth – Overview of Current Research Landscape

2.2.1 Heterogeneity of Growth

Besides the body of extant literature on business growth, there are various review studies which discuss the heterogeneity of growth from various aspects such as types, patterns, measurements and perceptions (Davidsson et al 2005; Dobbs and Hamilton 2007; Wright and Stigliani 2013). To be more specific, Davidsson et al (2005) identify three ways of achieving growth: organic, acquisition and internationalisation⁷ (e.g. through alliances and networks) whereas, McKelvie and Wiklund (2010) classify it into organic, acquisition and hybrid (falls between organic and acquisition growth). In comparison, Gilbert et al (2006) view the growth routes as internal or/and external. In addition, after studying growth patterns derived over time, Wright and Stigliani (2013) summarise three growth types: high, low and erratic. Furthermore, opinions are also diverse on growth measurements (Wright and Stigliani 2013; Machado 2016). Further discussions on measurements is presented in section 2.2.2.

The heterogeneity of growth is also reflected in what has been studied and how growth is fundamentally perceived by scholars (Achtenhagen et al 2010; McKelvie and Wiklund 2010). The first stream which is the majority of studies focus on why and how

⁷ According to Davidsson et al (2005), organic growth refers to growth through increased outputs, customers and usually associated with genuine jobs. Acquisition refers to the expansion through merger and acquisition. Growth through internationalisation refers to expansion brought by expanding into different market.

much a business has grown and thus growth is seen as an outcome (Achtenhagen et al 2010; McKelvie and Wiklund 2010). This stream of research investigates various factors that determine or influence growth such as the entrepreneurs' personality traits, resource availability, strategies employed, location choice and industry context (Gilbert et al 2006; Machado 2016). Various scholars (including Weinzimmer et al 1998 and Shepherd and Wiklund 2009, McKelvie and Wiklund 2010) have surmised that there is no agreement on which variables have demonstrated a consistent influence on business growth. McKelvie and Wiklund (2010) proposed five explanations for this: the developing and changing nature of the unit of analysis; the diversity in modes of growth; the variations in growth rates over time; the differences in growth measures and willingness to grow. However, I propose an alternative explanation in that, it is a combination of variables which, over time, form the necessary conditions and resources for growth. They form a pool of necessary conditions. Different combinations of these variables create sufficient conditions in tackling different situations. Therefore, it is necessary to understand how to get all necessary variables and conditions in place especially when facing uncertainties. From this perspective, it is still useful to discuss and investigate individual elements before piecing together a complete picture. Therefore, sections 2.3 and 3.3 are dedicated to this discussion.

The second stream of growth studies focuses on the outcome of growth where the stage models are most frequently discussed (Phelps et al 2007; McKelvie and Wiklund 2010). This stream of research focuses on the changes and consequences of growth where challenges and obstacles are often discussed (McKelvie and Wiklund 2010). Detailed discussion on the stage models are presented in section 2.2.3.

The third stream views growth as a process and investigates obstacles or changes encountered which has generated relatively fewer research comparing with the other two (Achtenhagen 2010; Abdelshafy et al 2015). While there are overlapping aspects between this stream and the other two, scholars in this field mainly focus on the question of how: how businesses grow, what constitutes growth and what are the limitations of growth? (McKelvie and Wiklund 2010). Penrose's theory of firm growth coined closely with the resource-based theory have underpinned much of the research in this stream (McKelvie and Wiklund 2010). Though the study of growth as a process is a valuable research direction, it is beyond the scope of this study as it studies a

company while it is growing (McKelvie and Wiklund 2010). However, this thesis is not restricted to companies who are currently growing but also who are looking to grow or already experienced growth in the past. While growth as a process will not be discussed in great detail in this thesis, understanding this perception and the underpinning theories can guide further research.

2.2.2 Complexity of Measuring Growth

Table 1 demonstrates not only the diversity of definitions on growth but also different measures of growth utilised in extant studies. Indeed, there is little consensus in current literature on how to define and measure growth and detailed discussions on this matter are provided by Weinzimmer et al (1998), Davidsson and Wiklund (2000), Wiklund et al (2009), Achtenhagen et al (2010) and Machado (2016). Drawing from the above-mentioned reviews, the list of potential growth indicators comprises: sales, employment, profits, assets, equity, firm value, market share, growth intention, strategies and internal development (e.g. improved products quality and range, and internal process). According to Weinzimmer et al (1998), Achtenhagen et al (2010) and Davidsson et al (2010), sales and employment are the two most commonly used growth measures. While many scholars have used a single measure in determining growth (e.g. Almus and Nerlinge 2000; Goddard et al 2002; Lotti et al 2003; Janssen 2006), Dobbs and Hamilton (2007) and Davidsson et al (2010) have highlighted the value of utilising compound measures by using more than one indicator.

There are criticisms on only including sales and/or employment as indicators and overlooking other aspects such as internal development (e.g. improved products quality and range, and internal process) and value-added (O’Gorman 2001, Achtenhagen et al 2010). In contrast, Nichter (2009) points out that obtaining reliable financial information can be extremely difficult and sometimes impossible. Kachlami and Yazdanfar (2016) also argue that there are challenges in implementing other indicators (other than sales) such as availability of data and relevance to the specific studies. For instance, indicators such as market share is only relevant when conducting research within the same industry or comparable products or services (Alese and Alimi 2014; Kachlami and Yazdanfar 2016). The value of assets also depends on how intensive and sensitive the industry is to capital and changes over time (Alese and Alimi 2014;

Kachlami and Yazdanfar 2016). Some scholars (e.g. Bolton 1971; Davidsson et al 2010) point out that customised measures can be applied when conducting industry or sector specific studies. For instance, while sales is often used to measure growth of product-making related businesses (Kachlami & Yazdanfar 2016), it may be more relevant to use quantity of vehicles and seats to measure car rental businesses and theatres respectively (Bolton 1971; Davidsson et al 2010). In particular, the initial growth of those ‘We Media’⁸ companies is often measured by subscribers or users and may not necessarily generate any income or profit until sufficiently large audiences or subscribers are reached.

The complexity also comes from the adoption of different methodologies to calculate growth (Machado 2016). Scholars (e.g. Achtenhagen et al 2010) believe that regression analysis over a period of time on employment can more effectively reflect growth and advocate the use of both primary and secondary data to improve accuracy. In comparison, Delmar and Wiklund (2008) suggest that past growth can be used as a control variable. Stam (2010) proposes to exclude firms under one year in age from analysis. From the above discussion, it is clear that there is no universally accepted methodology in measuring growth and that it depends on the specific industry.

Considering the complexity of growth in general, its measurements and differences across industry, sector and context, it is difficult or perhaps impossible to develop a universal measurement framework that can be applied to every business. However, the use of same measurement framework can be beneficial. For instance, results from different studies can be comparable if the same measurements were applied (Achtenhagen et al 2010; Machado 2016). In addition, as Achtenhagen et al (2010) suggest, it is necessary to learn what entrepreneurs and businesses value and how they define growth. Therefore, it is worth further exploring the possibility of developing a set of measurements that can be industry specific. This stream of thought is directly linked with the data collection process in section 4.4.2, where questions were asked to elicit what practitioners consider as appropriate measures.

⁸ We Media or Self-media generally refers to social media accounts that are run by an individual or a company on platforms like WeChat, Weibo, Youtube, Twitter among many.

2.2.3 Main Research Models or Approaches in Investigating Growth

In studying the topic of business growth, a number of research models, concepts and approaches are developed including, the Stochastic Models, deterministic approach, stage models and states framework (Levie and Lichtenstein 2010; McKelvie and Wiklund 2010; Farouk and Saleh 2011; Levie and Lichtenstein 2010). This section reviews each approach and model before focusing on the stage model and states framework.

Stochastic Models

Stemming from Gibrat's (1931) rule of proportionate growth (also referred as Gibrat's Law), the stochastic models, which were primarily used in the economics field, have been utilised to understand growth influencers (Dobbs and Hamilton 2007). Such stochastic models claim that although many factors have an impact on growth, the influence of each one is small and there are too many of them to determine which factors play a significant role (Dobbs and Hamilton 2007). Therefore, over time, business growth can be modelled as random or stochastic processes in which no variables should be used to predict future growth, indeed the present size is irrelevant to the future size of the company (Dobbs and Hamilton 2007; Farouk and Saleh 2011). Though earlier studies accept Gibrat's law, it is increasingly rejected by recent empirical studies where smaller companies are found to be associated with higher growth rates (Daunfeldt and Elert 2013; Nassar et al 2014; Tang 2015).

Deterministic Approach

In comparison to the stochastic models, the deterministic approach was developed as a common method to capture a wide range of causes of business growth (Dobbs and Hamilton 2007; Gupta et al 2013; Kachlami and Yazdanfar 2016). Such causes range from an individual level (e.g. age, experience, education) to an environmental level (e.g. industry, market, policy) (Kachlami and Yazdanfar 2016; Machado 2016) and a detailed discussion is presented in section 2.3. While this approach has gained popularity, it has also been criticised for its inability to provide complete explanations of business growth (Dobbs and Hamilton 2007; Farouk and Saleh 2011). In addition,

Farouk and Saleh (2011) assert that conclusions drawn from this approach are often context restricted. As shown in Table 1, studies are often industry or country specific which means results or claims may not hold when applied in different industries or countries.

Studies on stochastic models tend to be quantitative and only focus on firm growth as outcomes (see example in Nassar et al 2014) with little discussion on the process individual companies go through. While it is useful to be aware of such models, it is not the aim of this thesis to statistically prove or disprove whether the stochastic approach is empirically viable or not as it does not contribute to the understanding of the challenges that companies go through. On the contrary, the deterministic approach discusses possible causal factors that can help lay the foundations in understanding how that is applied in digital gaming industry. Therefore, further discussion under this school of thought is presented in section 2.3.

Growth Processes and Stage Models

As Davidsson et al (2010), Wright and Stigliani (2013) and Abdelshafy et al (2015) point out, although studies on individual growth variables are useful, sufficient understanding on the growth process is essential. As a response, stage models (sometimes also referred to as life cycle models) are commonly applied (Gupta et al 2013; Abdelshafy et al 2015; Jabłoński and Jabłoński 2016). Early models developed by scholars such as Steinmetz (1969) and Greiner (1998) have been further modified in Lewis and Churchill's (1983) work *The Five Stage of Small Business Growth*, which gained great popularity. Table 2 presents a selection of influential stage models at different time periods with brief summaries on the key contents.

Table 2. Stage Models of Organisational Growth

Author	Model	Stages
Steinmetz (1969)	Four Stages of Small Business Growth	<ol style="list-style-type: none"> 1. Direct Supervision: Owners become managers in the end. 2. Supervised Supervision: Managers focus on growth and expansion and learn administrative tasks. 3. Indirect control: Tasks are assigned key managers; endure decline of growth rate and overstaffing at medium cadre. 4. Divisional organisation: Organisation achieve stable state with suitable resources and structure in place.
Greiner (1998)	Five Phases of Organisation Growth	<ol style="list-style-type: none"> 1. Creativity: Birth stage and focus on creating a product and market where organisations experiences crisis of leadership. 2. Direction: Able and directive leadership established where crisis of autonomy emerged. 3. Delegation: Decentralised organisational structure applied and leads to crisis of control. 4. Coordination: Formal coordination systems initiated and administrated by senior management are used. A red-tape crisis is then expected. 5. Collaboration: Organisations take advantage of interpersonal collaborations.
Lewis and Churchill (1983)	Five Stages of Small Business Growth	<ol style="list-style-type: none"> 1. Existence: Under direct supervision, businesses focus on getting customers and providing products or services. 2. Survival: Under supervised supervision, revenue and cost relation becomes the emphasis. 3. Success: Functional management style is adopted. Owners face dilemma of either expand and grow or disengage and maintain the businesses as current state. 4. Take-Off: Key question is on how to achieve rapid growth and raises concerns on delegation and cash. Management is divisionalised. 5. Resource Maturity: Strategy emphasises on return on investment. Decentralised organisations possess competent and sufficient staff.
Lester et al (2003)	Five Stages of Organisation Life Cycle	<ol style="list-style-type: none"> 1. Existence: Emphasis is on viability. 2. Survival: Organisations focus on sustain operation and achieve competitive growth through income generation. 3. Success: It is also viewed as maturity where bureaucracy is installed to formalise and control operations where red tape becomes common issue. 4. Renewal: Innovation and creativity are nurtured through collaboration and teamwork. Customer needs are prioritised at this stage. 5. Decline: This stage is typified by politics, power, prioritising personal goals and failure to meet external demands and results in decline of profit and market share.

Models listed in Table 2 are different in several ways. For instance, the models by Steinmetz (1969) and Lewis and Churchill (1983) are designed for small businesses where Greiner (1998) and Lester et al (2003) aim to target all types of organisations. Only Lester et al (2003) include a decline stage in their model. Nevertheless, from Table 2, it can be derived that different stages possess different focuses and characteristics despite the variations on specific classifications of stages. These differences may imply differentiated growth strategies, practices and measures (Lewis and Churchill 1983; Farouk and Saleh 2011). As a result, indicators used to determine the performance of certain businesses (such as social media application software) in the start-up phase may not emphasise on financial performance (e.g. in forms of revenue, sales or profits). However, the emphasis on financial performance may surpass other indicators in the maturity stage. Similarly, different strategies are required at different development stages. For example, an early stage strategy may focus on how to increase user numbers while later stages may underline how to convert this large audience base into revenue and profit.

Attractions of Stage Model

There are reasons for the popularity of the growth stage models and attracting researchers to keep developing and proposing new models. For instance, stage models discuss many common issues an organisation may experience and offer solutions or suggestions on how to overcome these challenges (Davidsson et al 2005; Jacobs et al 2017). In theory, it can assist managers, entrepreneurs and other practitioners to develop awareness, predict future events, avoid potential pitfalls and make decisions, particularly at key transition points (Jones 2009; Jacobs et al 2017). For instance, Massey et al (2006) interviewed the owner-managers of 50 firms in New Zealand and found all those interviewed acknowledged the meaningfulness of the stage models (Massey et al 2006).

Criticisms of Stage Model

While the usefulness and contributions are acknowledged, criticisms are also raised in regard to stage models (Levie and Lichtenstein 2010; Farouk and Saleh 2011; Abdelshafy

et al 2015). First of all, different stage models vary in many ways. Table 2 provides an overview of the vast volume of literature proposing different stage models ranging from two to eleven stages (Lester et al 2003; Levie and Lichtenstein 2010; Farouk and Saleh 2011; Jabłoński and Jabłoński 2016). Each model has its own way of defining stage, transition and the process. Levie and Lichtenstein (2010) reviewed 104 stage models published between 1962 and 2006 and found that they share very little commonality among themselves. The models differ in the attributes of a stage, vary in the number of stages proposed, and disagree in how and why organisations progress between stages (Levie and Lichtenstein 2010). With new stage models arising over the years since 1960s, there is not yet an agreement on which stage models shall be universally accepted (Levie and Lichtenstein 2010).

The fundamental assumptions of stage models that organisations grow like organisms within a set number of stages and pre-programmed, linear processes, have also been questioned by some scholars (e.g. Levie and Hay 1998 cited by Gupta et al 2013; Phelps et al 2007; Levie and Lichtenstein 2010; Jacobs et al 2017). One of the key practical contributions of the stage models lies on the fact that it discusses a serial of problems and challenges that have happened or likely to happen in an organisation at a particular point in time and then provide some recommendations in addressing those issues (Hanks et al 1993; Jacobs et al 2017). However, it is questionable whether or not those problems occur in a pre-set sequence. In fact, various scholars (e.g. Levie and Lichtenstein 2010; McKelvie and Miklund 2010; Jacobs et al 2017) strongly disagreed on such linear, organismic metaphor as they believe business can experience any problems in any set of sequences in a complex and consistent changing environment. Such disagreements are further supported when some researchers (e.g. Tushman, Newman and Romanelli 1986; Eggers et al 1994; Garnsey et al 2006) tested a chosen stage model with empirical data. For instance, Tushman, Newman and Romanelli (1986) tested Greiner's model with businesses in minicomputer cement, airlines and glass industries. The results revealed that the businesses did go through crisis to survive and grow. However, they do not follow the sequence that Greiner described or in fact, any particular sequence. Similarly, Lewis and Churchill's (1983) model was also proven to be invalid by Eggers et al (1994). As Eggers et al (1994) concluded: "Due to our findings revealing individual company

differences in developmental progression, we believe using ‘Stages of Growth’ is no longer an appropriate term to refer to this process, and may be misleading” (p. 137). A more recent study by Garnsey et al (2006) revealed that the growth of the sampled start-up businesses in the UK, Germany and the Netherlands are largely non-linear and unpredictable.

Other criticisms of growth models pertain to the fact that the main focus has been on internal factors with significantly fewer studies on the external factors (Farouk and Saleh 2011). However, external factors such as characteristics of specific sectors and external environment can play a key role on the outcomes of growth strategies (Jabłoński and Jabłoński 2016). As Gibb and Davies (1990) and Farouk and Saleh (2011) assert, the stage models fail to serve as a universal theory as claimed. The stage models cannot explain sufficiently the growth of small businesses due to the diverse types of businesses and multidisciplinary property of the growth influencers. Stage models have also been criticised for being overly conceptual and lacking support from sufficient empirical longitudinal studies (Levie and Lichtenstein 2010; Farouk and Saleh 2011). Though further attempts with longitudinal studies confirm the existence of stages when organisations grow, they are unable to construct any reliable common stages (Gibb and Davies 1990; Farouk and Saleh 2011).

In summary, while there are some useful elements in the growth stage models, it is perhaps misleading for organisations to neglect the uncertain nature of the internal and external environment and accept such concept in its wholeness. In addressing the shortcomings of stage models, various scholars (e.g. Phelps et al 2007; Levie and Lichtenstein 2010; Jacobs et al 2017) have proposed an alternative approach namely the states framework.

Introduction of States Framework for Business Growth

In addressing above criticisms of the stage models, states theories have been developed (Gupta et al 2013). In this section, articles by Phelps et al (2007) and Levie and

Lichtenstein (2010) have been selected to discuss in detail for both their influence by citations and relative completeness of the frameworks.

Phelps et al (2007) examined previous growth studies and developed an integrated framework by considering the dynamic nature of business process and employing an issue-based typology. It rejects the idea of a universal linear model of business development but provides a series of crucial challenges that all growing businesses can be expected to experience during the growth process (Phelps et al 2007). Phelps et al's (2007) framework, as shown in Figure 2, recognises the heterogeneity of growth and allows businesses to travel both back and forward between stages.

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Figure 2. Phelps et al's (2007) States Framework

As shown in Figure 2, Phelps et al (2007) define six tipping points: people management, strategic orientation, formalisation of systems, new market entry, obtaining finance and operational improvement. In their view, in order to survive and achieve further growth, organisations need to address above tipping points through utilising their absorptive capacity (i.e. ability to learn and apply knowledge for successful operation) (Phelps et al 2007). As the authors themselves state, though this framework has addressed criticisms of the stage models, it is still at its early stage and require further development and adequate empirical validity (Phelps et al 2007; Farouk and Saleh 2011).

Similarly to Phelps et al (2007), in addressing the criticisms of the stage models, Levie and Lichtenstein (2010) proposed a dynamic states approach under the assumption that “each state represents management’s attempts to most efficiently/effectively match internal organising capacity with the external market/customer demand” (p. 335). Furthermore, Levie and Lichtenstein (2010) reject the idea that organisations need to go through a pre-defined development process with a set number of stages. Rather, they believe that the organisations can go through and be in any number of states so long as they can adapt to the changing environment, ensure their business model is sustainable and can respond to opportunities effectively.

Figure 3 shows a “Dynamic State” as defined by Levie and Lichtenstein (2010). The term presents an inherent tension in itself where “state” refers to a stable mode and “dynamic” means change. In this framework, such tension is realised in the form of “opportunity tension” which is driven by market opportunity and entrepreneurs’ desire to exploit it for value creation. A viable business model acts as the agent that facilitates the process of transferring opportunity tension into value creation. During this process, changes, which maybe incremental or radical, will inevitably be made in order to match internal capacity with external dynamics. As this happens, an organisation has started the transition process between different dynamic states in the hope of landing in a place where internal capacity can match the external demands. A dynamic state can then be maintained for a period of time until the need to change being triggered again. However, organisations do have the tendency to strengthen its stability positions which, over time, can weaken the organisations’ ability to respond to changes (Levie and Lichtenstein 2010). Levie and

Lichtenstein (2010) have not presented any primary empirical discussion of the dynamic states approach. As noted by them, further empirical research can help in further advancing the framework and revealing what sustains a dynamic state, when and where the states change, and what the most essential contextual variables in the process are.

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Figure 3. Levie and Lichtenstein's (2010) Dynamic State Approach

In contrast to the stage models, the states frameworks propose to acknowledge that the business environment is uncertain and dynamic. Instead of proposing instructive natured discussions, the states frameworks propose a different mindset i.e. where organisations need to be adaptive and willing to change in order to explore arising opportunities and create value. As indicated in both Phelps et al's (2007) and Levie and Lichtenstein's (2010) articles, there is no "one solution fits all" and organisations need to be proactive to opportunities and the changing environment. Compared with Phelps et al's (2007) model, Levie and Lichtenstein's (2010) states framework goes further in recognising the uncertainty and dynamic nature of business growth and eliminates the potential restrictions that the six tipping points may enforce. From this perspective, Levie and Lichtenstein's (2010) dynamic states approach is an advanced version compared to Phelps et al (2007). Moreover, in recognising the flaws of stage models and its limited empirical value as discussed in earlier section, Levie and Lichtenstein's (2010) dynamic states approach is adopted to guide further empirical data collection and analysis.

2.3 Influencing Factors of Business Growth

Earlier review work reveals the fragmentation of literature on studying business growth variables and lack of comprehensive and integration of the subject (Storey 1994; Wiklund 1998; Wiklund et al 2009). As discussed in section 2.2.1, despite the fact that there is no agreement on any variables that have demonstrated consistent influence on business growth (McKelvie and Wiklund 2010), understanding possible influencing factors can still help to identify specific elements for digital gaming companies. In the context of this research, understanding the broad spectrum of possible influencing variables can help form basic knowledge before addressing the digital gaming industry specifically. Table 3 summarises various variables which appeared in the literature into three categories: individual, firm and industry/environmental levels. Details are further discussed in the following sections (2.3.1, 2.3.2 and 2.3.3).

Table 3. Variables of Business Growth: Adapted from Wiklund et al (2009) and Machado (2016)

Individual	Firm	Industry & Environment
-Education level	-Size	-Market and supply-demand conditions
-Age	-Age	-Dynamism of the sector and entrance impairments
-Experience (in the sector , with other enterprises or previous success)	-Location	-Investors and venture capital
-Rank in personal carrier	-Learning and experiences	-Universities and mechanisms of transference of technology
-Insertion in social networks	-Mission and commitment to growth	-Availability and access facility and resources
-Fear of failure	-Innovation and development	-Availability of human resources and prime matter
-Goals	-Hiring advisors and experts	-Importance of stakeholders
-Internal locus of control	-Management competences development	-Importance of family ties
-Growth aspiration	-Human resources strategies	-Networks, alliances and firms' network
-Intentions and motivations	-Marketing strategies	-Public policies and national or local support policies to enterprises
-Growth expectations	-Networks and joint ventures with suppliers	
-Work-life balance	-Exports and internationalisation	
	-Business format (franchising)	
	-Fusions, acquisitions, joint-ventures and strategic alliances	
	-Entrepreneurial Orientation	

2.3.1 Individual Level

At an individual level, positive relationships tend to exist between company growth and the entrepreneurs' motivation, experiences⁹, personal goals and internal locus of control (Davidsson et al 2010; Rauch and Rijskik 2013; Wakkee et al 2015). Delmar and Wiklund (2008) define growth motivation as the '*aspiration to expand*' (p.438) and it may differ between new and experienced entrepreneurs (Wright and Stigliani 2012). Some scholars (e.g. Edelman et al 2010; Gupta et al 2013; Levie and Autio 2013) found that enterprise growth is closely associated with the goals and motivations of the entrepreneurs, though having the intention to grow does not automatically imply growth in reality. Machado (2016) argues that stable and persistent motivation is required to transform it into action. To make this transition successful, adequate resources, opportunities and appropriate strategy are required (Wiklund and Shepherd 2001; Delmar and Wiklund 2008). Growth intentions are related to entrepreneurs' perception of reality and the intended reality (Hermans et al 2012). It is influenced by how the competitive condition is perceived (Machado 2016). Though growth intentions and growth expectations are interrelated, but they are different: growth intention refers to what is desired and growth expectation refers to what is expected (Machado 2016). The desired outcome may not align with what is expected. However, both can influence business growth (Hermans et al 2012; Wakkee et al 2015).

Other variables involve fear of failure which impacts on the degree of risks people would willingly take which may result in missing a growth opportunity (Samuel et al 2013; Machado 2016). In addressing this potential obstacle, entrepreneurs need to develop awareness and knowledge in regard to their attitude towards risk and failure (Robinson 2008; Fatoki 2010). Concerns on work-life balance may also affect growth as more time may be demanded if expansion were to take place (Leitch et al 2010; Davidsson et al 2010). Other individual characteristics such as entrepreneurs' age, education background, experience, stages of life they are in and family supportiveness can all impact on their

⁹ Experience here refers to the experience gained by previously working in other companies but in the sector/industry as the entrepreneurs' own venture.

motivations, goals, attitude and the decision making process. Section 4.4.2 discusses how this stream of literature was incorporated into the research design for data collection.

2.3.2 Firm Level

Factors listed in Table 3 are identified as potential influencers and opinions may vary among different academics. For instance, Gibrat (1931) believes that firm growth is not influenced by size whereas empirical studies conducted by Calvo (2006) and Daunfeldt and Elert (2013) have rejected Gibrat's law. Instead, both Evan (1987) and Calvo (2006) argue that there is a negative relationship between firm size and rate of growth, i.e. smaller firms grow faster. On the contrary, Penrose (2009) rejects those traditional views and asserts that size is merely a by-product of growth and therefore should not be a determining factor. Examining past studies, Daunfeldt and Elert (2013) believe that whether Gibrat's law holds or not depends on various factors such as industry context including minimum efficient scale, market concentration rate, and number of young firm in the industry. Nevertheless, the diverse opinions in this stream of research re-enforces the heterogeneity of growth as discussed in section 2.2.1.

Innovation is considered as a key contributor for growth where small innovative businesses tend to grow faster (Daunfeldt and Elert 2013; Machado 2016). Other variables have been studied, including location and the advantage of clustering in regard to business growth (Kuah 2002; Porto and Brito 2010; Lämmer-Gamp et al 2014). Further discussion on clustering is included in section 2.4.1. In addition, literature often associates growth with characteristics of the company, including capability of the management team, appropriateness of aims and perspectives, effectiveness of strategies (e.g. marketing, human resources, production) and the level of commitment (Penrose 2009; Dobbs and Hamilton 2007; Davidsson et al 2010; Machado 2016). Section 4.4.2 discusses how this literature stream was incorporated into the research design for data collection.

2.3.3 Industry Level

Industry (or sector) is another factor that influences business growth (Van Stel and Carree 2004; Davidsson et al 2010; Machado 2016). Firstly, entry barriers differ among industries which can result in differences in supporting growth of existing businesses or even lead to market saturation (Janssen 2009). In addition, different industry or sector characteristics impact on the specific value chain and subsequently the growth opportunities (Nichter 2009). For instance, the framework on growth patterns developed by Farouk and Saleh (2011), which then modified by Abdelshafy et al (2015) is based on case studies within the consumer goods sector and require information such as, capacity and sales. However, this framework may not be suitable for other industries such as, some technology businesses (Wright and Stiglioni 2013). For example, revenue through licensing (Wright and Stiglioni 2013) or sales numbers for a mobile app development company often has no restriction on capacity.

Furthermore, Brito and Vasconcelos (2009) and Machado (2016) consider growth of the industry as the main driver for the growth of certain businesses. In comparison, through in depth case analysis on the wholesale sector, O’Gorman (2001) suggests that it is the firm’s choice and successful implementation of its competitive strategy on expansion that drives the growth of the sector. However, O’Gorman’s (2001) conclusion was derived from only two case studies, which suggest that the generalisability of the conclusion may be limited to the specific sector and region or even to the specific businesses. As discussed in section 2.3.2, the industry context can impact upon the relation between size and growth, i.e. conclusions may vary depending on the specific industry studied (Daunfeldt and Elert 2013). Therefore, there is a need to conduct industry specific studies on the subject of firm growth in order to derive applicable contributions.

As demonstrated in Table 3, the variables discussed can be broadly divided into two categories: the characteristics of the industry and the supporting environment. Market conditions, entry barriers and operating requirements can all be seen as the characteristics of the industry. In comparison, the supporting environment includes all variables that can affect the performance of the company and the industry in general such as finance and

talents availability, technological readiness and transferability, infrastructure requirements, networks and policy support. In here, the availability of finance is sometimes related to investors' attitudes towards a particular industry as a whole (see Valliere and Peterson 2004; Dincer et al 2016). The concept of networks is also brought up in both firm level and industry/environment level discussions, however, the focus is different. At the firm level, networks are discussed based on the connectivity of a particular company (Beekman and Robinson 2004). At the industry/environment level, networks are discussed at the industry level (Barringer et al 2005; Estrella and Bataglia 2013 cited by Machado 2016).

From the above discussions, it is rational and necessary to conduct industry (sector), country specific research in studying these factors. Moreover, internal and external factors are not isolated, instead they are interrelated and can influence each other (Gupta et al 2013). Chapter 3 discusses and applies these factors in the context of the digital gaming industry.

2.4 Supporting Approach: Entrepreneurial ecosystems

Section 2.3 discusses various factors influencing business growth by primarily adopting the deterministic approach (as discussed in section 2.2.2). The following section explores an alternative approach to explaining growth: the entrepreneurial ecosystems concept.

2.4.1 Introduction of Entrepreneurial Ecosystems

In recent years, business growth has been closely associated with entrepreneurship by various scholars such as Gartner (1990), Davidsson et al (2006) and Mason and Brown (2014). Given that focusing on the number of start-ups has limited sustainable impact, much of the attention has been shifted to growth oriented entrepreneurship which is regarded as one of the key drivers for economic development (Shane 2009; Isenberg 2010; Mason and Brown 2014; Stam 2015). Upon recognising the importance and impact of entrepreneurship, especially growth oriented entrepreneurship, in the process of a country's socio-economic development, governments have paid considerable attention on

creating favourable environments which lead to the emergence of entrepreneurial ecosystem concept (Zacharakis et al 2003; Isenberg 2010; Malecki 2011; Mason and Brown 2014; Stam 2015; Acs et al 2017).

Scholars have argued the development of entrepreneurial ecosystems studies have roots in and shared similarities with concepts like innovation ecosystems and clusters but still possess distinctive characteristics (Pitelis 2012; Brown and Mason 2017; Spigel 2017; O'Connor et al 2018; Daniel 2018). This section first defines entrepreneurial ecosystems and then discusses ecosystem frameworks. Comparisons with innovations and clusters are presented afterwards.

Definition of Entrepreneurial Ecosystems

While the concept is gaining worldwide recognition, scholars have not achieved consensus on the definition of entrepreneurial ecosystems (Mason and Brown 2014; Stam 2015; Audretsch and Belitski 2017). It is not the intention of this thesis to discuss in detail about different definitions or why a specific definition is selected over another. Mason and Brown's (2014) definition is chosen to be adopted and used in this thesis for it encompasses all aspects in a very explicit manner:

'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' (p. 1 and 2)

Four key properties can be derived through reviewing the definitions of entrepreneurial ecosystems (see Cohen 2006; Isenberg 2011; Acs et al 2014; Mason and Brown 2014; Stam 2015; Audretsch and Belitski 2017). Firstly, there are various actors involved in the ecosystem such as entrepreneurs, customers, firms, venture capitals, universities, culture and markets. Secondly, it is essential for actors within the ecosystem to maintain

continuous healthy and dynamic interaction. In addition, to distinguish itself and being successful, the ecosystem needs to be productive. The productivity can be realised in different forms such as jobs or revenue growth. Lastly, the ecosystems can vary in sizes but still retain its local features.

Entrepreneurial Ecosystems Frameworks and Components

Various frameworks have been proposed in studying the concept of entrepreneurial ecosystems (e.g. Isenberg 2011; Vogel 2013; Mason and Brown 2014; Stam 2015) which can be broadly classified into two types. The first type is presented in a flat structure where Isenberg's (2011) is considered to be one of the most influential models (Mason and Brown 2014; Stam 2015). Figure 4 illustrates the model in detail. Isenberg (2011) argues that a successful entrepreneurial ecosystem is composed of six main domains: finance, culture, market, human capital, policy and supports. All the components work together to create a favourable environment and provide necessary resources (e.g. finance, talents, market, networks) that encourage and support entrepreneurial activities.

Isenberg (2010) stressed the uniqueness of each existing or potential entrepreneurial ecosystems and provided nine principles¹⁰ for government leaders as a general guide. These principles emphasise the importance of tailoring to local conditions, using the power of successful examples as well as calling on the creation of favourable environment for entrepreneurship whether it is cultural or institutional related (Stam 2015). Comparing the list of growth variables in Table 3 and different elements shown in Figure 4, it is apparent that a number of factors overlap. For instance, variables at industry and environment level can be matched with policy, markets and finance in Isenberg's (2011) model. Factors at individual level can be generally matched with human capital and culture. Firm level variables can be matched with supports, culture, markets and human capital. Therefore, it is reasonable to view the entrepreneurial ecosystem model as an alternative approach to systematically study the influencing factors of business growth.

¹⁰ The nine principles are: stop emulating Silicon Valley; shape the ecosystem around local conditions; engage the private sector from the start; favour the high potentials get a big win on the board; tackle cultural change head-on; stress the roots; don't overengineer clusters and help them grow organically; reform legal, bureaucratic, and regulatory framework (Isenberg 2010).

Figure 4. Isenberg's (2011: 7) Entrepreneurial ecosystem

In comparison, Stam's (2015) model focuses on capturing the causal relations within the whole ecosystem. Stam (2015) criticises the effectiveness of the entrepreneurial ecosystem approach and provides a different model by unifying key elements, outputs and outcomes as shown in Figure 5. The elements that Stam (2015) includes in the systemic and framework conditions resemble much what presented in Isenberg's (2010) model. However, in contrast with models represented by Isenberg's (2011), Stam (2015) attempts to weaken the flat structure that focuses on presenting essential elements, but provides a framework that presented the causal relations within the ecosystem. The framework endeavours to demonstrate how value is created by indispensable factors with facilitation of transitional causes; how the outcomes and outputs can be recycled into those fundamental conditions; and how different factors within the system can interact with each other (Stam 2015).

Figure 5. Stam's (2015) Entrepreneurial ecosystem

In summary, entrepreneurial ecosystems provide an environment where business growth can be examined. The focus has been on creating a favourable environment to aid business development. The success of an entrepreneurial ecosystem is mainly measured by the overall development of the region rather than the growth of individual firms (see Mason and Brown 2013; Stam 2015). However, as discussed in this section, different business growth factors can potentially be factored into this environment to develop a holistic view on the subject rather than being viewed individually.

Comparison with Innovation Ecosystem

While it is obvious that innovation and entrepreneurship are two different words and represent different concepts, many believe that the two are closely linked and some regard the two ecosystems interchangeably (e.g. Levie and Autio 2013; Stern 2014). Similar to entrepreneurship, innovation has drawn much significant particularly for its importance on driving socio-economic growth and increasing organisation competitiveness (OECD¹¹ 2007, HM Treasury et al 2014). A vast amount of studies have been undertaken in innovation since the 19th century, including major contribution from Schumpeter (1934), Lundvall (1985) and Freeman (1987). However, the innovation process is complex and involves various actors which suggest the need for an effective study mechanism with a

¹¹ OECD standard for Organisation for Economic Co-operation and Development. It is an international organisation that aims to form better policies for better lives

holistic approach (Cooke and Morgan 1998; Frenkel and Maital 2014). The concept of innovation ecosystem was then born and is believed to serve as a response to effectively cultivate this complex process (Adner 2006, Frenkel and Maital 2014).

As the core of an innovation ecosystem, innovation covers a broad spectrum from new product to new process, from new organisations to new market (Schumpeter 1934; OECD 2005). In addition to innovative outputs, the ecosystem is also required to generate and sustain commercial benefits (Jackson 2011; Cross 2012). These features coincide with certain entrepreneurship characteristics. For instance, Audretsch (1995, 2003), Kao (1993) and Stam (2015) regard innovation as the essence of entrepreneurship. Successful entrepreneurship activities also require appropriate rewards including commercial returns (Sahlman and Stevenson 1991). As the preferred environment for fostering entrepreneurship, an entrepreneurial ecosystem is very similar to an innovation ecosystem from the perspective of key outputs. In addition, both ecosystems share an evolutionary nature and consist of a range of components (Mason and Brown 2014; Rabelo and Bernus 2015). Indeed, the two ecosystems sometimes even share the same examples. Silicon Valley is considered to be both a successful innovation and entrepreneurial ecosystem (Isenberg 2010; Atkinson 2014), so is the ‘start-up nation’ Israel (Frenkel and Maital 2014: 42).

However, with similarities identified, there are significant differences between the two ecosystems. An innovation ecosystem can be discussed at company, regional or national level (Morrison 2013; Frenkel and Maital 2014; Mian et al 2016) whereas an entrepreneurial ecosystem is generally considered at a regional or national level (Isenberg 2010; Frenkel and Maital 2014). Furthermore, an entrepreneurial ecosystem has a strong emphasis on locality and a critical mass with various actors included to be essential for its successful functionality (Mason and Brown 2014; Mack and Mayer 2015). In comparison, the location of different actors and components of an innovation ecosystem is much more flexible: different actors can be *‘either geographically localised or strategically linked to focus on developing a specific technology’* (Jackson 2011: 3). In addition, although related, the focus of the two ecosystems are different which can be reflected on the measurements chosen for evaluating the performances. For instance, both

require commercial benefits, but it is mainly measured in terms of financial return at innovation ecosystems whereas indicators such as number of HGFs, spin-off rates and employment are also used in entrepreneurial ecosystems (Jackson 2011; Stangler and Bell-Masterson 2015). For government leaders, these differences can result in variations in policy intervention strategies. Therefore, in this thesis, I argue that the two ecosystems are different, while acknowledging there is some overlap.

Comparison with Clusters

Cluster is another concept that is often associated with the ecosystems (Autio et al 2018; Spigel 2017). Porter (1998) defined a cluster as a ‘*critical mass-in one place-of unusual competitive success in particular fields*’ (p.78). Clusters are believed to be beneficial on increasing competitiveness of the region and facilitating the local and regional economic development by encouraging innovation and new venture (Dedehayir et al 2018). Drawing increasing attention since 1990s, clusters are believed to have a close relationship with the development of the innovation and entrepreneurial ecosystem concepts (Autio et al 2018; Spigel 2017). These concepts do share many common features in that, they all operate within a network, require various actors, create value, increase competitiveness and expect certain common outcomes (Pilinkienė and Mačiulis 2014; Spigel 2017). In addition, typical examples of successful clusters are also considered to be innovation and entrepreneurial ecosystems such as, Silicon Valley and Route 128 (Dedehayir et al 2018).

However, a cluster does differ from the ecosystem concept (Dedehayir et al 2018; Oh et al 2016; Autio et al 2018; Spigel 2017). Compared to an innovation ecosystem, it is the location specific feature that sets them apart since the boundary of the latter has no geographical restrictions but rather by ‘a “*collective functionality*” consisting of a functional barrier’ (Dedehayir et al 2018: 20). Businesses within a cluster are often within same sector or supply chain to form aggregate power to serve larger customers and learn and share technology or skills while it is not necessary the case for entrepreneurial ecosystems (Piore and Sabel 1984; Spigel 2017). Instead of a common client or market, it is the certain key technology that are often shared among entrepreneurs (Spigel 2017).

Spigel (2017) also argues that the benefit and focus of entrepreneurial ecosystems mainly attribute to the entrepreneurship related process (e.g. start-up culture and financing) instead of other cluster advantages that generally open to all firms in spite of size or age. Moreover, Autio et al (2018) argue that entrepreneurial ecosystems differ themselves by focusing on exploring digital affordances and business model innovation, discovering entrepreneurial opportunities and encouraging knowledge spillovers.

2.4.2. Entrepreneurial Ecosystems: Discussions towards a Conceptual Gap

Dynamics of Actors and Place: the Spatial Discussion of Entrepreneurial Ecosystems

Current literature on entrepreneurial ecosystems have mainly studied the concept by focusing on appropriate actors, institutions, resources and governance required at a local region and the supportive networks formed as a result (e.g. Acs et al 2017; Malecki 2018; Espinoza 2019)¹². The emphasis on resources and actors can be reflected in various definitions and models of the entrepreneurial ecosystems. Cohen (2006) was among the first to define the concept as ‘*an interconnected group of actors in a local geographic community committed to sustainable development through the support and facilitation of new sustainable ventures*’ (3). The concept has since been explored further and resulted in a number of variations in definitions (Alvedalen and Boschma 2017). Through synthesising previous studies (e.g. Zacharakis, Shepard, and Coombs 2003; Isenberg 2010; Malecki 2011; Feld 2012) on the concept, Mason and Brown (2014) expanded the definition by incorporating players such as actors, organisations, institutions and entrepreneurial process and emphasised the importance of collective effort in improving local entrepreneurial performance. This definition implies the importance of not only the actors but also the connectivity formed within the local region which align with views from influential authors like Isenberg (2010) and Feld (2012) in the field. More recent works by Spigel (2017), Roundy, Brockman, and Bradshaw (2017), Roundy, Bradshaw, Brockman (2018) have taken the discussion further on what are the key elements or

¹² Others focused on perspectives like evolutionary nature (Feldman et al 2005; Mack and Mayer 2016) and the measurement framework (Stangler and Bell-Masterson 2015; Liguori et al 2019).

attributes to form a successful entrepreneurial ecosystem and the connections among them.

As the entrepreneurial ecosystem drawing increasing attentions in policy and industries, various discussions have also raised on the emergence, creation and management of entrepreneurial ecosystems (Motoyama et al 2014; Stam 2015; Mack and Mayer 2016). As a response, the *Small Business Economics*' recent special issue in Feb 2019 focusing on context has triggered serial discussions on the governance of the entrepreneurial ecosystems. Colombo et al (2019) agreed with Adner, Oxley, and Silverman (2013) that three types of actors are key in managing the ecosystems as together they build the pathway to the end customer: participation, structure and governance. Participation commonly refers to the entrepreneurial companies. Structure includes necessary resources that support entrepreneurial activities like funding, knowledge, suppliers and customers. Governance relates to rules and regulations set in attempting to support entrepreneurial behaviours. Appropriate governance plays a crucial role in ensuring desirable outputs are achieved (Rampersad 2016) particularly when considering various actors within an ecosystem often possess different motivations and goals (Colombo et al 2019). While the little consensus have achieved, scholars have proposed various governing agents include large corporations (Bhawe and Zahra 2019; Colombo et al 2019), private equity investors (Colombo and Shafi 2016; Cumming et al 2019; Colombo et al 2019), universities (Hayter 2016) who may assume a leading role in a hierarchical type of governance (Colombelli, Paolucci, and Ughetto 2019). Comparatively, Colombelli, Paolucci, and Ughetto (2019) also stressed the necessity of ensuring a relational governance structure where the ecosystem is supported by 'shared cooperative norms and informal routines' (518). Nevertheless, the question on governance is inevitable related to defining boundaries and place (Miller and Acs 2017; Audretsch and Link 2019; Colombo et al 2019).

Actors, which may also referred as attributes, and place, where entrepreneurial ecosystems are defined, are the two fundamental concepts studied in the literature. Before discussing the role of digitalisation and research gaps, it is essential to understand the dynamics of actors and place first.

Actors

Isenberg's (2010) highly influential ecosystem framework captures six overarching domains (i.e. policy, finance, culture, supports, human capital and markets) which each consists of a number of sub-components that interacts in a highly dynamic and context-specific way. Spigel (2017) has also taken previous studies further and grouped them into three types of attributes: social, cultural and material. Each type composes a number of attributes: cultural includes supportive culture and histories of entrepreneurship; social includes talent, investment capital, networks and mentors and role models; material includes policy and governance, universities, support services, physical infrastructure and open markets (Spigel 2017). While emphasising on the importance of each attributes, Spigel (2017) also stresses that not all are necessary conditions for a successful ecosystem and those elements should rather be seen as main factors to aggregate resources and foster a supportive environment.

In comparison, Roundy, Brockman, and Bradshaw (2017) contribute to the topic by discussing the diversity and coherence of the entrepreneurial ecosystems. The diversity of entrepreneurial ecosystem can be exemplified in form of actors (e.g. entrepreneurs, investors, government, incubators, lawyer or accountant), business types and models (Morris, Neumeyer, and Kuratko 2015; Roundy, Brockman, and Bradshaw 2017). Supported by the ecosystem and various actors within, entrepreneurs are seen as opportunity-seeking and encouraged to set up ventures that responses to the market and any other exogenous changes (Williams and Vorley 2014). Popular approaches such as 'Lean Startup' (Blank 2013), 'Design Thinking' (Martin 2009) and 'Agile' (Martin 2002) facilitate entrepreneurs to explore innovative products, business types and models which in turn grows the diversity of the ecosystem (Roundy, Brockman, and Bradshaw 2017). Roundy, Brockman, and Bradshaw (2017) defines coherence as the level of connectivity between different elements in an entrepreneurial ecosystem. Various scholars (e.g. Acs, Autio, and Szerb 2014; Mason and Brown 2014; Stam 2015; Audretsch and Belitski 2017) emphasised the dynamic and inter-connected nature of an ecosystem and the importance of maintaining such positive connectivity. This connectivity is indeed one of

the key feature of an entrepreneurial ecosystem. Fragmentation of resources and support organisations hinders the entrepreneurial exploration process within a region (Mack and Mayer 2017). It is through a collaborative and supportive community effort that entrepreneurial activities can be best supported and hence maximum the chances of successfully response to any external changes or shocks (Roundy, Brockman, and Bradshaw 2017). The emphasis on collaborative effort and dynamic interaction among actors echoes with Spigel (2017) and other scholars (Isenberg 2011; Acs, Autio, and Szerb 2014; Mason and Brown 2014; Stam 2015; Audretsch and Belitski 2017).

Place

The ecosystem study often starts with defining boundaries (Miller and Acs 2017; Audretsch and Link 2019; Colombo et al 2019). Adner, Oxley, and Silverman (2013) believe that *‘the boundaries of the ecosystem are intimately related both to the nature of the value proposition as well as to the structure of interdependencies’* (x). Previous studies on entrepreneurial ecosystems have placed significant emphasis on the physical concentration in a close proximity particularly at regional level both in conceptual and empirical research. Various scholars (Isenberg 2010; Autio et al 2014; Mason and Brown 2014; Motoyama et al 2014; Brown and Mason 2017) have discussed the importance of taking into consideration of the specific regional context in a city, region or national level whether to be social cultural conditions, resources availability or unique characteristics driven by primary industries presented in the locality. Questions have been raised on what level that entrepreneurial ecosystems should be studied: firm or institution, accelerator, city, region, country or international levels (Stam 2015; Malecki 2018; Spigel and Harrison 2018). In addition to popular local or regional context, Colombelli, Paolucci, and Ughetto (2019) and Miller and Acs (2017) argue the unit of analysis for an entrepreneurial ecosystem could also be in levels of universities, incubators or accelerators.

Empirical studies have mainly adopted case studies as a method in investigating specific city or regional entrepreneurial ecosystems varying in terms of industries, region or country differences and focuses on aspects like the role of market, networks and

government (Fritsch 2013; Tsvetkova 2015; Maroufkhani, Wagner, and Wan Ismail 2018; Cavallo, Ghezzi, and Balocco 2018). For instance, Overholm (2015) studied US solar service industry and discussed the opportunity creation and discovery process within an ecosystem. Kshetri (2014) compared the entrepreneurial ecosystems in Estonia and South Korea and addressed the differences in terms of weaknesses and strengths. Mack and Mayer (2016) discussed the concept at city level in Phoenix, Arizona and emphasised the dynamic evolutionary nature of entrepreneurial ecosystem. Spigel (2017) studied the concept in the context of Waterloo (primarily technology driven) and Calgary (largely driven by oil and gas industry) in Canada and depicted the presence of key attributes and resources utilisation within the ecosystem as well as different characteristics in the two ecosystems. In comparison, quantitative research is scarce in the space (Maroufkhani, Wagner, and Wan Ismail 2018). Primarily drawing data from Euristat Statistical Database (Eurosta 2014) during 2004-2010 period, Audretsch and Belitski's (2017) attempted to add a quantitative perspective on the ecosystem topic and used city as the geographical boundaries for analysis. 70 European cities were analysed against citizen perceptions on areas like socio-economic conditions, information and institutional context. In summary, current research have a strong emphasis on localities within a geographical boundaries.

However, in a digital era, interactions among actors and flows of resources (Bruns et al 2017; Colombo et al 2019) are not restricted at a geographically bounded location but potentially can operate on a globally scale (Autio et al 2018). Despite the rising importance of digital technologies and internet economy, research on digitalisation and the role of digitalisation on entrepreneurial ecosystems is limited and remain undertheorised (Li, Du, and Yin 2017; Sussan and Acs 2017). There is a lack of research from a multi-scalar perspectives where the '*relative importance of non-local versus local linkages, or what kind of institutions at different spatial scales matter*' (Alvedalen and Boschma 2017: 894). In addressing this gap, this section first discusses theoretical background for an entrepreneurial ecosystem empowered by digitalisation and then develop a conceptual framework.

Entrepreneurial Ecosystems and the Role of Digitalisation

In Freeman and Perez's (1988) seminal work, the term 'techno-economic paradigms' was introduced which states that industrial and economic activities were principally changed due to a series of technology breakthroughs every 50 years or so since late 1700s. Such technological advancements will not only lead to new industries, but also challenge the way that existing industries operates and demand for new organisational structures that supports the new activities (Gibson 1977; Hutchby 2001). In respect to entrepreneurship and specifically the entrepreneurial ecosystem concept, the rapid development of digital technologies and infrastructure is already changing existing organisational behaviour and generating new affordances (Zammuto et al 2007; Majchrzak and Markus 2013; Nambisan 2017; Autio et al 2018). In light of the current digitalised era, Autio et al (2018) introduced the concept of digital affordance in entrepreneurial ecosystems and proposed to consider entrepreneurial ecosystems as '*a digital economy phenomenon that harnesses technological affordances to facilitate entrepreneurial opportunities pursuit by new ventures through radical business model innovation*' (74).

Autio et al (2018) discussed three main affordances empowered by digitalisation: decoupling, disintermediation and generativity. Decoupling reduces players' dependency on any specific physical assets in the value chain without comprising productive value (Williamson 1988; Tilson et al 2010; Yoo, Henfridsson, and Lyytinen 2010; De Vita, Tekaya, and Wang 2011). Disintermediation lessens businesses' reliance on any assets and resources that is location constrained (e.g. any specific industrial cluster) and brings new opportunities to interact with end-users in the process of value creation (Autio et al 2018). Such affordance on disintermediation is powered by the ability to communicate effectively with end-users directly via internet and the separation of the flow of information and the transport of products (Evans and Wurster 1997). Generativity refers to the ability to develop and utilise internet based tools such as platforms in coordinating audiences in scattered locations (Zittrain 2009; Yoo et al 2012; Thomas, Autio, and Gann 2014; Nambisan 2017) for improved innovation and entrepreneurial outputs. Such an affordance is empowered by various agents and structures such as trust mechanisms, internet enabled technologies (e.g. multi-sided platforms, online payment platforms) and

distributed ledgers that each may facilitate parts of a complex transaction process (e.g. payment verification) (Catalini and Gans 2017). The three affordances imply that the digitalisation reduces the actors' dependency on location-specific resources and assets.

Considering the close ties with concepts such as clusters, networks and innovation systems, scholars (Spigel and Harrison 2018; Autio et al 2018) argue that entrepreneurial ecosystems differ from traditional concepts and hold distinct features. In particular, Autio et al (2018) identify four main characteristics of the concept: no emphasis or restrictions on any specific types of industries or technology domains; cluster externalities in relation to the discovery and realization of entrepreneurial opportunities; leading in business model innovation; excel in voluntary horizontal knowledge spill-overs and pursuing entrepreneurial opportunities external to the local cluster. Autio et al (2018) also acknowledge that digital affordances together with spatial affordances characterizes the entrepreneurial ecosystems. Nevertheless, these features reinforced the idea that the reliance on location-specific resources or assets are weakened and the emphasis on externality (i.e. connections outside a geographical boundary) are strengthened.

Around the same time as Autio et al's (2018) article¹³, the digital entrepreneurial ecosystems (DEE) framework first appeared in Sussan and Acs' (2017) and Li, Du, and Yin' (2017) work. In Sussan and Acs' (2017) conceptual paper, DEE is defined by solely considering Schumpeterian (1934) entrepreneurs who develop innovative digital businesses, services or products targeting customers (users and agents) in the global market. The conceptual framework is developed by integrating two concepts: digital ecosystem with focus on digital infrastructure and users and entrepreneurial ecosystem with focus on agency and role of institutions (Sussan and Acs 2017). Sussan and Acs (2017) argued that the DEE is the intersection of the other two concepts which are bigger and more complex and the study only include entrepreneurs who either develop or use multisided platforms. The DEE consists of four elements: digital user citizenship, digital marketplace, digital infrastructure governance and digital entrepreneurship (Sussan and Acs 2017). While this study contributes to the entrepreneurship research by bringing in

¹³ Autio et al's article was accepted in July 2017 and published in Jan 2018. So the paper was written in the same year as Sussan and Acs (2017) and Li, Du and Yin (2017)

digital focus and incorporating a user-centric approach, it is however evidently restricted by only considering businesses and entrepreneurs operating in the multisided platforms and lacks of discussions on how resources are flowed under the umbrella of DEE. The restriction is an inevitable consequence when placing digital entrepreneurship at the centre of the discussion.

In comparison, Li, Du, and Yin (2017) examined the DEE by placing digital innovation at the core of the discussion and explored the organising issue by studying Zhongguancun, commonly referred as the Silicon Valley of China. The ecosystem is seen as a more efficient platform than open market where required resources such as labour can be generated and collaborations among stakeholders can be facilitated for digital innovations. Li, Du, and Yin (2017) pointed out that the potential diverse motivations and goals possessed by different players and lack of formal authorities can pose challenges in running a healthy and sustainable DEE which is echoed by Colombo et al (2019). Li, Du, and Yin (2017) thus treated DEE as an organisation as oppose to collective actors. Adopting Puranam et al's (2014) theory, Li, Du, and Yin (2017) investigated Zhongguancun against four organising problems: task division, task allocation, reward provision and information flow. While the research contributed by studying digital innovation at the ecosystem level and revealed context-specific solutions on organising form, it is largely bounded by activities occurred within a geographical bounded location, in Zhongguancun's case, a cluster located in Beijing.

While breaking the wall imposed by physical locations, Sussan and Acs' (2017) work also brings in consumers (users and agents) into the discussion by adopting a user-centric approach. However, the study was limited by only considering multi-platform related digital entrepreneurship. In contrast, Li, Du, and Yin (2017) focus on the other end of the entrepreneurial process, the innovation development. However, the discussion happened at a local level. Neither of the studies addressed Autio et al's (2018) question on the role of digitalisation in entrepreneurial ecosystems in its fullness.

In addressing the research gap, this thesis aims to develop a conceptual framework for entrepreneurial ecosystems empowered by digitalisation. In this framework, previous

studies were acknowledge and integrated for further development. For instance, taking Sussan and Acs' (2017) work further, the framework proposed not only include on digital entrepreneurs and users for multi-platform businesses but also actors and agents who operate and form part of the digital era regardless whether they are multi-platform businesses or not. The proposed framework will also develop from Li, Du, and Yin's (2017) work and not only discussing the innovation and development phase of the entrepreneurial process but also the entire business activities such as marketing and commercialisation in the digitalised global market.

Conceptual Framework of an Entrepreneurial Ecosystem Empowered by Digitalisation

To build a well-functioned sustainable entrepreneurial ecosystem, both resources and the social networks that facilitate the flow of the resources among actors play crucial roles (Spigel and Harrison 2018). It is acknowledged that traditional entrepreneurial clusters have many advantages e.g. concentration of talents and assets, established networks, resources recycling within the local community (Pitelis 2012; Spigel and Harrison 2018). However, as discussed in earlier sections, digitalisation reduces actors' dependency on physical assets and location-specific resources and empowers the flow of resources beyond any specific geographical boundaries (Autio et al 2018). Moreover, digital entrepreneurs are able to operate at an international stage (Sussan and Acs 2017). For instance, a large number of born-global firms operate and compete actively in global markets through digital technologies (Taney 2012). Many of born-global firms also collaborate with external partners or facilitators to carry out international activities where some may be in form of joint-ventures and foreign direct investment (Cavusgil and Knight 2009; Taney 2012). Therefore, I argue that empowered by digital technologies, the entrepreneurial ecosystems concept can and should also be studied under a global context in addition to the current mainstream research focusing on specific localities.

In developing the conceptual framework for sustainable entrepreneurial ecosystems, the proposed framework draws particular insights from social network theory and the biological ecosystem concept. Figure 6 illustrates the entrepreneurial ecosystems

empowered by digitalisation and recognising the opportunities both inside and outside of the local region. Firstly, as discussed previously, flow of resources can go beyond local communities through digital technologies. Traditional location-specific entrepreneurial ecosystems as well as individuals or firms that are not located within any identified local clusters can communicate, network and participate in the entrepreneurial activities and processes external to their localities. In the meantime, in recognising the potential limitations of relying on digital technologies, the proposed framework is acknowledged by the strong- and weak- ties theory in social network studies. At a local level (including city or region), actors are in the stronger positions to form stronger social networks linkages (strong ties) that can better facilitate the resources flow within the local community. In a global context, where resources are still flowing, the connections are weaker (weak ties). However, such assumption only indicate the possibilities and by no means being exclusive. Secondly, just like a biological ecosystem where the size of study objectives ranges from microbiomes to the biosphere which include all ecosystems on earth, the entrepreneurial ecosystems can be studied on a global level that is empowered by internet. Such ecosystem at a global level potentially constitutes all traditional location-specific entrepreneurial ecosystems but interlinked via internet.

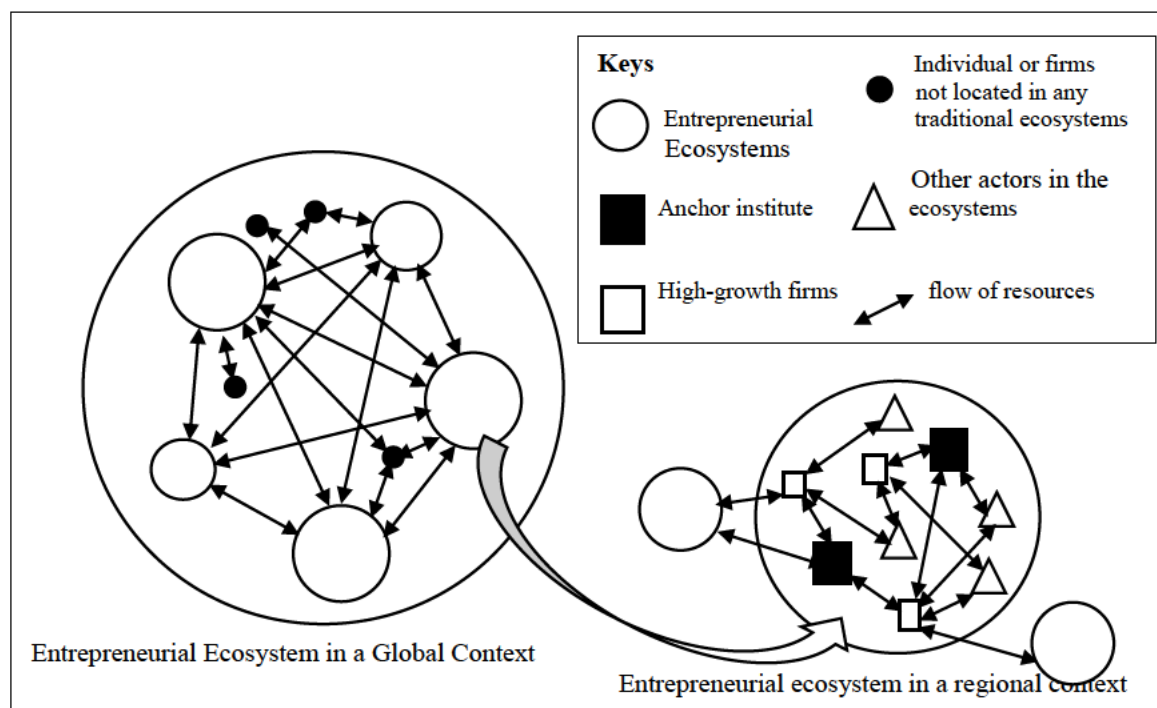


Figure 6. Entrepreneurial Ecosystems Empowered by Digitalisation (Author's Own Figure)

Studying the entrepreneurial ecosystem in a global context through the lens of digitalisation is a large and potentially extremely complex topic in nature. However, such attempt is still necessary. First of all, it advances current understanding on entrepreneurial ecosystems and the role of digitalisation plays in this concept from a different perspective. In addition, as the rise of digital era and increased cross-boundaries¹⁴ interactions, there is a need for a tailored ecosystem governance which can only be discussed and promoted with adequate understanding on the phenomena. Such governance can in turn ease the burden and overcome barriers for cross-boundaries interactions and support businesses who operate in a global context.

2.5 Summary

This chapter has outlined the literature landscape on the topic of business growth including its definition, heterogeneity, research models and approaches, complexity of measurement as well as the list of antecedents of business growth. The entrepreneurial

¹⁴ "Cross-boundaries interactions" here refers to interactions happens among different communities, cities, regions and countries.

ecosystems and related concepts (such as innovation ecosystem and clusters) have also been discussed as an alternative approach to study various influencers on business growth. In particular, this study proposes a framework that discusses entrepreneurial ecosystems beyond the local/regional level but in a global context. Discussions have been kept at a general level in this chapter. However, considering the differences and variations, scholars (e.g. Bolton 1971; Davidsson et al 2010; Daunfeldt and Elert 2013; Machado 2016) have pointed out the needs to focus on a specific industry to generate constructive findings and recommendations that can be applied to a particular setting. The next chapter focuses on SME growth factors in the digital gaming sector.

Chapter 3 Literature Review: SMEs in UK Digital Gaming Sector

As various scholars (e.g. Bolton 1971; Davidsson et al 2010; Daunfeldt and Elert 2013; Machado 2016) point out, there is a need to focus on a specific industry to generate constructive findings and recommendations that can be applied at particular settings. Thus, this chapter narrows the focus of literature to business growth and the role of entrepreneurial ecosystems in the digital gaming sector. It starts by investigating the rationale of focusing on SMEs and the digital gaming sector in the UK and thereafter explores growth variables within the technology sector. Thus a review of entrepreneurship policy is presented to understand the environment for entrepreneurship in this domain. Lastly, a summary of the two literature review chapters and research gaps with a conceptual research framework are presented.

3.1 Rationale of Focusing on UK SME

Davidsson et al (2010) and Machado (2016) assert that findings and growth characteristics between large and small business do differ. As discussed in section 2.1 and 2.2, findings on business growth are also influenced by the sizes of the businesses studied. Therefore, there is a need to be specific on the size of firms studied. In particular, SMEs are believed to play a key role in economic development and contribute significantly to job creation and improve upon innovation and competitiveness (European Commission 2015; World Bank 2015). The exact definition of SMEs varies among different organisations and countries (see European Commission 2015; Department for Business, Innovation and Skills 2012; Innovation, Science and Economic Development Canada 2013; Robu 2013; Berisha and Pula 2015). For instance, the European Commission (2015: 3) defines SMEs as enterprises with:

‘fewer than 250 persons; and have either an annual turnover not exceeding EUR 50 million or annual balance sheet total not exceeding EUR 43 million’.

In comparison, Australian's most commonly used criteria concerns the number of employees where the upper limit for SMEs is 200 (Government Affairs and Public Policy 2014). In the US, industry differences are taken into account when defining SMEs which implies that the specific size varies among different industries (Berisha and Pula 2015). In the UK, a company is classified as an SME if it meets two out of three criteria: less than £25m turnover per year, fewer than 250 employees, and less than £12.5m gross assets (Department for Business, Innovation and Skills 2012). For this thesis, research focuses on UK economy and therefore the UK definition is adopted.

Accounting for 99.9% of the total businesses in the UK and contributing for 60% of employment and 52% turnover (Department for Business, Energy & Industrial Strategy 2018), SMEs are regarded as the backbone of UK economy for the contributions of socio-economic and political development by both scholars and policy practitioners (Matlay and Westhead 2005; Robu 2013; Jones et al 2014; Department for Business, Innovation and Skills and Department for Communities and Local Government 2015; Department for Business, Energy and Industrial Strategy 2017). Furthermore, SMEs are also regarded as fundamental for maintaining competitive edge at national, regional and local levels (Porter 2006). In particular, Graph 1 demonstrates SMEs contribution towards the UK economy from the perspectives of number of businesses, employment, and turnover. In 2018, there were an estimated 5.6 million SMEs with 16.3 million employment in private sector and contributed near £2 trillion turnover (Department for Business, Energy & Industrial Strategy 2018).

Graph 1. Share of Businesses in UK Private Sector at Start of 2018
(Department for Business, Energy & Industrial Strategy 2018)

Significant research has been undertaken on influential factors for SMEs performance and ways to support them (Hussain et al 2006; Bhamra 2011; Department for Business, Innovation and Skills 2013; Jones et al 2014). For instance, extensive literature has discussed the difficulties that SMEs face in regard to access to finance (Beck and Demirguc-Kunt 2006; Cowling et al 2012 and Brown and Lee 2014). While financial and legal institutions are thought to play an important role in the remission of the growth constraints of SMEs, Beck and Demirguc-Kunt (2006) believe that improvement of the general business environment is crucial for long-term sustainability. Moreover, despite the fact that exports can bring in new opportunities and greatly contribute to UK domestic economy, a range of obstacles, which can be broadly classified as imperfect information and externalities, have hindered SMEs from benefiting from it (Love and Roper 2013; Department for Business, Innovation and Skills 2013). Furthermore, internal capacity and capability are important for the success of SMEs (Love and Roper 2013; Alvarez and Iske 2015). Other factors affecting SMEs growth include procurement, culture, leadership and managerial skills (Achanga et al 2006; Department for Business, Innovation and Skills 2013). Further discussions on growth factors can be found in sections 2.3 and 3.3.

Acknowledging the significance of SMEs in the UK and challenges they are facing, Vinck (2014) argues that the importance of SMEs is underrated and demands further attention and investment from government. The UK government has made various commitments and attempts in supporting the growth of SMEs (ICAEW 2014; Department for Business, Innovation & Skills and HM Treasury 2015). For instance, the government has been working together with the private sector to invest in SMEs through programmes and initiatives including the Start-Up Loan Scheme, R&D Tax Relief, Business Angel Co-Investment Fund, Local Enterprise Partnerships (LEPs) to ensure opportunities for SMEs' to access government contracts (ICAEW 2014; Cabinet Office et al 2015; Department for Business, Innovation and Skills and HM Treasury 2015; National Audit Office 2016). However, questions on the effectiveness of these approaches and expenditure are also raised (Commons Select Committee 2016). For discussions on government entrepreneurship policy see section 3.4.

3.2 Overview of UK Digital Gaming Industry

The UK digital gaming industry is regarded as one of the hubs for “creative, high-tech, knowledge-intensive companies” (UKIE 2016a). Therefore, in order to develop a thorough understanding of the industry, it is essential to first understand the meaning of knowledge company and knowledge economy.

3.2.1 Knowledge Company and Knowledge Economy

Knowledge has been widely accepted as a key factor for economic development and is also considered as one of the most important determinants in creating variations and imbalance in economic performance between countries and regions (Archibugi and Coco 2005; Švarc and Dabić 2015). Various studies and concepts have been developed and reinforced over time such as the knowledge economy (Blomstrom et al 2002; Švarc and Dabić 2015), knowledge-creating company (Nonaka 2007), knowledge-based business or organisation (Davis and Botkin 1994; Heaton and Taylor 2002; Neagu 2008), and learning organisations (Garvin 1993; Goncalves 2012). Though the research focus may vary, much attention of these studies have been on knowledge creation and transfer within

a company or economy (Blomstrom et al 2002; Nonaka 2007; Neagu 2008; Goncalves 2012). While these concepts have been developed and enhanced over time, Švarc and Dabić (2015) also note the focus of knowledge economy has been moving from science and technology to service and creative industries.

Nonaka (2007) believes that in today's economy, the consistent creation of knowledge is essential to a company's survival and requires not only explicit knowledge but also tacit knowledge. In Nonaka's (2007) theory, tacit knowledge, which is usually developed from practice and experiences and difficult to be transferred to others using a standard guidebook or theories, plays a key role in a knowledge creating company. Built on many success stories of Japanese firms, Nonaka and Takeuchi (1995) proposed a middle-up-down management system where the middle managers take up a strategic role to link the top decision makers with first line staff. By implementing this middle-up-down model, knowledge creation and accumulation activities are expected to be engaged with every individual (Nonaka and Takeuchi 1995).

In 1995, Davis and Botkin summarised six interrelated features that a knowledge-based company will normally possess. The first characteristic relates to offerings, whether products or services, become smarter when being used more. Likewise, users can also learn while using such products or services and have the potential to react in real time. In addition, knowledge-based offerings can adapt to dynamic environment and be customised. Davis and Botkin (1995) empathize and promote the idea of engaging customers as learners and businesses as educators in this concept of knowledge-based company. While acknowledging the importance of technology, Davis and Botkin (1995) also stressed the importance and potential of processing of data and information and transform them into new knowledge.

Another closely related concept is the learning organisation which has influenced many aspects of organisation management (Garratt 1999; Wang and Ahmed 2003). Echoed with Nonaka and Takeuchi's (1995) view that knowledge creation starts from an individual, Wang and Ahmed (2003) believe that individual learning is a necessary foundation of organisational learning but is not sufficient. Garvin et al (2008) summarises three

fundamental components of a learning organisation: an environment that favours learning; appropriate and consolidated learning procedures; and leaders that strengthen learning. In comparison, Wen (2014) places the role of human nature, such as the power of dream and imagination, the human interactions and the collective wisdom, as the essential ingredients of a learning organisation.

Considering the importance of context (Autio et al 2014), it is necessary to choose an industry or sector as a context for further discussion. Being recognised as a source for innovation and social-economic development, the creative industries have drawn increasing interest from both researchers and government leaders (British Council 2011, 2016). The Digital Gaming industry is considered to be one of the key representatives of the creative economy (Florida 2002). In addition, digital games, especially video games, are multimedia products which comprise not only knowledge creation and transfer but also business applications (Vogel 2000; Pilon and Tremblay 2013). While the creative industries are receiving growing attention as a key contributor to UK economy, the digital gaming sector is considered to be at world level (UK Trade and Investment 2014; Kampfner 2017). In particular, the gaming industry is forecasted to be fast growing: PwC estimates the global video games market to be worth \$90.1 billion in 2020 (Takahashi 2016) and Newzoo (2016) projects world game market to worth \$118.6 billion by 2019. With a long history in video games, the UK is in a great position to take advantage of this growing opportunity (UKIE 2016a). It is for these reasons, that the digital gaming industry is selected as an example for in depth investigation within this study.

3.2.2 Digital Gaming Cluster

Definitions

In the age of information, the concept of a digital economy has also gained worldwide recognition particularly due to the unlimited opportunities it brings to businesses (Anderson and Wladawsky-Berger 2016). It is believed that digital technology has the power to transform every industry and each aspect of the human activities (Department for Culture, Media and Sport 2016). Under an OECD classification, while technology is

mostly emphasised under the Information and Communication Technology (ICT) section, as well as sectors such as business support, mineral and mining, education, legal and government (OECD 2016). By contrast, under the UK government industrial classification code, digital media and technology appears predominantly under the Information and Communication and Professional, Scientific and Technical Activities sections (Company House 2017). The Information and Communication Technology sector can be defined as industries whose principal purpose of operation is to accomplish or empower the processing (including transfer and exhibit) of information and communication through electronic channels (Department of Economic and Social Affairs 2008). Figure 7 demonstrates the relationship among digital media and technology industry, ICT and digital gaming sector adopted in this thesis.

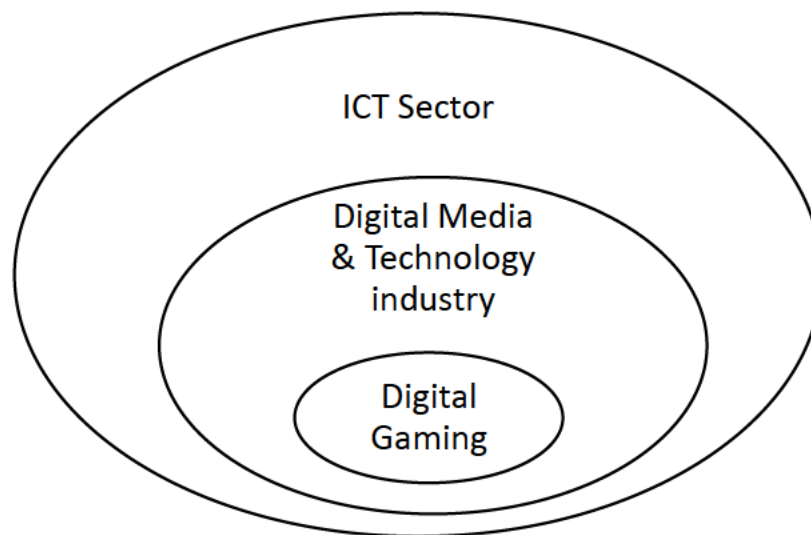


Figure 7. Relationship among Digital Media and Technology Industry, ICT and Digital Gaming Sector (author's own compilation)

In addition, digital games, especially video games, are multimedia products which comprise not only knowledge creation and transfer but also business application (Vogel 2000; Pilon and Tremblay 2013). The Digital Gaming industry is considered to be one of the representatives of the creative economy (Florida 2002). While the creative industry is a key contributor to the UK economy, the digital gaming sector is considered to be at a global level (UK Trade and Investment 2014; Kampfner 2017).

The definition of game has never achieved a consensus across various disciplines which subsequently suggests that it is unlikely to derive a universal definition on digital gaming (Whitton 2010; Arjoranta 2014). However, it is not the focus of the thesis to discuss the boundary of digital gaming. This thesis adopts Salen and Zimmerman's (2004) definition on games: a "*system in which players engage in artificial conflict, defined by rules, that results in a quantifiable outcome*" (p. 80). Adapted from Whitton's (2010) definition, digital gaming industry then further refer to games that are played using electronic devices such as computers, consoles, mobile phones, digital audio players and so on. For the purpose of this study, games that facilitate gambling are excluded as practices are very different from those with pure entertainment purpose.

Digital Gaming Cluster

Being part of the creative economy, the emergence of the digital gaming industry benefits from the development of multimedia technology (Aoyama and Izushi 2003; Darchen and Tremblay 2015). The cluster's development is often linked with other creative industries such as film, animation, design and software development (Mateos–Garcia et al 2014; Darchen and Tremblay 2015). Moreover, as a project-based industry, the video game industry is facing potential challenges such as the over-reliance on localized networks (Perretti and Negro 2007; Vaan et al 2012). Nevertheless, the industry has continued to grow since the 1970s and several factors have been identified in supporting the development of video games clusters (Vaan et al 2012; Pilon and Tremblay 2013; Darchen and Tremblay 2015).

Firstly, location-specific assets have made considerable contributions at least to the initial emergence of the cluster (Pilon and Tremblay 2013; Cabras et al 2017). Location advantages may include improved international exposure, historical concentration on related industries (e.g. film and animation etc.), competitive creative labour force, lower cost for living and production (Pilon and Tremblay 2013; Darchen and Tremblay 2015). However, Cabras et al (2017) argue that as globalisation increases, these location advantages are increasingly limited especially in relation to the operation of the businesses and their survival rates. As Darchen and Tremblay (2015) note, knowledge

exchange and sharing is also occurring more frequently through social media and targeted events organised by the community. Secondly, public policy is identified to be a key factor in the clustering of video games businesses which can incentivize businesses to locate and stay in the region by establishing supporting programmes and initiatives (Pilon and Tremblay 2013; Darchen and Tremblay 2015). For instance, the Multimedia City programme in Montreal has assisted in creating a globally recognised ‘brand’ which attracts more talent and businesses and subsequently grows the cluster (Pilon and Tremblay 2013). Darchen and Tremblay (2015) also point out that policy needs to work together with other influential factors. Other influential factors include access to finance, market and talents. (Hasegawa et al 2012; Pilon and Tremblay 2013).

3.2.3 UK Digital Gaming Industry

In 2014, there were an estimated 34 million active video game users in the UK (UK Trade and Investment 2014). The Nesta report reveals the existence of 1,902 video games companies and the entrepreneurial boost since the 21st century in the UK (Mateos–Garcia et al 2014). UKIE (2016a) also points out that 95% of these companies are micro or small businesses. In comparison, TIGA (2016) reveals that only 2% of the studios have more than 150 staff members. Although the estimated percentages vary depending on the estimation methods used, it is still apparent that SMEs account for the vast majority of UK digital gaming businesses. As shown in Table 4, 12 highly concentrated (in terms of employment or company number) video game clusters are identified and three key drivers for their formation are proposed (Mateos–Garcia et al 2014: 5):

1. Existence of other creative sectors within same location such as ‘*design, advertising, software and film, video and TV*’;
2. Excellent broadband connection;
3. Presence of educational institutions offering degrees in video game technology.

Mateos–Garcia et al (2014) further classified 12 highly concentrated clusters with six potential ones into four categories (see Table 4). Although London and the South of England are leading regions of video games companies, the Midlands area is following

second with a stronger presence in the gaming sector (7.7%) than the overall creative industries (5.7%) (Mateos–Garcia et al 2014).

Table 4. Clustering of UK Video Games (Mateos–Garcia et al 2014)

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While the total sales number is growing rapidly, the decrease of physical sales and the increase of digital sales should be recognised (UKIE 2016a). For instance, physical sales dropped from £927 million to £776 million in 2016 while digital sales rose from £1.9 billion to £2.18 billion (Entertainment Retailers Association 2017). This phenomenon reflects changes that technology advancement imposes (Stuart 2016). For instance, the launch of iPhone and iOS stimulates the mobile gaming sector and attracts both more mobile game developers and users (Stuart 2016; UKIE 2016a).

The UK has a number of competitive advantages in the digital gaming industry. First of all, the UK is considered to be a preferable location for doing business due to aspects like business-friendly environment, supportive policy and regulation and skilled workers (UK Trade and Investment 2014). In particular, the game industry is eligible for R&D tax credit and the Video Games Tax Relief (VGTR) is available since April 2014 (UK Trade

and Investment 2014; UKIE 2016a). Secondly, the UK is known for its rich experiences in technology advancement and creative outputs, which are supported by its world class universities (UK Trade and Investment 2014). Furthermore, the UK also benefits from easy access to Europe and having London as a leading international digital entertainment and technology hub (UK Trade and Investment 2014). However, whether this competitive advantage will be enhanced or deteriorated in the long term remains questionable particularly during the current Brexit¹⁵ issue. The two major games industry trade associations, UKIE (2016b) and TIGA (2016), have made recommendations to the government in addressing the uncertainty of Brexit including the video games industry in the Industrial Strategy; ensuring access to markets; encouraging innovation, exports and free flow of data; and improving a favourable tax regime.

The digital games industry broadly consists of two groups of actors: publishers (large, medium or small-sized) and development studios (large, medium, small or independent) (Heineman 2015). While it is widely acknowledged that digital game development can be costly and risky, the overall sector-wide profit has witnessed a steady growth for the past ten years (Heineman 2015; Egenfeldt-Nielsen 2016). In particular, benefiting from rapid development of the 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 game companies may be small in size-typically containing only one or a few developers-often tight in budget, they nevertheless still have the opportunity to obtain funding by publishers or investors as well as achieving great success (Santiago 2015). While being an increasingly important trend, there are few academic studies focusing on indie game companies (Santiago 2015).

As the gaming industry is gaining more popularity, there is an increasing volume of academic studies in a broader context (Heineman 2015). Literature can be found in various disciplines such as Psychology, Education, Computer Science, Software Development, and Social Sciences (Feijoo et al 2012; Anguera et al 2013; Greitemeyer

¹⁵ Brexit refers to the withdrawal of UK from the EU following the referendum took place on 23 June 2016.

and Mügge 2014; Roger 2014; Heineman 2015). However, this study is not focusing on those areas and only looks at the subject from a business perspective.

3.2.4. Discussion

The project-based nature of the industry (as mentioned briefly in section 3.2.2) indicates potential uncertainty caused by initiation and completion of projects. The possible expansion and contraction processes that companies need to go through intuitively suggest that the linear growth models does not apply whereas the dynamic states approach can fit. Moreover, the clustering phenomena have already shown some characteristics of entrepreneurial ecosystems. While globalisation has been frequently brought up in the literature, the framework developed in section 2.4.4 should intuitively capture the entrepreneurial activities. The results analysis sections (Chapter 5 and 6) discuss these thoughts with empirical data.

3.3 Growth Variables of Technology Related Businesses

Due to the paucity of literature in digital games per se, I had taken the decision to broaden the review coverage and presents literature findings on technology related businesses. Table 5 summaries a selection of extant literature concerning growth determinants of firms in technology industries in complement with findings discussed in section 2.3. In the following part of this section, discussions focus primarily on contents that are specific to the technology industry, which were not previously mentioned in the general section 2.3.

Table 5. Growth Determinants of Technology Related Businesses

Author	Findings		Notes
Zhao & Aram (1995)	Entrepreneurial networking has positive impact on firm growth.		China firms; Case studies: sales and revenue
Almus & Neringer (1999)	Firm level	-Small and young firms grow faster; -Firms with limited liability grow faster; -Start-ups with tight business links achieve notable higher growth rate	German firms; Quantitative analysis: employment as growth indicator;
	Founder level	-Team founded firms achieve higher growth only confirmed in “Other Manufacturing” ¹⁶ ; -Technical knowledge and skills show positive impact on NTBFs ¹⁷ whereas complementary technical and business knowledge does not;	
	External factors	-Population and cost factor (wage and salary) does not show significant impact on the growth of NTBFs	
Löfsten and Lindelöf (2002)	NTBFs located in Science Parks have significantly higher employment growth rate than NTBFs in general. NTBFs on Science Parks benefit from specific supporting initiatives and policies, tend to have links with universities.		Swedish firms; Quantitative analysis: sales, employment and profitability as growth indicator
Del Monte & Papagni (2003)	R&D commitment measured as research intensity has positive relationship with rate of firm growth.		Italian firms; Quantitative analysis: sales & employment as growth indicator
Ferguson & Olofsson (2004)	Science Parks based NTBFs have higher survival rate though no significant relationship found with higher growth rate.		Swedish firms; Quantitative analysis: sales & employment as growth indicator
Hoogstra & Dijk (2004)	Location matters in firm growth but effect differs by type of economic activity.		Dutch firms; Quantitative analysis: employment as growth indicator

¹⁶ It refers to firms with lower than 3.5% R&D intensity in Almus and Neringer’s (1999) paper

¹⁷ NTBFs short for New Technology-based Firms

Hogan & Hutson (2005)	Financing may be a growth constraint. Majority of start-ups is inside financed. Equity is the primary source of external financing than debt.	Irish firms; Quantitative analysis
Coad & Rao (2008)	Innovation demonstrates positive impact in fast-growing firms, but comes with great uncertainty at the same time.	US firms; Quantitative analysis: sales (& market value) as growth indicator
Maine et al (2010)	Distance to a cluster has negative relationship with NTBFs growth and clustering has positive influence on biotech firms. ICT firms benefits from proximity to a cluster and have higher growth rate.	US firms; Quantitative analysis: revenue as growth indicator
Clarysse et al (2011)	Environment (i.e. stability and complexity) influence resources bundles (i.e. finance, human, social and technology) which then impact on growth patterns (i.e. sales, employment).	Belgian firms; Case studies: sales & employment as growth indicator
Ganotakis (2012)	Human capital characteristics have notable impact on firm performance generally: U-shape relation with general experience; positive relation with high formal business education together with commercial and managerial experience; positive relation with experience in same sector	UK firms; Quantitative analysis: employment as growth indicator
García-Manjón & Romero-Merino (2012)	Positive relation between sales growth and R&D intensity.	European firms; Quantitative analysis: sales as growth indicator
Albuquerque et al (2014)	Partnerships contribute to the sustainable growth of businesses.	Brazilian firms;

3.3.1 Individual Level

Characteristics of human capital have notable impacts on firm performance, but findings of growth determinants on the general and specific characteristics are diverse (Almus and Neringer 1999; Avermaete et al 2004; Koellinger 2008; Ucbasaran et al 2008; Ganotakis 2012). Whereas some scholars (e.g. Almus and Neringer 1999; Avermaete et al 2004) believe that higher levels of education and experiences contribute positively to firm performance, others (e.g. Ucbasaran et al 2008; Ganotakis 2012) point out the potential negative relationship between the two. In particular, as Ganotakis (2012) argues, while certain degrees of education and experiences are beneficial to firm growth, too much education or experiences may hinder firm performance. Instead, Ganotakis (2012) believes personality is the main influencer. Moreover, entrepreneurs' heavy technical background can lead to decisions that overly attempt to have maximal control of the business and focus on the technological side and comparatively neglect aspects such as, marketing and general management (Oakey 2003; West and Noel 2009; Ganotakis 2012). However, notable positive relationships are found between firm performance and technical-commercial and technical-managerial experience (Ganotakis 2012). Furthermore, experiences in some sectors demonstrate greater positive influence on firm performance in comparison with experiences within other sectors (Ganotakis 2012). In addition, Ganotakis (2012) suggests that both practitioners and policy makers can benefit from the findings and investigate the optimal way of investment whether in aspects of providing training or educational opportunities or supporting businesses financially.

3.3.2 Firm Level

Almus and Neringer (1999) analysed German data to study growth determinants of New Technology-based Firms (NTBFs). Though not explicitly presented in Table 5, innovativeness is considered to be a positive impact factor towards business growth (Almus and Neringer 1999). The proposed explanation for faster growth of firms with limited liability is that founders of such firms are more willing to take risks (Harhoff et al 1998; Almus and Neringer 1999). Del Monte and Papagni (2003) and Coad and Rao

(2008) present a more focused study on the relationship between R&D commitment and innovativeness with firm growth. Both studies demonstrate positive relationships of R&D commitment and innovation with fast-growing firms. However, it should also be noted that innovation activity is not only highly uncertain but also not necessary to lead to higher growth or large profit by itself (Del Monte and Papagni 2003; Coad and Rao 2008; García-Manjón and Romero-Merino 2012). Successful innovation needs to be supported by a whole chain of appropriate commercialisation strategy (Coad and Rao 2008). Therefore, Coad and Rao (2008) suggest that innovation policy should be formed by consulting a broad range of researchers and avoid only targeting a limited number of businesses.

Location wise, science parks and clustering are two of the commonly brought up topics (e.g. Löfsten and Lindelöf 2002; Ferguson and Olofsson 2004; Maine et al 2010). Though science parks are established in order to support a region's economic development, the discussion on the usefulness for supporting business growth has resulted in different opinions (Löfsten and Lindelöf 2002; Ferguson and Olofsson 2004). For instance, Löfsten and Lindelöf (2002) claimed science parks based NTBFs achieve higher growth rate whereas Ferguson and Olofsson (2004) did not find significant relationships between the two. However, Ferguson and Olofsson (2004) find NTBFs located in science parks have higher survival rate and suggest that science parks may be favourable in certain development stages. Findings on clustering are also mixed (Globerman et al 2005; Rosenthal and Strange 2005; Maine et al 2010). Maine et al (2010) finds no significant relationship between being located in a cluster and growth of NTBFs. However, it is revealed that distance to a cluster has a negative relationship with NTBFs growth; clustering has a positive influence on biotech firms; ICT firms benefits from proximity to a cluster and have a higher growth rate. While Zhao and Aram (1995) suggest that the importance of networking is associated with culture background, its positive impact is also supported by Almus and Neringer (1999). Though not directly discussed as a business growth factor, Soetanto and Jack (2013) investigate networks of businesses located in incubators and believe that networks are developed more for accessing intangible resources than tangible resources. Scholars (Löfsten and Lindelöf 2002; Ferguson and Olofsson 2004; Hogan and Hutson 2005; Maine et al 2010) believe that the above findings can contribute to policy formulation in regard to support NTBFs growth effectively.

3.3.3 Industry or Environmental Level

Although Hogan and Hutson (2005) did not explore the relationship between firm growth rate and capital structure, they recognised that financing may be a growth constraint and revealed that software companies facing greater challenge in obtaining debt from banks who need fixed assets as form of deposit. In addition, owner-managers' development ambition also affects their funding decision where independency is not perceived as important for NTBFs as it would be for SMEs in general which explains NTBFs' choice of equity financing (Hogan and Hutson 2005).

Clarysse et al (2011) investigate growth of NTBFs in relation to the business environment and resources accumulation: environment (i.e. stability and complexity) influence resources bundles (i.e. finance, human, social and technology) which then impact on growth patterns (i.e. sales, employment, acquisition). As environmental stability and complexity vary, businesses can alter their resource bundle strategies to achieve firm growth (Clarysse et al 2011). For instance, when environment is stable, NTBFs tend to aggregate resources steadily. Firms focus on product is likely to achieve revenue growth whereas firms focusing on technology or exit is likely to achieve employment growth (Clarysse et al 2011). In contrast, when environmental stability is low, less time is available for resource accumulation which demands for quick market establishment and legitimacy through acquisition (Clarysse et al 2011). Businesses need to compete either through acquisition or by having strong founding team, high financial capacity, strong products and cumulated networks at start-up stage (Clarysse et al 2011).

3.3.4 Discussion

While the above findings present important initial insights for the topic, three observations are derived from previous discussions. Firstly, the suitability of the use of employment number or sales as growth indicators may require further consideration. As illustrated in section 2.2.3, sector or industry specific measures may be implemented by also taking opinions from entrepreneurs. Secondly, some of the conclusions and findings are not consistent among scholars such as the claim of whether locating in

science parks contributes to NTBFs' growth rate (Löfsten and Lindelöf 2002; Ferguson and Olofsson 2004). This opens the space for further investigation. Lastly, the results are drawn on data collected from specific countries and covers certain industries such as technology-intensive manufacturing industries in Almus and Neringer's (1999) study and software sector in Del Monte and Papagni's (2003) study. Therefore, it is questionable whether the conclusions still hold true if testing on different countries and sectors.

3.4 Policy Infrastructure with Focus on Technology Sector

Much of the literature reviewed and presented in section 3.3 has suggested potential policy implications of their findings. The importance of entrepreneurship oriented policy towards firm development and economic growth has been supported by various scholars such as Acs and Sanders (2013); Mirzanti et al (2015); Figueroa-Armijos and Johnson (2016). Moreover, as discussed in section 3.2.2 and 3.2.3, public policy is identified as one of the key contributors in supporting the development of the digital gaming industry whether it is designed to support businesses in general or the industry in particular. In order to gain a thorough understanding of the topic and its implications, the following section examines policy infrastructure in the technology sector first before narrowing down to UK technology and then digital games sector.

3.4.1 Emergence and Importance of Entrepreneurship Policy

Involving governments' activities at all levels and influencing all economic sectors from low-technology to high-technology industries, the domain of entrepreneurship policy is complex (Hart 2003; Gilbert et al 2004). Gilbert et al (2004) illustrates their theory on the emergence of entrepreneurship policy as shown in Figure 8. Before the second industrial revolution, the primary requirement to enter and expand into a market is capital; the dominant market structure is oligopoly; the performance of the market mainly reflects in the form of price; and policy turn to take forms of applying restrictions to the market and businesses (Gilbert et al 2004). However, globalization and the development of technology has shifted dominant market requirements to knowledge which subsequently leads to the inefficiency of monetary and fiscal policy development for the post-war economy (Gilbert et al 2004). As the number of

entrepreneurs as well as the value they create grow rapidly, tailored supportive policies are required hence the emergence of the enabling-oriented policies (Gilbert et al 2004; Mirzanti et al 2015).

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Figure 8. Rationale of Entrepreneurship Policy Development (Gilbert et al 2004)

Since 1990s, public policy has gradually been recognised as one of the critical factors in entrepreneurship development and businesses formation and growth (Mirzanti et al 2015; Figueroa-Armijos and Johnson 2016). However, Acs and Sanders (2013) and Figueroa-Armijos and Johnson (2016) argue that entrepreneurship has not yet gained its full attention from main stream economic theories. Nevertheless, it is evidenced that a long-lasting culture which gears towards entrepreneurship makes its region more tolerable towards changing political and economic environment (Fritsch and Wyrwich 2014). It is also been revealed that local governments and relevant authorities of those regions are often very active in formulating policies to encourage innovation and entrepreneurship activities (Betz et al 2012). Acknowledging the importance of entrepreneurship in socio-economic development, governments at all levels have put much attention on developing entrepreneurship policy to support such activities (Mason

and Brown 2014; Kritikos 2014; Auerswald 2015). Mirzanti et al (2015) developed a conceptual framework for entrepreneurship policy where it was divided into three layers: micro, meso and macro (see Appendix 1). At micro level, entrepreneurship policy is set to address individual's needs. For instance, entrepreneurship oriented education and training programmes aim to equip people with required skills to start businesses. There are also favourable policies which help reduce the entry barrier and provide funding to increase the opportunity for start-ups to take advantage of rising opportunities. The availability of incubation space and mentorship and the publicity of role models helps to motivate the people to become entrepreneurs. The meso level policy is targeting businesses to assist them to grow or exit by reducing administrative burdens and provide specific incentives. At macro level, the entrepreneurship policy aims on facilitating economic growth where culture, infrastructure and education being the main areas of focus.

3.4.2 Common Forms of Entrepreneurship Policy with UK Focus

As Gilbert et al (2004) and Acs and Szerb (2007) argue, entrepreneurship policy differs from other business related policy mainly by encouraging increased innovation outputs and knowledge commercialisation rather than imposing restrictions. It is also believed that entrepreneurship policy should employ a co-operative approach rather than being isolated (Audretsch 2007; Autio et al 2007; Acs et al 2014). It is also revealed that such policies tend to focus on new businesses or SMEs (Gilbert et al 2004). Entrepreneurship policies are commonly realized in forms like 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 2006). 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).

UK Entrepreneurship Policy Overview

In particular, the UK government identifies access to finance, relevant skills and experience as the main barriers hindering individuals from becoming entrepreneurs, whereas growth of SMEs can be inhibited by the lack of funding, the difficulty to recruit the right people and the ineffectiveness when dealing with daily cashflow (Department for Business, Innovation and Skills and HM Treasury 2015). Accordingly, various actions have been taken such as coordinating with private sectors and setting up programmes to provide support and financing solutions to SMEs; encouraging entrepreneurship endeavours among young people and introducing tax relief (Department for Business, Innovation and Skills and HM Treasury 2015). For instance, the Midlands Engine is addressing the financial constraint that hinders SMEs growth by providing appropriate access to finance (Department for Business, Innovation and Skills and Department for Communities and Local Government 2015). A £250 million investment fund for SMEs was also announced in supporting SMEs growth and a further £5 million investment plan in assisting the region to promote in foreign markets and expand exports (Department for Business, Innovation & Skills et al 2015; British Business Bank 2017). Furthermore, an innovation voucher scheme combined with technology is also being considered to effectively facilitate SMEs growth by building more and improved networks among science parks and innovation centres (Department for Business, Innovation & Skills and Department for Communities and Local Government 2015).

One of the most significant initiatives in supporting this local growth agenda during this period is the establishment of LEPs which are partnerships between local authorities and businesses to decide priorities for investment in the area and drive economic growth and job creation (Department for Business, Innovation & Skills 2010). A total of 39 LEPs were established across England in 2011 to support regional economic growth and facilitate the ‘bottom up’ approach (Hildreth and Bailey 2014). Under this initiative, various programmes have been set up in assisting local growth. Take Coventry and Warwickshire LEP (CWLEP) as an example. Five priorities are set up in guiding projects, initiatives and funding expenditure: unravel growth opportunities; advance development and expansion of manufacturing and engineering sector; develop SMEs; cultivate talent and develop tourism and culture sector (CWLEP

2017a). Corresponding to the five priorities, 31 projects have been initiated by CWLEP with more to come (CWLEP 2017b). In particular, established in September 2014 and designed to be a one-stop shop for business support, the Coventry and Warwickshire Growth Hub have engaged with more than 2,000 businesses in the first year (CWLEP 2017c). It is also reported that the hub helped local businesses to gain access to £1.6 million grants which subsequently led to £10 million private investment and generated over 700 jobs with further 2,500 positions in transit in the first five months (CWLEP 2017d).

Entrepreneurship policy differs from region to region, country to country and sector to sector (Lundstrom and Stevenson 2001; Mirzanti et al 2015). In preparation for the case studies within the UK digital gaming companies, it is necessary to examine the UK entrepreneurship policy for the technology sector.

3.4.3 UK Technology Entrepreneurship Policy

Technology is regarded as the key driver for growth in modern society where high-tech sector has also been idealised as the elixir for economic advancement (Brown and Mason, 2014). This belief has influenced governments at both regional and national levels to formulate policies in encouraging the creation and growth of technology based firms (TBFs) (Asheim et al 2011; Coad and Reid 2012). However, minimal research has been done in assessing the dynamics of entrepreneurial activities and characteristics of high-tech businesses (Brown and Mason 2014). Nevertheless, those policies are developed on the basis of four interiorized and interrelated assumptions (Brown and Mason 2014). First of all, high-tech industry is the key driver towards economic development in contemporary economy (Frenkel 2012). Secondly, regional successes such as Silicon Valley were widely accepted as evidence of the impact that a technology cluster can impose (Hospers et al 2008; Delgado et al 2010). Thirdly, entrepreneurial opportunities are often derived from technology advancement and further exploited by disruptive start-ups rather than existing businesses (Shane and Stuart 2002; Eckhardt and Shane 2011). Lastly, TBFs have been a key focus within industrial and entrepreneurship policy frameworks despite the fact that they only make a moderate contribution towards HGFs (Bleda et al 2013; Brown et al 2014, Coad et al 2014).

These assumptions have led to a generalised policy approach across OECD countries such as the formation of technology/science parks or incubators, support towards university research and spin-offs, public-private coordinated funding programmes, cluster policies and tax credits (OECD 2010; House of Commons 2013; Department for Business, Innovation & Skills and HM Treasury 2015). Brown and Mason (2014) have questioned the above assumptions and raised concerns regarding how these firms can be most effectively supported, using Scotland as a case study. The findings are contrary to previous assumptions, the research reveals that the most successful TBFs interviewed are corporate spin-offs and do not have in-house R&D activities nor protected IP; only a small minority TBFs have been backed up by venture capital (Brown and Mason 2014). In addressing these issues, Brown and Mason (2014) presented four policy related recommendations. Firstly, it is essential to ensure an inclusive policy approach towards traditional R&D support and help to strengthen the SMEs' links with various parties such as suppliers, customers or end-users (Van de Vrande et al 2009; Huizingh 2011). In addition, governments should come to realize their potential as a customer with significant procurement demand and impose policies that assist small businesses compete with large ones equally and fairly rather than disadvantaging them (Miles and Rigby 2013). Furthermore, Brown and Mason (2014) argue that current policies are targeting a narrow range of technology sectors whose worthiness has not yet been evidenced. Smart specialization approach has come to prominence in developing tailored regional supporting policies across EU countries (European Commission 2013). Lastly, there is a requirement to develop an inclusive policy framework that not only supports start-ups and SMEs but also existing companies to help them grow (Brown and Mason 2014).

Digital Gaming Related Initiatives

The game industry is entitled to R&D tax credit and the Video Games Tax Relief (VGTR) has been available since April 2014 (UK Trade and Investment 2014; UKIE 2016a). In the first six months of 2015, with a £348.9 million budget, 89 games were awarded either a transitional or final certification (UKIE 2016c). In further growing the UK gaming industry, policy support has been urged to help build an environment that encourages the flourish of gaming businesses (UKIE 2016c).

There are also regional policies that support local gaming businesses development. For instance, as home to the UK's third largest cluster of gaming companies which was also referred to as 'Silicon Spa', CWLEP has established and planned various development strategies in digital media and technology sector such as the establishment of the Serious Games Institute & SG International Ltd at Coventry University alongside other innovation and technology support programmes (CWLEP 2016a). As of current, CWLEP is investing in developing the gaming cluster at Leamington Spa to realise its commercial and cultural potential in the local economy (CWLEP 2016a; CWLEP 2017e). For instance, CWLEP is currently working together with UKIE to develop a growth strategy for this gaming cluster (Densham 2017).

3.4.4 Critics of Current Entrepreneurship Policies

Despite the fact that policy initiatives and programmes that supports SMEs have cost the government approximately £12 billion annually (Richard et al 2007), the reviews have been mixed (Bennett 2008; Van Cauwenberge et al 2013; Arshed et al 2014). The general ineffectiveness of current entrepreneurship policy has also been discussed by Arshed et al (2014) where the formation mechanism has been criticised. They argue that the process of entrepreneurship policies formulation is manipulated by influential players for their own interest rather than for the benefits of the whole population.

It is believed that entrepreneurship policies are designed 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 are commonly used to support technology invention or more risk inherent research projects (Wu 2005; Figueroa-Armijos and Johnson 2016). It is designed to provide support to the formation, growth and survival of the businesses against market competition and failure. However, scholars and policy makers have presented conflicting results and evidences such as increased competition and inequality among businesses and reduction of government income (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 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 contributors towards South Korea's advancement in entrepreneurship, particularly in the technology sector (Gilbert et al 2004). Therefore, there is a need to conduct further research to reveal businesses' real needs and help to determine whether they are benefiting from certain programmes and what they really need.

3.5. Entrepreneurial Ecosystem in Context: Digital Gaming Industry

Entrepreneurial ecosystems traditionally have a strong regional focus (Isenberg 2010; Frenkel and Matal 2014; Mason and Brown 2014). In the age of information, the concept of digital economy has also gained worldwide recognition particularly due to the unlimited opportunities it brings to businesses (Anderson and Wladawsky-Berger 2016). As the world becomes increasingly connected and long distance communication made easier, it is useful to see how an entrepreneurial ecosystem is applied in the digital era. Considering the importance of context (Autio et al 2014), it is necessary to choose an industry or sector as a context for further discussion. Being recognised as a source for innovation and social-economic development, creative industry has drawn increasing attraction from researchers and government leaders (British Council 2011, 2016). The Digital Gaming industry is considered to be one of the representatives of the creative economy (Florida 2002). In addition, digital games, especially video games, are multimedia products which comprise not only knowledge creation and transfer but also business applications (Vogel 2000; Pilon and Tremblay 2013). With a natural global reach and being high in technology, the digital gaming industry is examined as an example to apply the entrepreneurial ecosystem concept and resilience theory.

3.5.1 Diversity

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 perspective of portraying teenage antisocial boys 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 requirements on skills and technology (UKIE 2015). For instance, other than shooting, fighting games, there are games designed for education and training purposes. Games can be played in various forms as well such as mobile, console, personal computer (PC), virtual reality (VR) and augmented reality (AR). The diversification is not only on games produced but also on the gamer profile. According to Newzoo (2017) report, 48% of the gamers are female and 52% are male among UK mobile market among active players. The average age of console gamers is 37 years old in the US (Marchand and Hennig-Thurau 2013). The business models in the gaming industry are also diversified such as the pay-to-play, free-to-play or hybrid models (Davidovici-Nora 2014; Rayna and Striukova 2014). As the industry evolves over time, the expectations on the games produced become higher and higher which have led to greater skills requirement and division of work (Ruggill et al 2016). Particularly in big AAA¹⁸ type of development projects, common roles and skillsets include programming, art, design, 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.

3.5.2. Global-Local Crossings

As discussed in section 3.2.2, the emergence of digital gaming industry is often regarded to be associated with the development of other multimedia creative or technology driven industry such as film and software development (Mateos–Garcia et al 2014; Darchen and Tremblay 2015). Clustering is a common scene observed in digital gaming industry to benefit from locational resources (Pilon and Tremblay 2013;

¹⁸ AAA games refers to high games with high production and marketing budget usually at least in millions of dollars (sometimes billion dollar) budget. In many ways, it is analogous to “blockbuster” in the film industry.

Ruggill et al, 2016). This location concentration can take advantage of the existing resources such as skilled workers, spill-over, already formed formal or informal networks to facilitate better information and knowledge sharing (Ruggill et al, 2016). However, as the world becomes increasingly connected, virtual collaboration and knowledge exchange occurs which goes beyond regions, countries and continents (Cabras et al 2017). For instance, publishers or investors can work with the studios for game development and publishing from all over the world. Developers can also work on the same game from different countries. The born-global nature of gaming businesses also reflect on the distribution channels. Platforms such as Steam, Apple App Store and Google Play Store makes the distribution of games revolutionary easier: with a click of button, the game can reach audience all over the globe. This born-global nature strengthens the global-local crossings in development. Under this global-local structure, the line between local and global resources and supports are increasingly blurry. In this thesis, a conceptual framework on digital gaming industry ecosystem has been proposed reflecting on the global-local structure.

3.5.3. Conceptual Framework

This section conceptualises digital games industry concentrated entrepreneurial ecosystems with an evolutionary view and underpinned by the digitalisation empowered framework developed in section 2.4.4. I developed a conceptual framework shown in Figure 10, to illustrate the characteristics of nascent and matured ecosystems.

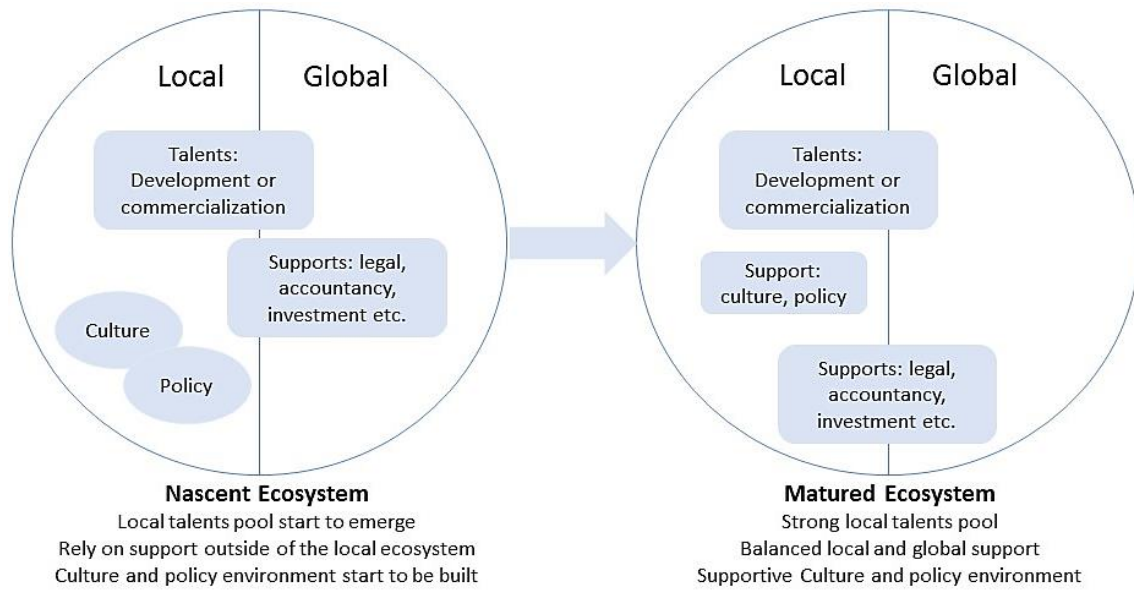


Figure 9. Conceptual Framework of Digital Gaming Ecosystem

Nascent Ecosystem

A local digital gaming companies' concentration is often started from an existing technology driven industry cluster such as film or software development (Mateos–Garcia et al 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 exist industry cluster is often rich in specialized qualified skilled workers that can be easily recycled into games development companies (Ruggill et al 2016). This talent recycle process can take place for different reasons. The decision can be made with proactive and more risk-taking attitude that entrepreneurs or other members of the companies decide to invest their time, money or skills into a new venture (Mason and Brown 2014). Or the decision can be more passively and triggered by other events such as company contraction and in need of finding either new employment or starting one's own venture (Mason and Brown 2014). Nevertheless, a local talent pool suited for the industry started to emerge in the nascent stage of the ecosystem which then became a magnet for the region to further grow the ecosystem.

As the ecosystem first started to emerge, the support mechanism is often incomplete. Supportive culture, community and policy need to be constructed to nurture entrepreneurial activities (Isenberg 2010; Mason and Brown 2014). For instance, at the

birth stage, the 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 2016). In case of digital gaming industry, studios often require support services such as legal and accountancy when it comes to commercialisation and increasing revenue. Sometimes, specialized knowledge and support are required which may not be locally situated. Funding opportunity may also be limited at the start locally where there are either no venture capitalists around or 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 wider audience beyond the local region. It is a common phenomenon for a game studio being funded by overseas investors or publishers. For instance, Coatsink Game Studio in 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.

Matured Ecosystem

In a matured and self-sustained 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 has been built, a range of entrepreneurial policies have been development and implemented, 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 experiencing hardship in accessing funding overall (Mack and Mayer 2015). Digital gaming businesses may still seek certain support outside the region. While professional services such as investment, legal, accountancy, PR or marketing may be obtained locally, businesses still have the option to work with providers outside the region where necessary. However, as the ecosystem gains reputation, talent is continuously attracted into the region and support providers such as, investors start to take a positive approach in exploring investment decisions, though this may still be a very competitive process.

3.6 Thesis Outline

Following from Chapter 2, which outlined the overall literature landscape on business growth in general, Chapter 3 focused on growth discussions specifically for UK SMEs within the digital gaming sector. The rationale of studying UK SMEs and digital gaming businesses are illustrated by discussing their significance particularly in the current UK economy and the relevance to the two concepts: dynamic states approach and entrepreneurial ecosystems. Although it would be ideal to review literature specifically to digital gaming sector, there is a limited amount of academic articles available. Therefore, in order to develop a more thorough and in-depth understanding on the topic, technology-based industry are chosen as a substitute to broaden the review coverage. After presenting a summary table of literature findings, the main growth factors such as human capital, networks, financing, legal forms, innovation, science parks, clusters and external environment are discussed. Moreover, while policy plays an important role under entrepreneurial ecosystem model (Isenberg 2010; Mason and Brown 2014), it is also identified as one of the key contributors in supporting the development of digital gaming industry as discussed in section 3.2.2 and 3.2.3. Figure 10 conceptualises the main theories discussed in the two literature review chapters and how it is linked with the UK digital gaming industry. The following two sections illustrate the framework in more detail and reiterate the research aim and objectives.

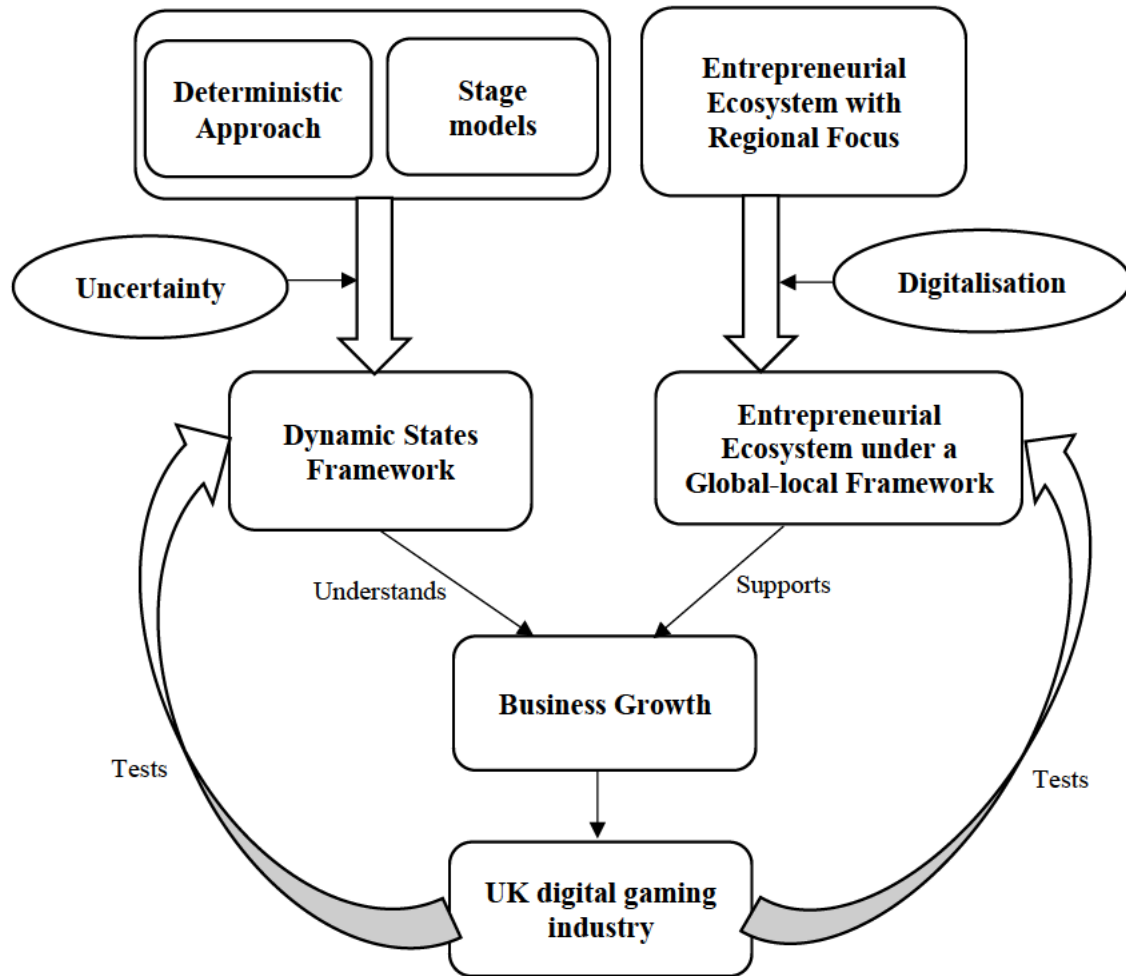


Figure 10. Research Outline

3.6.1. Business Growth and the Dynamic States Framework

As discussed in section 2.2 of Chapter 2, the deterministic approach and growth stage models are two commonly adopted methods in business growth studies (Wiklund et al 2009; Gupta et al 2013; Machado 2016). The school of deterministic approach has resulted in a number of growth variables identified by scholars which can be categorised at individual, firm and industry/environmental levels (Wiklund et al 2009; Machado 2016). However, as dozens of influencing factors have been identified, there is yet no consensus achieved on any variables that have demonstrated consistent influence on business growth (Weinzimmer et al 1998, Shepherd and Wiklund 2009, McKelvie and Wiklund 2010). However, as proposed in section 2.2.1, it is likely that the combination of those variables can form the necessary resources for carrying out certain activities (growth included) over time. They form a pool of necessary conditions. Depending on

situations, a combination of sufficient conditions are drawn. Therefore, it is also useful and important to understand how to get all the requisite variables and conditions in place when facing uncertainties. From this perspective, it is still useful to discuss and investigate individual elements before piecing together a complete picture. Following this thought, Sections 2.3 discusses these possible elements from extant literature in general where section 3.3 focuses the discussion on the technology sector. In summary, owner-managers' educational background, motivation, previous experiences, attitude towards risks and failure, and age can impact on businesses performance. A company's location, investment and internal culture toward innovation, legal forms and involvement in networks can also influence on business performance. The general industry environment and market are also important factors.

In comparison, the school of business stage models divide organisational growth into several stages which range from two to eleven stages depending on the classification standards set by different authors (Lester et al 2003; Levie and Lichtenstein 2010; Farouk and Saleh 2011; Jabłoński and Jabłoński 2016). Literature on stage models often discuss challenges that organisations may experience at each stage and offer solutions or suggestions on how to deal with these challenges (Davidsson et al 2005; Jacobs et al 2017). In doing so, this school of thought has attracted many managers, entrepreneurs and other practitioners as it theoretically can help with developing awareness, predicting future events, avoiding potential pitfalls and making decisions which are particularly valuable at key transition points (Massey et al 2006; Jones 2009; Jacobs et al 2017). However, stage models have also received criticisms over time from both theoretical and empirical perspectives (e.g. Tushman, Newman and Romanelli 1986; Eggers et al 1994; Garnsey et al 2006; Phelps et al 2007; Levie and Lichtenstein 2010; Farouk and Saleh 2011; Abdelshafy et al 2015). First of all, scholars such as Levie and Hay (1998) cited by Gupta et al 2013, Phelps et al (2007), Levie and Lichtenstein (2010), Jacobs et al (2017) argue that the fundamental assumptions of stage models, in which organisations grow like organisms with a set number of stages and pre-programmed, linear processes are flawed. Some empirical studies (e.g. Tushman, Newman and Romanelli 1986; Eggers et al 1994; Garnsey et al 2006) have also confirmed that the unpredictable development paths companies went through were caused by uncertainty. Moreover, with stage models differing in the attributes of a stage, varying in the number of stages proposed, and disagreeing in how and why

organisations progress between stages, there is no model that can be universally accepted and applied (Levie and Lichtenstein 2010). As Gibb and Davies (1990) and Farouk and Saleh (2011) assert, the stage models fails to serve as a universal theory as claimed to explain sufficiently the growth of SMEs due to the diverse types of businesses and multidisciplinary property of the growth influencers. Other criticisms of growth models lie on the fact that the main focuses have been on internal factors and significantly less on external factors (Farouk and Saleh 2011) while external factors such as characteristics of specific sector and external environment can play a key role on the outcomes of growth strategies (Jabłoński and Jabłoński 2016).

In addressing the criticisms of stage models, various scholars (e.g. Phelps et al 2007; Levie and Lichtenstein 2010; Jacobs et al 2017) have proposed the states frameworks as an alternative approach (Gupta et al 2013). In that, the states frameworks developed by Phelps et al (2007) and Levie and Lichtenstein (2010) have been discussed in detail for both their influence by citations and relative completeness. Employing an issue-based typology, Phelps et al (2007) developed an integrated framework that provides a series of crucial challenges that all growing businesses can predict to experience during the growth process. They defined six tipping points: people management, strategic orientation, formalisation of systems, new market entry, obtaining finance and operational improvement. Organisations can travel back and forth in different stages in addressing these tipping points by utilising their absorptive capacity to survive and grow. As identified above, the framework is still in its early stages and requires further development and adequate empirical validity. In comparison, Levie and Lichtenstein's (2010) dynamic states framework works under the assumption that the organisations can be in any state which is achieved through most effective matching internal organising capacity with external demand. The transition between states is triggered by "opportunity tension", which is driven by market opportunity and desire for value creation, and achieved through the development of a viable business model. A state will remain stable for a period of time until the new opportunity tension arises and the transition process repeats.

In contrast to the stage models, the states frameworks proposes a concept that acknowledges the fact that the business environment is uncertain and dynamic. Compared with Phelps et al's (2007) model, Levie and Lichtenstein's (2010) states

framework goes further in recognising the uncertainty and dynamic nature of business growth and eliminates the potential restrictions that the six tipping points may enforce. In the following section of the thesis, Levie and Lichtenstein's (2010) dynamic states framework is used to guide further research. The empirical research will also attempt to address three key questions: what sustains a dynamic state, when and where the states change, and what the most essential contextual variables in the process are.

3.6.2. Entrepreneurial Ecosystems under a Global-Local Framework

As business growth is increasingly associated with entrepreneurship in recent years, the entrepreneurial ecosystem concept has emerged as an effective way to create favourable environments on nurturing growth activities (Zacharakis et al 2003; Isenberg 2010; Malecki 2011; Mason and Brown 2014). Entrepreneurial ecosystem frameworks (e.g. Isenberg 2010; Stam 2015) provide an alternative approach to link different factors together in a holistic and interactive manner. Current literature on entrepreneurial ecosystems have mainly focused on a local and regional level (e.g. Isenberg 2010; Autio et al 2014; Mason and Brown 2014; Motoyama et al 2014; Brown and Mason 2017). However, empowered by digitalisation, social networks can play a key role in facilitating the process of resource allocation and particularly assist entrepreneurs to access resources beyond a local level. As the world becomes increasingly globalised, resources are moving in a global context (Audretsh and Sanders 2008). While digitalisation is a global phenomenon, limited studies have addressed the entrepreneurial ecosystems concept from this perspective. Therefore an entrepreneurial ecosystem framework empowered by digitalisation in a global context has been proposed (see section 2.4.4 Figure 6). A further sector specific literature review revealed that the digital games industry does seem to operate in such a global-local framework.

3.6.3. Rationale of Research Aim and Objectives

While literature reviews in Chapter 2 and Chapter 3 have uncovered the current research landscape, it also highlighted research gaps. The aim of this research is to: investigate the practical applicability of dynamic states framework and the role of entrepreneurial

ecosystems in the digital age for SMEs in the UK digital gaming industry. To support this aim, three objectives have been identified as follows:

- 1) Analyse the digital gaming industry with particular focus on the influencers of survival and growth.
- 2) Investigate the theoretical base of business growth in the UK digital gaming industry.
- 3) Evaluate the entrepreneurial ecosystem supporting business growth in the UK digital gaming industry.

The rationale of the above research questions are presented throughout Chapter 2 and Chapter 3. First, as shown in sections 2.3 and 3.3, findings of growth factors are sector specific and implications may vary depends on industry circumstances. Thus, it is beneficial to study industry or sector specific growth factors. Although much literature focuses on the technology industry in general, the digital gaming sector still has its distinct characteristics compared with other technology sectors such as, biotech and advanced manufacturing and carries features of creative industries. However, there is currently limited research on the growth factors within the digital gaming sector. This study will make a contribution by investigating the digital gaming sector.

Second, while the dynamic states framework can be considered more advanced than the stage model, it is still lacking empirical support. The empirical testing of the dynamic states framework should be done by looking at individual businesses. If applicable, the key concept of transitioning between different states can be reflected in a company's development journey. Therefore, it is also essential to investigate the development history of the businesses and use it as the analysing context to test the applicability of the framework. Through analysing the historical development, further contributions can look to answer Levie and Lichtenstein's (2010) question on what sustains a dynamic state, when and where the states change, and what the most essential contextual variables in the process are.

Third, an effective supportive ecosystem nurtures and supports the development of innovation and growth of entrepreneurial businesses (Jackson 2011; Mason and Brown 2014). In turn, these advancements can feedback to the economy and further facilitate socio-economic development (Szirmai, Naudé and Goedhuys 2011). In order to build

such an ecosystem, it is essential to first understand what it is, how it works and what is required. Thus, data is also discussed and presented from an entrepreneurial ecosystem perspective and explores the role of digitalisation. As a result, a conclusion can be made whether looking at the ecosystem from the global is also necessary.

As discussed in sections 2.3 and 3.3, current literature mainly looks at individual factors rather than employing a more holistic and interactive approach. This research aims to contribute to the subject by providing a more holistic and interactive framework for studying growth and how they can potentially be related to each other. Moreover, as discussed in sections 2.4.4 and 3.5.2, current ecosystem literature is mainly focused at a regional/local level. However, empowered by digitalisation, there is need to look at the concept from a global perspective. Thus, contributions can be claimed when objective 3) is achieved.

In order to address the research questions and investigate growth variables in UK small and medium sized gaming businesses, appropriate research methodology is required. As discussed in sections 2.3 and 3.3, the majority of current literature are quantitative analysis based. An exploratory oriented qualitative method can add complementary insights to the industry. The research design is discussed in the next Chapter.

Chapter 4 Research Methodology

Having reviewed the literature on business growth and entrepreneurial ecosystems and discussed the UK digital gaming industry, this chapter presents the philosophical stance adopted and the practical strategies employed in further exploring the research domain. The research aim and objectives are revisited first before moving on to discuss the research philosophies (i.e. ontology and epistemology). Both quantitative and qualitative methods have been considered and evaluated. Discussions on the choice of methods used for this project are then presented. Next, specific strategies employed in this project and the reasoning behind them are reviewed. Finally, this chapter addresses issues on data analysis and ethical standards.

4.1 Research Questions

The aim of this research is to: critically analyse business growth in small and medium sized UK digital games development companies. To support this aim, three objectives have been identified as follows:

- 1) Analyse the digital gaming industry with particular focus on the influencers of growth.
- 2) Investigate the theoretical base of business growth in the UK digital gaming industry
- 3) Evaluate the entrepreneurial ecosystem supporting business growth in the UK digital gaming industry

This research aim and three objectives act as principals in guiding the choice of research methodologies and empirical and secondary data collection and analysis.

4.2 Research Philosophy

It is of fundamental importance to reflect on my philosophical stance in conducting this research, not only to work around any potential bias but also to ensure a coherent logical inquiry process (Holden and Lynch 2004; Hammond and Wellington 2013). Research philosophy is concerned with the nature and development of knowledge (Gill and

Johnson 2010). Ontology discusses the nature of reality including how it operates and any specific viewpoint that researchers adopt (Hudson and Ozanne 1988; Gill and Johnson 2010). Practitioners of objectivism tend to suggest that the presence of societal entities is disaffiliated from societal players (Gill and Johnson 2010; Schroeder 2015). In contrast, the subjectivists tend to advocate that the occurrence of social phenomena rest on the opinions and behaviours of social actors which implies the necessity to examine the specific situation in order to gain meaningful understanding (Andrews 2012; Saunders et al 2012). The researchers' ontological assumption will influence how information is viewed, collected and presented (Saunders et al 2012; Bryman and Bell 2015). Ontology is also closely linked with epistemology. The latter is conceived as the theory of knowledge and its justification and it is concerned understanding what is considered to be acceptable knowledge and the relationships that the researchers developed with the ontological reality under investigation (Carson et al 2001; Gill and Johnson 2010).

The variations of ontological and epistemological perspectives lead to several different positions that researchers may take and the choice made influence how a research project might be carried out (Hammond and Wellington 2012; Bryman and Bell 2015). In particular, positivism and interpretivism are often presented as two of the main epistemological positions that reflect different intellectual traditions (Bryman and Bell 2015). A positivist philosophical stance is commonly adopted in natural science research where observable facts are studied (Snape and Spencer 2003; Gill and Johnson 2010). From this position, positivist researchers are assumed to be making every effort to ensure a neutral stance and quantitative methodologies are most commonly used to test hypothesis (Saunders et al 2012). The experiments or research processes are normally expected to be able to be repeated with minimum alterations (Rycroft-Malone and Bucknall 2010). The goal of the research is often to do with explaining certain phenomena and the conclusions are ideally generalizable where laws or universal theories tend to be the outcomes (Rycroft-Malone and Bucknall 2010; Mkansi and Acheampong 2012). In comparison, interpretivists emphasise the importance of gaining an understanding of the diversity of human behaviours and criticises the applicability of positivism in social science field (Gray 2013; Bryman and Bell 2015). Rather than taking an absolute objective standpoint, interpretivist researchers tend to argue that social realities are complex where individual actors can view realities differently

(Hudson and Ozanne 1988; Carson et al 2001). Therefore, the goal of the interpretivist researchers is often to understand reality from the perspective of different actors (Gray 2013; Chowdhury 2014). Consequently, the outputs of the research tend to be subjective frameworks that could be applied in different contexts with adjustments of local conditions (Rycroft-Malone and Bucknall 2010).

Taking an interpretivist perspective, this study investigates the phenomena of business growth with a particular focus on the role of entrepreneurial ecosystems empowered by digitalisation in UK digital gaming industry. The performance of businesses is the result of the combined inputs and actions from various actors such as owner-mangers, employees, policy makers, customers and other support agents. These actors also interact with and influence each other's decisions, actions and perceptions of the reality. As shown in Table 3 and Table 5 in section 2.3 and 3.3, previous studies on the variables of business growth obtain knowledge primarily from different individuals regardless of whether they adopted a quantitative or qualitative methods. In this research, human related behaviour within the ecosystem was also closely studied, but I also aimed to gain increased understanding from different perspectives held by various actors. This implies that the reality presented depends upon the individuals' perceptions of the topic as influenced by, for example, their personal experiences, previous conversations, news and internet sources. Each individual describes their subjective reality. In the knowledge discovery process, I then need to apply critical analysis to the described realities and to interpret the information to construct a reality of one's own understanding. In short, following an interpretivist perspective, here reality as it is studied and assumed in this research is influenced by the views of the individuals involved and my own interpretations. Such interpretation is inevitably shaped by various perspectives such as past experience, conceptual understanding and knowledge where objectivity cannot be fully achieved. Therefore, for this study, it is apparent that my perspective on what is knowledge and how the knowledge is acquired is guided by an interpretivists philosophical stance.

4.3 Research Approach

Depending on the researchers' knowledge of the theory at the outset, the approaches can be broadly classified into deductive, inductive and abductive (Saunders et al 2012;

Walton 2014; Bryman and Bell 2015). A deductive approach implies that conclusions generated always hold true when all the conditions are met whereas an inductive approach describes the situation where the conclusion may be true when specified observations are made (Ketokivi and Mantere 2010; Bryman and Bell 2015). In contrast, abductive reasoning combines induction and deduction approaches by moving in between data and theory (Walton 2014). It often starts with certain phenomena and then develop a conceivable theory to explain the situation which can then be further tested (Walton 2014).

In case of this study, a deductive approach was broadly followed at the beginning where general theories were adopted from a literature review and followed by in-depth interviews for validation. However, as the research progressed, a more abductive approach became more capable of capturing the process of moving between data and theories. Conceptual assumptions in relation to the states framework and entrepreneurial ecosystems were adopted in forming the interview questions and throughout the entire research design. Semi-structured interviews were used to gain in-depth first-hand industry information and feedback from a set of specific companies and individuals in testing the suitability of the theories from literature review. As insights emerged from the data collection and analysis process, there was a need to re-visit some of the conceptual assumptions. As a result of this iterative process which went back and forth between theories and data, an extended dynamic states conceptual framework was proposed. In so doing, an abductive approach is adopted in this study as it best supported with the research objectives and procedures.

4.4 Research Design

4.4.1 Choice of Research Methods

Research strategy is guided by research questions and objectives. As re-iterated in section 4.2, this research is exploratory in nature and follows an interpretivist philosophy. While the research investigated the growth (or development) process of SMEs in the digital gaming industry and the role of entrepreneurial ecosystems, it is also essential to learn the reasoning behind the decisions made and what factors influenced individual opinions and practices. Thus, a qualitative research strategy was

chosen to fulfil the research objectives as it facilitated the process of understanding, interpreting and exploring an object or phenomena (Saunders et al 2012; Sarantakos 2012).

In evaluating the method to investigate and gather primary data, two methods stood out due to their effectiveness in exploring rich contextual information, namely case study and thematic analysis. The case study is often employed to explore and understand a phenomenon within one or more settings or contexts (Huberman and Miles 2002; Saunders et al 2012). It concentrates on collecting data, possibly from various sources and employing different methods, with regard to a particular case such as a particular organisation, location, individual or event (Sekaran and Bougie 2016). The case study method is suitable for answering “why”, “how” and “what” questions of a contemporary phenomenon (Yin 2014). While it may raise concerns on the generality of the results, the case study is still considered to be a justifiable method to “understand a phenomenon in depth and comprehensively” (Easton 2010: 118) and is suitable to be used in this research.

In addition to the case study method, I also adopted an alternative method because the emphasis on only one or more cases may hinder the data collection and analysis process in regard to reveal the general characteristics of the industry rather than a few selected firms. Particularly, some participants of this study have extensive experiences working in the gaming industry and had also worked in other gaming companies before setting up their own. Focusing on solely their current companies may hinder the potential of learning from their prior experiences which could be valuable insights. In addition, as discussed in section 3.2.2, Indie games businesses are an important part of the current UK gaming industry. Due to the nature of Indie businesses, it is unlikely to be able to interview more than one person at the same studio and find extensive resources for the company since they are often young and small in size and do not release much information about the businesses other than their products: the video games. However, excluding the inputs from those Indie developers from the study may result in an incomplete conclusion of the industry. Therefore, there is a need to look at other options that can complement the case study method for this study.

Thematic analysis is another common method used in qualitative research (Braun and Clarke 2006; Alhojailan 2012). It can be used for identifying, analysing, and reporting patterns or themes within data and investigating diverse aspects of the dataset (Braun and Clarke 2006). It is often used in interviewing-based research and can extract, identify and describe themes and patterns from the data (Braun and Clarke 2006; Athanasiou and Darzi 2011). Seen as a fundamental method underpinning qualitative research, thematic analysis is considered as a flexible research tool as it does not require a detailed and refined theory and can be adapted to different philosophical positions (Alhojailan 2012; Vaismoradi et al 2013; Coolican 2014). It also provides freedom to me when analysing data to investigate relationships between concepts and compare them with replicated data (Alhojailan 2012; Vaismoradi et al 2013). Moreover, thematic analysis is very useful in exploring rich content to identify commonalities among the samples (Coolican 2014). In this study, thematic analysis complements the case study method. In addition, growth measures and influencing factors can all be classified as themes or patterns. The evaluation of the ecosystem for gaming companies is another topic which can be discussed as themes. These themes can potentially extract various sub-themes which can in turn help to develop a conceptual framework for the sector. Furthermore, without the restriction of focusing on a particular study unit, I was able to bring interviewees' prior experience and knowledge of the industry into the study to capture industry-wide characteristics and phenomena. Thus, thematic analysis is also selected to fulfil the aims and objectives of the research.

While the advantages of applying thematic analysis in this research is clear, I am also aware of the potential challenges when implementing this method. Firstly, conducting a good thematic analysis is time-consuming (Guest et al 2011). The process may include transcribing audio data into text format, coding the information, repeated reading interviews and searching, defining and reporting themes (Guest et al 2011; Riger and Sigurvinsdottir 2016). To ensure adequate time allocated for quality analysis (Lincoln and Guba 1985), these challenges can be mitigated by appropriate planning and time-management. The second set of challenges lie on the actual analysis of data such as the use of analytical techniques and the results' reliability and validity (Alhojailan 2012; Riger and Sigurvinsdottir 2016). For instance, there is a tendency for researchers to just simply scan and review the data rather than performing proper analysis to produce novel and credible results (Braun and Clarke 2006; Riger and

Sigurvinsdottir 2016). While data analysis is performed, there is also a potential to produce fragile and questionable conclusions where themes identified may overlap or not consistent or lack of examples (Braun and Clarke 2006; Riger and Sigurvinsdottir 2016). This situation occurs essentially due to the inadequate or inappropriate analysis of the entire dataset (Braun and Clarke 2006). In order to avoid to fall into these traps, I had ensured adequate time is allocated to perform proper data analysis using appropriate techniques. Details are discussed in following chapters. The reiteration of data analysis and regular discussions can also help to ensure the results is valid, robust and reliable.

4.4.2 Overview of Research Design

This section provides an overview of the research protocol designed for the study. It starts with objectives, followed by the design of interview questions, data analysis and report. The overview of the research design can be seen in Figure 11.

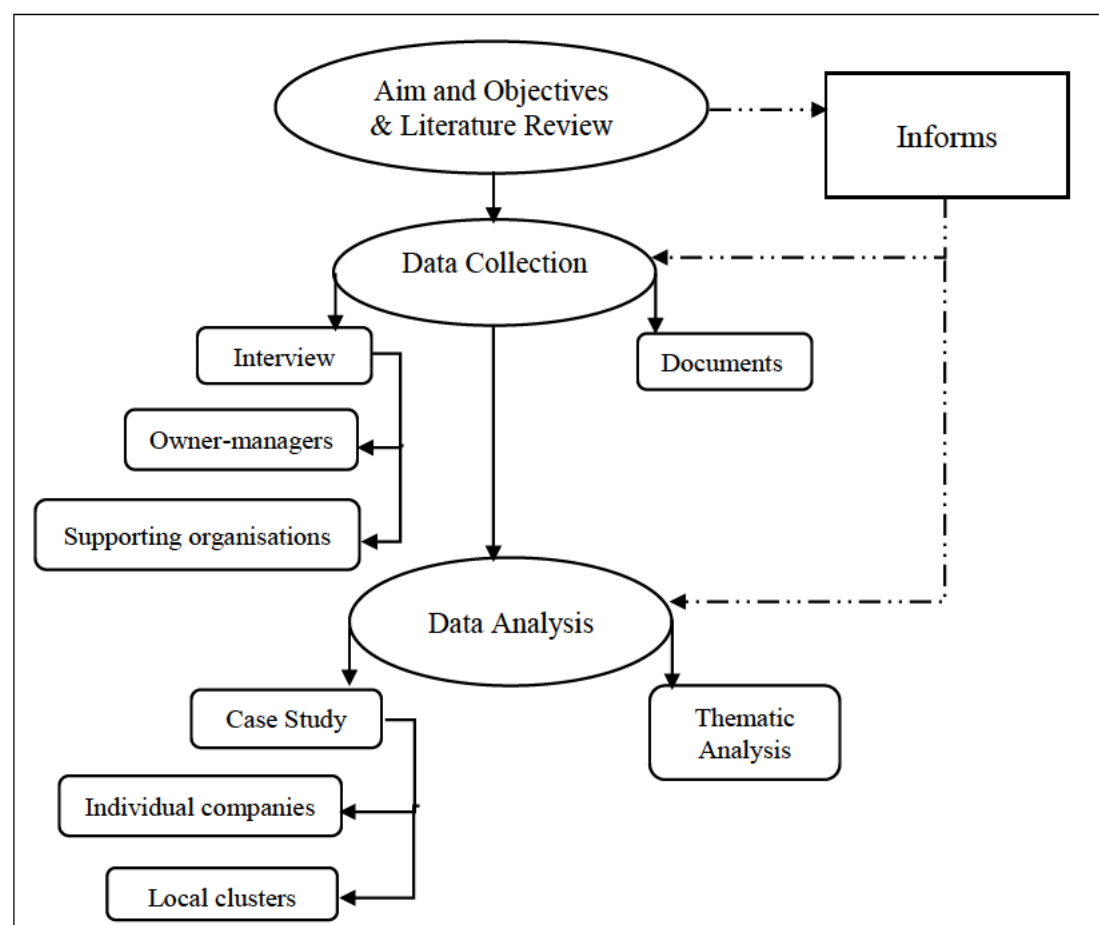


Figure 11. Research Design Overview

The objectives of the thematic analysis were to critically analyse the UK digital gaming industry, investigate what people inside the industry consider as growth and what are the influencing factors towards games development businesses' performance. The objectives guide data collection decisions. In this research, data were collected from two main channels: interviews and documents. Interviews were conducted with two different groups: owner-managers of digital games development companies and people working in supporting organisations. Complementary documents were also collected in assisting interview data to derive a complete picture. During the document collection and analysis process, high degree of objectivity and sensitivity is essential in ensuring credibility (Bowen 2009) where I had made conscious effort in doing so. The rationale and details of the procedures for the interviews are presented in section 4.4.3. Data were then analysed using two methods: case study and thematic analysis. Case studies were then divided into two types of cases: individual companies and local clusters. Rationale and detailed procedures for the thematic analysis are presented in section 4.4.4.

4.4.3 Data Collection

Designing of Semi-structure Interviews

Interviewing is a commonly used research method and broadly comprises structured, semi-structure and unstructured interviews where the latter two are widely adopted in qualitative research (Saunders et al 2012; Bryman and Bell 2015; Sekaran and Bougie 2016). Considering that this particular research is exploratory in nature with explanatory elements, semi-structured interviews are most appropriate as this approach allows me to both cover key topics identified from the literature review, but also to have the flexibility to 'skip' some questions if not necessary or explore unexpected but meaningful topics in depth (Saunders et al 2012; Bryman and Bell 2015).

A set of questions was developed and derived from the literature review and from knowledge of the gaming industry. Two sets of questions were designed: one for interviewing owner-managers or employees of the digital gaming businesses; and one for interviewing staff members from supporting organisations. The inclusion of views from supporting organisations avoids the potential bias that might emerge from considering only the owner-managers/entrepreneurs' narrative. The supporting

organisations provided a different perspective and insights that help in understanding and assessing the industry. Table 6 and Table 7 provide the full set of questions and detailed explanations of inclusion of each question, however some of the wording of the questions has been abbreviated for the tables.

Where exploratory questions were asked to encourage interviewees to share their opinions, I had to ensure that phrasing did not lead to bias. During the interview, I only indicated topics for discussion but did not influence the direction of travel in the answer.

Both sets of interview questions were divided into four main parts. The first part captured demographical information on the interviewee and the company they represent. The relevance of this information on business growth has been discussed in sections 2.2 and 3.3 (it applies only to owner-managers' question set in Table 6). Demographic and company data is useful in contextualizing the response of interviews in both question sets.

The second part is concerned with opinions on growth measures. As discussed in section 2.2, measuring growth can be complex and differ from industry to industry and even businesses to businesses. Thus, in order to answer research objectives 2) and 3) in a meaningful way, one should first be clear on what is considered to be the measure of growth. As revealed by Achtenhagen et al's (2010) empirical research, scholars and policy makers value aspects such as employment numbers or assets whereas entrepreneurs tend to value aspects like internal growth (e.g. improved products quality and range, and internal process). Reijonen (2008) studied microbusinesses in craft and rural tourism in Finland and found that those business owners were not motivated to grow but value aspects such as job satisfaction and quality of life. Thus, for digital gaming businesses, it is possible that traditional growth measurement (e.g. employment and sales) may not be suitable or align with what the entrepreneurs value. However, the motivations and goals of entrepreneurs can influence company performance (Davidsson et al 2010; Wakkee et al 2015; Chedli and Kchaich 2016; Machmud and Sidharta 2016). Thus, there is a need to investigate the industry insiders' view on growth and what they value, which also helps address objective one.

For owner-managers, the third part of the question set considered the development history of the business and the growth variables that they consider to be critical. For supporting organisations, the third part of the question set queried their opinions on the growth variables for the digital games development companies based on their experience and knowledge of them. The final part (Part D in Table 6 and Table 7) of the question set was asked only when time allowed and/or the interviewees had not previously touched upon on the topic. This part concerned interviewees' opinion on the digital games industry from perspective of: human capital, strategy, environment and markets, culture, finance, business policy and other aspects (e.g. infrastructure, support organisations). These questions were asked to ensure broad coverage by prompting interviewees' thoughts which may otherwise be forgotten or omitted.

Table 6. Interview Questions with Reasoning – For Gaming Companies

Questions		Explanation and Link with Previous Chapters
Part A: Company and participant information	Year of formation, employee number, annual turnover, location, founding team, type of businesses, <i>business model</i> ¹⁹	Demographical information collected for its potential association with business performance (see section 2.3 and 3.3). It is also useful to contextualize the responses (Bryman and Bell 2015).
	Role and age of interviewee, <i>Education background, years of experiences in or outside the industry</i>	
Part B: Growth Measure	<i>Owner-manager and employees' motivation of starting or joining the businesses</i>	Measure of growth can be complex and varies depends on industry, company and people (see sections 2.2.3).
	Has company grown since formation and in what ways? If no, why? Change of growth objectives over time? If so, in what ways? (<i>may include prior experience</i>)	
Part C: History and Growth variables	Can you provide a brief history of your business development since formation?	Core of this study. Business history and variables help to uncover key events and address the latter question more thoroughly.
	<i>What do you see your company in the future (short, medium and long term)? What have you got or still need in order to achieve this? Or is there anything have or will inhibit you from achieving your goals?</i> Looking back as well as forward, what factors do you consider have or will impact on your business growth? <i>What do you see the biggest change or shift of the industry and how did you benefit or cope with these changes?</i>	
Part D: Additional Questions (only asked if deemed necessary)	Human Capital - <i>Video games education programmes (e.g. college or university degrees)</i> - Owner-manager's vision, growth ambition, risk taking attitude and experiences - Is there a skills shortage for the industry? - How is the work-life balance? - Does what discussed impact on company performance? If yes, in what ways?	These questions are derived from discussions in sections 2.3, 2.4 and 3.3. They (and following questions) are asked to prompt interviewees' thoughts which may otherwise be forgotten or omitted.
	Strategy - company development strategy - Does it impact on business performance in the past and future? ²⁰	

¹⁹ In Table 6, questions shown in *Italic* refers to changes made after the refinement of interview questions

²⁰ In Table 6, questions with Strikethrough (e.g. ~~Strikethrough~~) are the ones deleted after the pilot study

	<p>Environment and Markets -Impact of location, industry or market on business performance -Is the business involved in any networks, clusters or partnerships? Is it useful?</p> <p>Culture -Relationship between your company performance and external culture in terms of tolerance of risk, mistakes and failure <i>-What do you think of general public opinion towards the industry? What do you think of entrepreneurs/investors' tolerance towards risk, mistakes and failure?</i> -company encourage innovation, creativity, experimentation? -company invest in innovation/R&D? Does it impact on business performance? -Any noticeable success stories that have influenced you on personal ambition or company operation? If yes, in what ways?</p> <p>Finance -Company financing option and its influence on business operation -Overall environment for financing within the industry. Does it impact on business past and future performance?</p> <p>Business Policy -What kind of business support have you received? Are there any other supporting policies you are aware of?</p>	
	<p>Other Aspects -Do infrastructure, support professions and non-government institutions are well developed for your company to benefit from? Any impact on company performance? -What is the legal form of the businesses? -Business model and its impact on business performance -Are there any other aspects impact on company performance? <i>-What kind of support would you need or prefer to have to support your businesses development? This can be in forms of government programmes, policies, network opportunities, ease of administration burdens, training programmes etc.</i></p>	

Table 7. Interview Questions with Reasoning – For Supporting Organisations

Questions		Explanation and Link with Previous Chapters
Part A: Company and participant information	Year of formation, location, type of support provided, type of businesses supported, engagement in supporting digital gaming businesses	These demographical information is collected to understand their relationship with digital gaming businesses. It is also useful to contextualize the responses (Bryman and Bell 2015).
	Role and age of interviewee <i>Education background, years of experiences in or outside the industry²¹</i>	
Part B: Growth Measurement	<i>Owner-manager and employees' motivation of starting or joining the businesses from your experience</i> Growth measure of digital gaming businesses	As discussed in sections 2.2.3, measurement of growth can be complex and varies depends on industry, company and people.
	Change of growth objectives over time? If so, in what ways?	
Part C: Growth Contributors and Barriers	Examples of support provided to digital gaming businesses	Growth antecedents are the core of this study hence questions asked. Asking interviewees about support provided can help them to reflect and address the latter question more thoroughly.
	Looking back as well as forward, what factors do you consider have or will impact on games development business' growth? <i>What do you see the biggest change or shift of the industry and how did you benefit or cope with these changes?</i>	
Part D: Additional Questions (only asked if deemed necessary)	Human Capital -Video games education programmes (e.g. college or university degrees) -Owner-manager's vision, growth ambition, risk taking attitude and experiences -Is there skills shortage for the industry?	These questions are derived from discussions in sections 2.3, 2.4 and 3.3. They (and following questions) are asked to prompt interviewees' thoughts that may otherwise be forgotten or omitted.
	Strategy -Does company strategy impact on business performance? In what ways?	
	<i>Environment and Markets</i> -Impact of location, industry or market on business performance -Is involving in any networks, clusters or partnerships beneficial for business?	
	Culture -Relationship between your company performance and external culture in terms of tolerance of risk, mistakes and failure	

²¹ In Table 7, questions shown in *Italic* refers to changes made after the refinement of interview questions

	<p>- <i>What do you think of general public opinion towards the industry? What do you think of entrepreneurs/investors' tolerance towards risk, mistakes and failure?</i></p> <p>-Any noticeable success stories that have influenced on personal ambition or company operation?</p>	
	<p>Finance</p> <p>-Company financing option and its influence on business operation</p> <p>-Overall environment for financing within the industry. Does it impact on business past and future performance?</p>	
	<p>Business Policy</p> <p>-What kind of business support are you aware of that digital gaming business can benefit from?</p>	
	<p>Other Aspects</p> <p>-Do infrastructure, support professions and non-government institutions are well developed for your company to benefit from? Any impact on company performance?</p> <p>-Relationship between businesses legal form, model and performance?</p> <p>-Are there any other aspects impact on company performance?</p> <p>-<i>What kind of support would you need or prefer to have to support your businesses development? This can be in forms of government programmes, policies, network opportunities, ease of administration burdens, training programmes etc.</i></p>	

Refining and Piloting of Semi-structured Interviews

1st Stage of Questions Refinement

After the initial review of the interview questions by collecting valuable advice from supervisors and colleagues, I then further refined the questions after the Insomnia61²² event which took place in late August 2017. Though no official data was collected during the event, I developed a more detailed and nuanced understanding of the industry. A total of eight modifications were made to the questionnaires as detailed below.

First, the question on a *brief overview of business model* is brought forward from Part D into Part A (see Table 6). This question is brought forward to inform an understanding of the company and its subsequent performance. This helps the interviewee's thinking process. Second, in Part A, the question on the interviewee's *education background, years of experiences in or outside the industry* is included. This question is added to capture the data in aid of contextualizing. The relevance of this question is also illustrated in section 2.2 and 2.3. Third, in Part B, a question on the *owner-manager and employees' motivation of starting or joining the businesses* is added. The relevance of this question is illustrated in section 2.2 and 2.3. Fourth, in Part B, the question has been rephrased to allow interviewees to share their *prior experiences and knowledge in other businesses* where possible. Fifth, in Part C, some questions were rephrased: *What do you see your company in the future (short, medium and long term)? What have you got or still need in order to achieve this? Or is there anything have or will inhibit you from achieving your goals?* They were included in the question-set for owner-managers.

The essential aim of the questions has not changed, however, the rephrased questions allowed the interviewees to have a better foundation to start the conversation. Sixth, in Part C, an additional question is asked: *What do you see the biggest change or shift of the industry and how did you benefit or cope with these changes?* This aims to draw out

²² Insomnia61 is the 61st Insomnia Gaming Festival. It is considered to be one of UK's biggest gaming festivals that open to companies and individuals work or involved in digital games.

owner-managers' knowledge and perception of the industry and provide another angle to tackle the central question of the antecedents of business growth. Seventh, in Part D, an additional question on *video games education programmes (e.g. college or university degrees)* is included. This question is related to education and human resources but may be easily neglected if not asked separately. Lastly, in Part D, an additional question is added in the end: *What kind of support would you need or prefer to have to support your businesses development? This can be in forms of government programmes, policies, network opportunities, ease of administration burdens, training programmes etc.* This question aims to investigate the possibility and potential of any support programmes that can be developed from business people's perspective.

2nd Stage of Question Refinement: Pilot Testing

Pilot testing is a useful way to verify and modify research instruments and the interview protocol (Remenyi et al 1998; Rowley 2012; Galletta 2013). By performing two or three pilot interviews with participants who share some common characteristics of the target groups, I can reflect on the wording, order, relevance and applicability of the questions and the overall interview design (Rowley 2012; Galletta 2013; Kallio 2016). Such a pilot test can also help to establish the validity and reliability of the research instrument and construct (Dikko 2016; Kallio 2016). Thus, two pilot studies assisted me in gaining first-hand experience of how the questions were perceived by the interviewees and the time required for each questions. Overall, the questions were transparent to the interviewees though some questions required time to think and reflect before an answer was provided. Four questions proved to be too difficult to answer, particularly for the owner-managers: 1) *Does company strategy impact on business performance in the past and future?* 2) *What do you see the relationship between your company performance and external culture in terms of tolerance of risk, mistakes and failure?* 3) *What do you see the company financing option and its influence on business operation?* 4) *What do you see impact of Business model on business performance?* On reflection, these questions did not really fit with the research aim and objectives. They were, therefore, deleted from the owner-managers' interviews but retained in supporting organisations' interview question set. In both sets of interview questions, to make it more understandable for the

interviewees, question 2) was replaced with *What do you think of general public opinion towards the industry? What do you think of entrepreneurs/investors' tolerance towards risk, mistakes and failure?*

Conducting Semi-structure Interviews

This section outlines a data collection procedure for the semi-structured interviews. Such procedures typically include aspects such as characteristics of the researcher and interviewees, how participants are recruited, how and when the research was conducted, and advice from any third party (Remenyi et al 1998; Saunders et al 2012). The following section details the practical process of collecting the above information.

First of all, I am studying towards a doctoral level degree and has attended several workshops to gain an understanding and knowledge of how to conduct research, undertaking a literature review and training on using specific software such as Nvivo. In addition, I have also read extensively on research methodology and understands various aspects and methods in relation to conduct primary data collection. Moreover, the interviewees can be broadly classified into two groups: people who work in gaming companies (e.g. programme developer, artists, designers, managers) and people who work in related organisations (e.g. investors, governments, publishers, marketing companies). This classification is based on the assumption that an ecosystem should comprise a range of actors that interact dynamically as discussed in section 2.4.

The interview participants were recruited through various channels. First, in order to develop first-hand understanding on digital gaming industry, I attended several industry events (e.g. Insomnia61 at Birmingham NEC on 26th and 28th August 2017 and EGX²³ in September 2017; local games industry gatherings, workshops and seminars during the period of October to December 2017). I was then able to talk to various people who attended the events and formed the initial tie with the potential interviewees. People who had expressed an interest in the project were contacted after the event to schedule a time for interview. Second, participants were also recruited through recommendations. A

²³ EGX is also considered as one of UK's biggest games exhibitions.

colleague introduced me to a person who works in the games industry providing consultancy services whom then put me in contact with two more people and resulted in one interview. The third way of recruiting interviewees was through locating suitable participants online and contacted them via email or social media channels (e.g. LinkedIn).

The interviews were all conducted in the UK between Sept 2017 and June 2018. The selection of interview participants was based on maximizing the sample's representability of the UK gaming industry. For instance, participants were selected from games development companies of different sizes and at a diverse geographical locations such as Brighton, Dundee, Leamington Spa and London. Although face-to-face interview was preferred and implemented where possible, Skype calls or telephone interviews were used where necessary. The interviews took place either in public places, such as offices, or over the internet. Participants were briefed before the interview where consents and declaration forms were signed for ethical considerations. These steps are essential to ensure the integrity and validity of the research (Bryman and Bell 2015). While brief notes were taken, interviews were also audio recorded and stored securely in an encrypted drive of my computer providing prior agreement from the interviewees. These practices were adopted to ensure maximum accurate information can be collected for subsequent analysis (Sekaran and Bougie 2016).

Two groups of candidates were interviewed: 26 owner-managers of small and medium sized games development companies and 15 individuals from supporting organisations, such as support programmes providers, investors, publishers, education sectors and marketing agencies. Each group has an individual question set used in order to maximizing the sectoral knowledge contribution to this research (see Table 6 and Table 7 for details). Due to the limitation of time and resources, 27 interviews out of 41 were selected for transcription and in-depth analysis.

Documents

In addition to interview transcripts, additional supplementary documents were also collected to derive a complete picture of the sector and the participants. The data collection process included internet searches for relevant documents with particular focus on the companies' websites and the Company House sites. Documents, including materials supplied by interviewees, can be used as evidence to complement, verify and support the verbal information provided by the interviewees (Jones 2008) which in turn contribute to achieve data triangulation and demonstrate validity of the analysis and finding (Guba 1981; Liu 2018). Moreover, credible websites, news and industry trade journals or websites were also included for data triangulation as they can be valuable sources in providing industry insights particularly in the absence of sufficient academic articles. A list of sources and types of data used for data analysis included some or all of the following:

- Interview transcripts.
- Field notes.
- The company's website and social media accounts where applicable
- Company House website.
- Credible websites and news (e.g. government or industry websites, reported news).
- Any additional documents supplied by the organisation (this was entirely voluntary and generally rather rare).

4.4.4 Data Analysis

Thematic Analysis

The six-stage thematic analysis proposed by Braun and Clarke (2006) is widely adopted in academic research as evidenced by Vaismoradi et al (2013), Coolican (2014), Jason and Glenwick (2016). Braun and Clarke (2006) also point out that the analysis process can start during the data collection stage when the researchers start to notice any interesting patterns or themes emerging. Figure 12 summarises the six stages and their main practical implications. I have followed each step in the following chapters to present

the findings. In order to ensure the quality of coding, a colleague of my who has extensive experience in using Nvivo double checked the coding process and initial themes identified. Although no changes were made after this double checking process, the process nevertheless provided further quality assurance.

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Figure 12. Thematic Analysis Process (Braun and Clarke 2006)

For thematic analysis, the unit of analysis is the owner-managers, while information from supporting organisations is used for consolidation. Moreover, there is likely to be some mismatch of information or misunderstanding between the two groups as they see things from different perspectives. Thus, constructiveness and objectivity can be strengthened by analysing both groups. Due to the limitation of time and resources, 27 interviews out of 41 were selected for transcription and in-depth analysis. The selection ensured that all key aspects were covered from the 27 interviews in relation to the research questions and data saturation was achieved. In addition, the choices of interviews maximized the reflection in terms of distribution of gender, location, development history and size of the business.

The entire process of collecting and analysing interview data is time-consuming (Braun and Clarke 2006; Jason and Glenwick 2016). Aside from following Braun and Clarke's (2006) six-stage thematic analysis process, the amount of data that needed to be processed in a rigorous manner suggested that there was a necessity to take advantage of modern technology: using Computer-assisted Qualitative Data Analysis (CAQDA) (Saunders et al 2012; Bryman and Bell 2015). Although the use of CAQDA does not influence on the coding decisions of textual data nor the interpretation of the results, it can nevertheless reduce the clerical tasks and improve transparency and accuracy (Saunders et al 2012; Bryman and Bell 2015). The CAQDA software used in this research is Nvivo 12.

A mixture of framed coding and emergent coding has been used in the data analysis process. I first familiarized herself with the interview data during the process of conducting and transcribing interviews as well as reading through the transcripts. During this process, a list of themes and sub-themes were developed as initial frame for subsequent coding process (framed coding). I then used Nvivo 12 to code the two pilot interviews and further refined the themes and sub-themes. Both pilot interviews were included as part of the final data analysis as only minor alterations were made in the semi-structured questions and key questions were all addressed by the participants where insightful knowledge were shared. I recognised the usefulness of emergent coding and acknowledges that pilot interviews did not cover all themes emerged from all 27 transcribed interviews. Thus, I also implemented emergent coding techniques with the aim to allow new themes or sub-themes being generated and added to the initial framework. The final presentation of the coding themes have evolved and since appeared much different from the initial coding frame. Detailed discussion and results are reported in Chapter 5.

Case Study

The case study analysis was used to test the feasibility of the dynamic states framework and the role of entrepreneurial ecosystems empowered by digitalisation at specific firms. Two types of cases were selected and analysed in this study: individual digital games development companies and local level clusters.

For case studies of individual companies, the unit of analysis was the firm selected. Out of the 26 games development companies interviewed, 7 were selected for in depth case studies. The selection ensured that the representativeness of the industry was maximized. The analysis involved content analysis of interview transcripts and the documents collected (e.g. annual reports from company house, websites, and official social media accounts). The case studies focused on companies' development histories. Each company was discussed and presented carefully with mindful choices of details revealed so that anonymity was ensured. In order to investigate the feasibility of the dynamic states framework and their connections with the wider environment/market, the case study analysis of each business was divided into three main sections. The first section analysed available resources and developed a timeline based on revenue and employment number since their formation until the time of interview. Basic information such as when, who and how the company started were presented. Key events, lessons learned and stories behind any notable changes were also revealed. Interview transcripts were the main sources of information in illustrating the business journey. Secondly, drawing from interviews and other documents, each case study was then analysed from the lens of entrepreneurial ecosystems. In particular, key interactions at local, national and global levels were presented. Lastly, each case study concluded with a reflection that directly addressed the research aim and objectives and discussed the applicability of the dynamic states framework (by Levie and Lichtenstein 2010) and the entrepreneurial ecosystems at both local and global levels (as discussed in section 3.5).

In contributing to the discussion of entrepreneurial ecosystems at a wider context, two notable regional digital gaming clusters, Dundee and Leamington Spa, were chosen as regional level case studies. The two clusters were selected based on two considerations. Firstly, they both had high concentration in digital gaming industry. Secondly, they represented two different types of clusters as shown in Table 4, in section 3.2.3. Dundee is the balanced type with both big and well-established firms as well as smaller and younger companies. In comparison, Leamington Spa is the consolidated type with comparatively fewer companies but with large number of employees. The data used for cluster level case studies comprised interviews with local companies; credible news articles; company and industry websites, and conversations with people in the two

clusters. These conversations took place during events, workshops and conferences. Although they were not formal interviews, their value should not be neglected. Indeed, without the constraints of the formal interview settings, individuals were more prone to express their views and feelings. During these informal interviews where obtaining written consents were not feasible, I had made sure the interviewees were briefed (i.e. interviewees understood the purpose of the research and rationale of questions asked) and verbal consents were obtained.

4.4.5 Ethical Considerations

Ethics are one of the fundamental parts of a creditable research project (Saunders et al 2012). Academic researchers should not merely focus on the acquisition of knowledge and quality of information, but also consider potential consequences of their actions (Miles et al 2014). A list of good practices have been discussed such as seeking agreement with participants, obtaining informed consent, maintaining objectivity, ensuring anonymity where required (Miles et al 2014; Bryman and Bell 2015). Therefore, several measures have been implemented in this research to ensure ethical integrity throughout.

Firstly, the research instrument has been discussed with my supervisors and then assessed and approved by Coventry University Ethics assessment team. This process has ensured the robustness of the research protocol at a conceptual level and that every effort has been made to address potential ethical issues thoroughly. During this process, several forms have been developed including semi-structured interview questionnaires, participant information sheet, informed consent forms, risk assessment form, permission and gatekeeper letters. Secondly, all participants were briefed prior to the interview on the purpose and expected involvement of this research. I also made sure the research was on a voluntary basis and they were free to withdraw before the set deadline, 1 February 2018, by providing formal request. Formal consents (in form of written signature or email) were also achieved by this stage. Furthermore, a coding system was implemented to ensure anonymity. Lastly, data acquired in paper format were held securely in the office of International Centre for Transformational Entrepreneurship (ICTE) at Coventry

University under secure conditions as described in University's data protection policies. The electronic data were stored in university's encrypted drives.

4.5 Conclusion

This chapter outlines research methodology implemented in this project and its underlying rationale. The choices of ontological and epistemological positions are discussed in relation to the research context. In particular, the reasons of implementing both case study and thematic analysis methods are reviewed to ensure their suitability to analyse the data and reflect the perceived reality. Potential challenges are addressed with mitigation measures. While the overall data collection procedure is presented, detailed reasoning and refinement of the semi-structured interview questions are also included. Furthermore, this chapter discusses analytical tools and techniques, such as NVivo, used in the study. Lastly, ethical issues are considered and addressed through various measures. The results and analysis are reported in the succeeding chapters.

Chapter 5 Results and Analysis – Thematic Analysis

Having discussed the research design in the previous chapter, this chapter reports the first half of the data analysis, namely the thematic analysis. From the previous literature review chapters (Chapter 2 and Chapter 3) and the interviews, it is apparent that the success and performance of a game development company depends on a range of factors, many of which are very difficult to predict. The reasons for this are complex. However, to understand the influencing factors of games companies' performances, it is essential to understand the characteristics of the industry first. Thus, this chapter is structured into four main parts: section 5.1 provides an overview of the findings; section 5.2 reports on the characteristics of the digital gaming industry; section 5.3 to section 5.11 presents key themes and sub-themes derived from the data analysis; section 5.12 discusses the results with regard to growth measures.

5.1. Overview of Findings

The core product of a games development company is the game(s) they produced. A game can be categorised based on the platform on which it is released, its genre and the purpose of the content. For the purpose of this research, the interviews focused on entertainment games that are released on all platforms include mobile, PC and consoles with no specific restrictions on genres. This section provides an overview of the datasets and is structured into three sub-sections: a word frequency search; a table outlining the interviewees' profiles; and a table outlining identified themes.

5.1.1 Word Frequency

Figure 13 shows the results of the NVivo 12 word frequency search within the 27 interview transcripts (after deleting non-essential words such as “the”, “yes”, “yeah”). It gives an overview of the most frequently brought up words during the interviews such as people, development, money, funds, project, design, industry, project, changing, mobile, cost and culture. It assists the initial coding and analysis process by providing an overview.



5.1.2. Interviewee Profile

As shown in Table 8, the 27 interviewees consist of 18 owner-managers from games development companies and 9 people from supporting organisations. The size of the organisation varies from employing one person to 220 people. The selection of the supporting organisations ensured a broad coverage of sectors and include practitioners such as education providers, funding provider, consultants, policy maker and lawyers. Although this research does not intend to have an in-depth discussion on gender, there are only two female interviewees in this sample: game developer GDF04 and education provider SO02. This phenomena is further addressed in section 5.10 diversity in the workplace.

Table 8. Profiles of Interviewees

	Interviewee Code	Position	Company Founding year	Employee number	Interview date
Game dev firms	GDF01	Director/Co-Founder	2017 June	3	5th Sept 2017
	GDF02	Founder/Creative Director	2013 April	4	26th Sept 2017
	GDF03	Director /Co-Founder	2013 June	4	2nd Oct 2017
	GDF04	Game designer and programmer/Co-founder	2010 late of the year	1	4th Oct 2017
	GDF05	Director/Co-originator	2017 Jan officially/2016 August unofficially	26	5th Oct 2017
	GDF06	Director/Founder	2012 Nov	4 full time+15-20 part time	5th Oct 2017
	GDF07	Founder	2015	1+9 contractors	6th Oct 2017
	GDF08	Founder/CEO/Creative Director	1992	220	10th Oct 2017
	GDF09	Director/Co-founder	2014	3+	17th Oct 2017
	GDF10	Technical Director/Co-founder	2007	12	18th Oct 2017
	GDF11	CEO	2009	56/7	29th Nov 2017
	GDF12	CEO	2013	104	6th+7th+8th+9th Nov 2017
	GDF13	Founder & Director	2008	1 grow to 3, now down to 0	10th Nov 2017
	GDF14	Founder & CEO	2006 April	32 full time+2 part time	15th Nov 2017
	GDF15	Founder & Co-owner	2005	30+35 in New Zealand	30th Nov 2017
	GDF16	Co-founder	2011 Jan	15	28th Sept 2017
	GDF17	Co-founders	2014 Jul	3 (was 9)	13th Dec 2017
	GDF18	Founder/Director	2015 May	3	4th Jan 2018
Supporting orgs.	SO01	Director of PR company	NA	NA	17th Oct 2017
	SO02	Lead of Enterprise Programme	NA	NA	14th Sept 2017
	SO03	Senior Lecturer	NA	NA	24th Oct 2017
	SO04	Founder and CEO of funding organisation	NA	NA	24th Sept 2017
	SO05	Inward Investment Officer of local government	NA	NA	4th Oct 2017
	SO06	Founder and Programme Organiser	NA	NA	6th Oct 2017
	SO07	Training/Consulting/Project Management	NA	NA	12th Oct 2017
	SO08	Founder and game developer of game collective	NA	NA	1st Dec 2017
	SO09	Lawyer	NA	NA	8th Aug 2018

5.1.3. Outline of Themes

Table 9 outlines 11 main themes derived from the interviews analysis. Each main theme also consists of a number of sub-themes that came out from the interviews. Further detailed analysis is presented in section 5.2 to section 5.12.

Table 9. Overview of Themes

Main Themes	Sub-themes	Notes
Industry characteristics	<ul style="list-style-type: none">Fluidity and sustainabilityLocationShift or change of the industryWork life balance	See section 5.2 for detailed discussions.
Funding	<ul style="list-style-type: none">Overall environmentChallenges and drivers <ul style="list-style-type: none">SourcesOther	See section 5.4 for detailed discussions.
Policy	<ul style="list-style-type: none">Tax credit <ul style="list-style-type: none">Brexit	See section 5.8.
Market (incl. marketing)	<ul style="list-style-type: none">Challenges and driversStrategy and practicesCommercialising of games and performancePricing	Detailed discussions and breakdown sub-themes are in section 5.6.
Human resources	<ul style="list-style-type: none">Challenges and driversTeam work and multi-disciplinaryUniversity degreesStaff recruitment and retention <ul style="list-style-type: none">Experience and knowledgeForeign workersPassion etc.BrexitOtherDiversitySkills shortage	For more details, see sections 5.3, 5.4, 5.8.2, 5.10
Business model and strategy	<ul style="list-style-type: none">Freelance and contractorDevelopment cycleProducts diversificationCost structureMarketing <ul style="list-style-type: none">Product and IP ownershipFreemium or premiumRemote or office workWork for fire or other	For more details, see sections 5.2, 5.4, 5.6
Networks and connections	<ul style="list-style-type: none">Locations <ul style="list-style-type: none">Clustering	For more details, see sections 5.2.2, 5.4.
Development instability	<ul style="list-style-type: none">Prototype or project cancellationFunding cut <ul style="list-style-type: none">Project-based natureKey personnel changeOthers	For more details, see sections 5.2.2, 5.4.
Infrastructure	<ul style="list-style-type: none">InternetTransport <ul style="list-style-type: none">Other supporting infrastructure	See section 5.7
Support organisations	<ul style="list-style-type: none">LawyerAccountantGovernment support <ul style="list-style-type: none">General business supportTrade organisations: UKIE and TIGA	See sections 5.8 and 5.9
Growth measurement	<ul style="list-style-type: none">Growth measures for digital gaming companiesDo measurements change over timeMotivation of setting up the businesses	See section 5.12

5.2 Characteristics of Digital Gaming Industry

Common characteristics of the digital gaming industry were identified by analysing primary and secondary data. It is important to understand the industry as it builds the essential foundations on understanding how individual companies operate. Therefore, this section summarises the characteristics of the digital gaming industry.

5.2.1. Changing Dynamics of the Industry

The digital gaming industry has evolved dramatically since the 1980s particularly benefiting from continuous technology advances (Chikhani 2015). The changing dynamics have also resulted in the evolution of various business models and new market segments (Marchand and Henning-Thurau 2013).

Technology Advances

With the rising popularity of home computers, the 1980s saw the booming of the digital gaming industry (Chikhani 2015). Production costs were very high in this period. This resulted in publishers having strict control over game developers as developers rely on publishers to commercialise their games for both the consoles and home computer markets, as recalled by interviewee GDF12. This scene continued into 1990s and all the way to the early 2000s with increasingly diversified genres, the launching of handheld game consoles and early mobile games, and the blockbuster AAA games. Over time, the quality of games increased which resulted in increasing budget especially for console games (section 5.2.3 provides further discussion from different perspectives). The large budgets required for making and commercialising games made it difficult for independent games developers to survive. During this period of time (1990s to early 2000s), UK game developers have mainly been operating on a “work for hire” business model (section 5.2.2 expands this topic further). For early mobile games (e.g. Java games), developers generally needed to rely on publishers to publish their games on mobile platforms prior

to the existence of smart phones (e.g. iPhone). Interviewees GDF12 and GDF15 have been making games from the early days and recalled their experience in this period.

“Publishing on cartridges is a very, very expensive business. Cartridges cost something like \$10 each. At source, you have to pay them up front and then you can sell them on to retailers for something like, I think it's like something like \$16 or \$17. That...so... your cash flow shoot, you have to invest something like a million dollars, you also have a high production volumes minimum rounds you have to hit, plus you have to do marketing budgets. So you couldn't release a game without spending many millions.”

---GDF12

“You needed a mobile publisher to basically make money in mobile.”

---GDF15

From the 1990s until around 2008, the huge production cost had been one of the main barriers for many developers to publish their games and they need to rely on the support of publishers. Though the use of CDs had decreased the cost to some extent, it still required considerable amount of pre-sales investments within an already competitive market. This scene was then disrupted by a series of technological advances.

The 21st century has witnessed many significant changes in the industry and many of which are related to technology advances. For instance, the launch of Steam²⁴ in 2013 and Apple's App Store in 2008 has made it possible for game developers to self-publish their PC and mobile games online digitally without huge upfront costs. It shifted the power from publisher to developers and platform holders such as Steam (section 5.2.2. expands this topic further). At the same time, the launch of software like Unity in 2005 dramatically reduced the difficulties of making and porting games for different platforms. This, coupled with digital distribution platforms (e.g. Steam, Apple App Store, Google Play Store), led to increased opportunities for independent game developers to self-publish their games. As large AAA games continued to grow, indie games, which are

²⁴ Steam is a video game digital distribution platform, launched in 2003. It is the largest digital distribution platform for PC games.

often developed with small budgets, started to boom as well. GDF12 shared his opinion on this topic:

“And when you go digital distribution, there is no cost of goods, there is no cost of run. You can do viral marketing instead of TV advertising and print advertising. So the cost of publishing again has dropped hugely by digital distribution and made it possible. But it was only possible after about 2008.”

---GDF12

However, the lowered barriers to entry does not automatically imply success or even recoup of the initial investment. The overwhelming customer choices and market saturation have made the marketing and commercialisation of games difficult (e.g. GDF15 and SO01). Section 5.6 takes this conversation further. Moreover, the use of other companies' technology does not come without risk. The decisions and changes made by the companies who own the platforms and technologies can also hinder the independent development process. GDF09 shared their experience of using Unity:

“Certain features of Unity...[....] So they..... it changed while we developing the game. And that had been hard to deal with because... er..... we had to upgrade things, figure out how they work, certain aspects of the technology were broken on release which meant we need to find alternative ways to do things. Er.... and so we had to wrestle with all of that.”

- Interviewee GDF09

In the recent decade, the industry sees rising popularity of mobile, VR and AR games (Sinclair 2018; Newzoo 2019). Cloud gaming has also attracted attention, although with mixed reviews (Morgan Stanley Research 2018; Warren and Hollister 2019). The trends and development of the games industry have been shaped and influenced by technology advances to a large extent. While some technological advancements have been incremental, they nevertheless have had a prolonged impact on the industry such as the launch of Steam, App Store and Unity. These technologies have provided alternatives to the traditional options and driven the evolutions of business models.

Business Model Evolution

As Interviewee GDF12 recalled, the early model for digital games development companies relied heavily on publishers: partly due to the large upfront production cost; and partly due to the traditional sales channels in shops where developers rely on publishers' connections to get more prominent positions in physical shops. The emergence of digital distribution channels made it possible to self-publish games and reduced the reliance on traditional publishers. In fact, publishers now also need to use these same digital distribution routes in addition to traditional store sales. Such digital distribution channels can particular influence the sales performance of the games through ways (e.g. the displaying or ranking algorithm used). Section 5.5 discusses this topic further. Other channels such as subscription based models and cloud gaming are also gaining traction. Table 10 outlines a key comparison of the evolving business models (based on interviews and secondary data).

Table 10. Comparison of Business Models (author's own compilation)

Traditional (1980s-early 2000s)	Digital Distribution Era (early 2000s-now)	Others: Cloud gaming and subscription model (post 2000s-now)
<ul style="list-style-type: none">• Publishers publish games• Publishers often commission developers to develop games• Games are sold in physical copies (e.g. cartridges) via high street shops• High market entry as limited by funding and controlled by publishers	<ul style="list-style-type: none">• Developers self-publish games• Indie developers often need to cover their own cost of development• Game publishing relies on the running of distribution platforms, i.e. Steam, App Store, Play Store• Low market entry for developers and high market saturation	<ul style="list-style-type: none">• Game subscription services typically charge a flat fee for a period (e.g. £20/month) and give players access to games on their platforms• Cloud gaming enables players to play games from various devices• Cloud gaming experience vary depends on factors such as internet speed

Various business models have emerged since the digital distribution era (Davidovici-Nora 2013; Williamson and Ridsdale 2019). GDF16 states that the “free to play” business model was one of the biggest evolutions. It changed people's perception from paying into play games to play it for free. This subsequently resulted in a variety of monetisation

strategies. Interviewee GDF16 who has been in the games industry since late 1990s and runs a publishing-developing company, shared his experience on free to play games:

“When Pete²⁵ and I had the idea to start RXX²⁶, we didn't envisage the market being like it is now. So for example, there is no such thing with free-to-play game. It just didn't exist and it's hard to imagine that because you know, you go on your smart phone now, you can download a thousand of games this afternoon, they all free. [...] I can remember we used to spend half a million pounds making a mobile game and we sold it for £1.99 and my youngest son said to me ‘that's a rip off’. And I was like ‘what?’ £1.99, it....it costs half a million pounds to make it and £1.99, we only sold 5000 copies.”

---GDF16

Common monetisation strategies now include in-game advertisement and in-game purchase. However, not all game experiences are suitable for this type of strategy (e.g. SO07, GDF04). For instance, for certain types of games, interruptions during the play can really impair user experience which can then damage the reputation of the game and in turn limits the monetising process. Indie developer GDF04, who had made well-received premium games, shared her view on the downside of free to play games:

“Because we obviously also have this challenge of the Free to Play market that has created this kind of like mentality that game should be free, right? And that's a big, well, a big hurdle. Because free to play games as a specific game design... that it... suits itself to the straight Free to Play experience, but there's also a lot of experiences that cannot work as free to play mechanics or advertisement.”

---GDF04

As part of the business model evolution, marketing strategies have also evolved dramatically over the decades (Davidovici-Nora 2013). For instance, social media and influencer marketing are now playing an increasingly important role in the games industry

²⁵ Pseudonym to ensure anonymity

²⁶ Pseudonym of the company name to ensure anonymity

(SO01). The influence of traditional marketing channels such as TV advertisements, and paper-based media have declined. Further discussions on marketing and commercialisation are presented in section 5.5.

5.2.2. Project based Business and Clustering

Making a digital game is essentially a software development project and it has many of the characteristics of a project-based business. This project-based nature comes with challenges. Games businesses are generally perceived as risky as the return on investment is hard to predict. It is also difficult for games businesses to sustain or grow over a long period of time as it is hard to ensure the success of each game (Kershner 2015; Rivera 2019). In fact, many games businesses constantly go through the expansion and contraction processes when projects are initiating or completing. Closure of businesses are also not uncommon in the industry.

“What you have is.... er... a group of contractors that you bring together for a specific project, stay together for that project and then when the project goes, that disbands.”

---SO07.

SO07 was a senior project manager in a medium sized games studio who is a consultant in the games industry and had also worked on his own small games studio. He shared that the frequent expansion and contraction process had posed challenges over job security. The level of impact on an individual partly depends on which stage of life the person is in.

“And that's great if you're young, single without a mortgage and all of the things that go with that. I think a lot of people.... particularly people who have been in the industry for a while, who have been in a custom of having a job will want that security. And so I don't think it's a choice so much. [...] I know as they get older, they need that kind of security of having a job.”

---SO07.

SO07 further shares that although company structure is an interesting topic that many people are discussing, no consensus has yet been achieved over what is the best way of going forward. Some people have found inspirations from the film industry in addressing the issues that come with the constant contraction and expansion. In the film industry, business keeps the core production members and only recruits people for particular projects when required. In this way, businesses do not need to risk paying staff after a project is finished. However, such a model ignores employees' needs for job security and only addresses the owner-managers' concerns (Blair 2001; Blair, Grey and Randle 2001). During off the record conversations, some owner-managers expressed the opinion that if people choose to go into games industry, then they should accept the reality of low job security just as how people work in the film and movie industry accept their working environment.

“And I think there's a drive at the moment I see for a lot of companies effectively trying to follow the film industry model where you don't have a company²⁷.”

---SO07.

“So basically I try to do things more like a.... I suppose the film production company where I come up with the concept, and then I hire people specifically for the game. And at the end of the project, people go separate ways.”

---GDF04.

In essence, the continuous expansion and contraction of games development companies is driven by the financial restrictions as new project deals often come with funding and hence wages can be afforded. However, securing a deal from publishers or other investors is not straight forward and has its own challenges (section 5.4 discusses the funding topic in detail). It particularly raises challenges in job security, business sustainability and talent recruitments. Business clustering emerged as a model which could lead to better results.

²⁷ Don't have a company here refers to the fact that a new company will be formed just for making a new game.

Clustering is now a common phenomenon in the industry (Mateos–Garcia et al 2014). As described by SO07, employees normally have three options after their former employers disband the team upon finishing a major funded project: self-employment and freelancing, set-up their own companies or join a different company. It is observed that people often stay in the same region if they choose to do freelance or set-up their own companies to take advantage of the local connections formed and no cost of moving. Though people may choose to move to a different region to join a new company, it is also common for them to find their next employment in the same region if it has a cluster of games development companies. The reason for this lies in the advantage of clustering: as one company going through the contraction process, there is likely to be another company going through the expansion process. Moreover, as the cluster grows over time, there are also various support services located nearby. All these support service providers together with games companies enrich the local talent pool. The various skills and knowledge accumulated are transferable to different companies and projects. This will strengthen the region and contribute to its long term sustainable development.

5.2.3. Power of Publisher and Platform and Consumer Expectations

As the industry has evolved over time, the power of publishers and platforms has shifted. Consumers' expectations have also changed as time passes. Businesses are expected to meet the changing demand. Table 11 summarises the changes of the power of publishers and platform holders and consumer expectations over time drawing insights from interviews and secondary sources.

Table 11. Evolution of the Power of Publishers and Platform Holders and Consumer Expectation (Author's Own Compilation)

	Traditional (1980s-early 2000s)	Digital Distribution (early 2000s-now)	Emerging trend: Cloud based computing (post 2010s)
Power of publishers	Essential	Reduced	Reduced
Power of platform holders	-	Essential	Essential
Consumer expectations	Emerging	Increasing	Increasing

From the 1980s until the early 2000s, publishers had overwhelming power over developers due to the significant up-front costs required to produce and sell the games as discussed in section 5.2.1 (and as agreed by GDF12). The rise of digital distribution in early 2000s revolutionized how games could be distributed to potential consumers (Williamson and Ridsdale 2019). While independent games developers gained more control and opportunities, the power of publishers were significantly reduced (O'Donnell 2017). However, for many large scale games such AAA games, funding is still essential and publishers can still play a significant role. Many of these companies have transited to become publisher-developers where they have both an in-house production team and a publishing team. Such companies are often big in size. The use of digital distribution also comes with disadvantages. For instance, the sales of the games are heavily relied on distribution platforms who normally have an extensive long list of terms and conditions that companies need to sign before publishing their game (as agreed by SO07, GDF16). Moreover, with the overwhelming number of games available on these platforms, the decisions on the editor's choice (as shared by GDF04 and GDF15) and the ranking algorithms (e.g. McAloon 2019; Teuton 2019) can greatly influence the sales of the games whereas developers (and publishers) have little or no control of the sales (see section 5.5 for further discussion).

As technology has advanced, consumers' expectations have also grown higher and higher. They expect better quality, improved player experience and sometimes larger games (GDF12). As a result, the games require increased manpower and finance to produce (GDF12). During some off-the-record conversations, some people believe cloud based gaming is the "next big thing". According to existing user reviews, technology and infrastructure still require further upgrading in order to support and develop the business model and meet the growing consumer expectations.

5.2.4. Work-Life Balance

The games industry traditionally has a reputation for employees working long hours and not necessarily being well-compensated for this. "Crunch" culture was frequently brought up during the conversations. It describes a culture where games developers need to work

very long hours for weeks or even months when a production deadline is approaching. During some off-the-record conversations, industry practitioners have said that sometimes employees need to sleep in the office to meet the deadline. Such long hours are also experienced in one of the interviewee's company:

"I think all creative industries, and gaming is no different, the balance is probably a little bit... too far away into work because it's a very tricky industry and so now, we all stay late every night because we are trying to finish the game. Er.. I think in general creative industries going towards that. But then sometimes you have a period where it's very quiet for a few weeks, so it's kind of up and down."

---GDF05

However, many interviewees have expressed that such "crunch" culture is gradually being replaced by more modern day practices which lead to an improvement in promoting and maintaining a healthier work-life balance.

"I guess, the kind of temperature that you get from the triple A space that.... you work ridiculous hours and you burn out fairly quickly. Er..... the average burn out time for game developers roughly five years. Er.... we try to avoid that. Although we might sometimes work late nights occasionally, very rarely, [we] try to maintain a 9 to 5 pattern.... er... which has led to some projects taking longer, but we kind of feel that the expectation that we're going to work from 9 until 9 at night isn't healthy at all."

---GDF03

"It depends on the company, ours is relatively quite well balanced, er.... maybe not for the core team members like us, but for most of the staff, when you want to have a balanced life, you can have it, for sure. It just depends.....cus... you find a lot of developers they do really enjoy working on games as a hobby, so...yeah. "

---GDF11

In comparison, interviewee GDF08 expressed a different perspective on this topic of "over-working" or "crunch":

“I refuse to [accept] the concept of work life balance in its entirety. [...] I think it's unhealthy if you do not enjoy what you are doing all the time. [...] You should enjoy the work you do, and that should be part of your life, so..... the concept of work life balance implies that work is something that you do because you have to, and a life is something you do when you're not working. I think that's rubbish.”

---GDF08

The perspective blurs the line between work and life and believes that people should be enjoying their job and therefore there is no such thing as work-life balance. However, it is also necessary to understand that the GDF08 oversees a company with over 220 employees at the time of interview. Whether an employer's view aligns with the employees, or indeed is practical for the majority still remains questionable.

5.3 Talents

Games development, in essence, is software development which often includes essential inputs from creative perspectives whether that be original arts or audio, creative storylines or new technologies. The main resource required for game development is talent and the *“cost structure is mostly people's salaries and overheads”* (GDF08).

5.3.1 Clustering and Business and Management Skills Challenges

The project based nature of the games industry often means that the company needs to expand their team rapidly over the short period of time when finance is made available. For many relatively inexperienced developers, this can cause problems. Coming from a technical background often implies that they do not have much knowledge or experience in business or management. However, managing a relatively large team with over 30 people requires skills, the *“dynamic changes really dramatically, really quickly”* (SO07) in comparison with working in a micro or smaller studio. This change of dynamic requires skills in building a trustworthy and collaborative team. SO07 further shared that his

consultancy work involves providing project management training for companies, such as the use of Scrum²⁸ method. Such project management methods (e.g. Scrum) require physical co-location preferably or close online collaboration. Staff are also encouraged to be present at such meetings and activities for effective communication and increased efficiency.

The project based nature of the industry and the constant expanding and contracting often result in clustering of digital games development companies. Clustering was seen as beneficial by most interviewees at least at some stages of their development. For instance, as one company is contracting its size, there is probably another company recruiting to expand their team.

5.3.2 Skills Shortages

Talent is the driving force behind games development. The industry is facing various challenges in obtaining, managing and retaining of quality human capitals. The project based nature implies low job security and imposes challenges on recruiting right talents at short space of time and keeping them after projects finished. Some interviewees believe there is a skills shortage in the industry in the UK. As GDF08 and SO07 both argue that games industry is also competing with other industries (such as banking, finance, technology companies) with talents as they also need programmers and can afford much higher salary.

“Yeah, [there is a shortage] in all areas. Basically, the industry, the games industry is growing, we are competing with [the] banking industry, everybody wants software, software is very important and it's hard to make. So we need to find the right people to make computer games, I imagine.”

---GDF08

“Personally no. But that's.... maybe because I don't restrict our hires just in UK. I think in the UK.... if I was hiring only from the UK, then I would probably say yes.

²⁸ Scrum is an agile project management tool to help people manage complex knowledge based projects.

Er.... because I find that UK or British programmers aren't very good. Haha. I don't know why. And, and same with artists. I find, I haven't sort of seen a really good British artist. I mean, my, my whole team, I'm the only British person on my team.”

---GDF02

Some interviewees (e.g. GDF11, GDF02, GDF04, GDF06, GDF12, GDF14, GDF15) have reported that they do have a number of overseas workers (EU or non-EU nationals) working in their companies or the interviewees themselves are indeed non-UK nationals. Thus, UK exiting the European Union poses uncertainty. Section 5.7.2 discusses this Brexit issue further.

5.3.3. Games Related Education Degrees

As a response to this skills shortage, many related education degrees are now offered at university or college level in the UK. However, opinions are mixed towards the quality and usefulness of those education programmes. Whilst the majority of the interviewees expressed either a neutral stance or leant towards the argument of being useful (but need further improvement), there are some opinions questioned the value of having such degrees. As GDF08 expressed that they did not think “*games is something one can get a degree in*” whereas GDF11 stated:

“It's a mixture. I would say most of them in my experience are good, pretty good but some needs work.”

---GDF11

“We don't necessarily feel they are as good as they could be. So we want people that are er... well educated in a proper degree, and then have an interest in making computer games. [.....] There are some poor game degrees. And quite frankly, making a game is not something you can get a degree in because it's.. too many skills involved, too many different skills. Making computer games is team, it's teamwork and it's very unlikely that many people can....do all of that themselves at [the] right standard.”

---GDF08

Among the 18 games development companies analysed, seven of them were formed by people who studied games related degrees at undergraduate or master levels. Seven out of the 11 remaining companies said their company had previously hired games degree graduate(s). It is not unusual to see games degree graduates form their own companies. However, the reasons behind this are mixed. While creative freedom or other advantages of running their own companies were reported, some interviewees (e.g. GDF15, GDF09) said the direct reason was because they could not find jobs in the industry after graduation.

While industry employers' opinions are mixed, lecturers interviewed did believe in the idea of game development teaching. However, these education practitioners also acknowledged the importance of industry inputs into their programmes. The graduate employment rate is also something they considered to be a key measure that they need to continuously work on.

5.4. Clustering and Networks

Situating in a games development cluster brings opportunities to interact with a group of talents working in the same or similar field. Such interactions can be very beneficial. As GDF02 expressed:

"I met some amazing people. So what was great is they were from studios making Real Time Strategy games as well. [.....] We're now quite close friends and they're testing the game for us as well which is cool."

---GDF02

Proximity makes it easier for knowledge and resource exchange that assists the games development process which ultimately helps with the performance of the company. Clustering of games development companies also attracts supporting service providers such as marketing, usability testing and legal firms. Locating nearby can make the experience of using certain services easier. GDF02 had just moved to a main games cluster and shared his experience of locating in there:

“There's a UX, UI studio near company B1²⁹. So we're probably gonna be using them. And the fact they are just down the road from me makes it really nice and go to the office, we can chat. We're going to be using another company called B2 that, that do.... er.....usability testing and UX design. [...] So, so we'll probably go there for the day and do all of our usability testing with them. So it's lovely to actually be close to so different service providers.”

---GDF02

While localized clustering is growing in the games industry, another increasing common phenomenon is the multi-location collaborations enabled by globalisation and digitalisation. The use of digital communication technologies have made it possible for individuals or teams to work remotely on the same project. Companies can now not only employ freelancers from different countries to complete parts of their project but also start a company or project entirely based on virtual communication. For instance, GDF10 has a junior designer who works from Asia. GDF04 works from home in the UK and pays freelancers to work on aspects such as storyline and music. GDF02's co-founders worked from four different cities in three different countries on their game in the first two to three years. However, as SO07 said that the process of games development involves consistent trouble-shooting, bug finding and testing which implies that effective communication is key. While some teams have been operating on a virtual basis, others did also express preferences of working in the same location. Indeed, GDF02 and his co-founders were looking to relocate to a gaming cluster and work from the same office space once sufficient funding was secured. This multi-location collaboration approach comes with strengths and weaknesses. On one side, companies can potentially access talents from all around the world and are not restricted by their geographic location. However, the games development process involves constant sharing of ideas or progresses which implies extensive communication. Therefore, proximity is beneficial in this situation and often preferred given current environment (where virtual communications may not be as efficient as face-to-face communication).

²⁹ Company names are anonymous to ensure the anonymity of the interviewee.

5.5. Funding

5.5.1. Funding Options

Finance was the most common topic during the interview conversations. Particularly, funding was seen as a main challenge towards growth among indie developers. There are various sources to obtain funding such as private or public investment, crowdfunding, and grants. It is also common for companies to earn money through work for hire, utilising skills in other areas, or work on part-time jobs so that they can work on their own game titles outside of their paid working hours. Policies such as the UK Video Games Tax Relief have also been beneficial for eligible companies as 20% of their development cost can be injected back into their businesses.

However, each funding option comes with its own advantages and disadvantages. Funding options such as doing part-time job and taking on contract that is irrelevant to the game in development mean delay in the game development progress. As the market changes quickly, delays in releasing implies further risks. While a grant is a great source of funding, it is also very competitive to apply for and often comes in smaller amounts. Crowdfunding has received mixed reviews in recent years (Futter 2019; Dring 2019; O’Keefe 2019). While some criticise its administrative burdens and its instability, some games studios have benefited greatly from their successful crowdfunding campaigns. As some popular grants were European grants, Brexit may impact on UK developers’ eligibility of applying for those grants in the future.

Games development companies often need to trade with equity share or Intellectual Property (IP) ownership for getting private or public investment. For instance, publishing companies can fund a development studio to develop a particular game title. In exchange, publishers normally retain the full ownership of the game. If the game sells well, using different ways of calculation, additional royalties will be paid to the developers. In addition, money is usually paid in instalments and depending on the contract, publishers can withdraw with only weeks of notice. It is therefore important to maintain a good relationship with the publishers to ensure foreseeable, steady income stream but sometimes this is not possible. For instance, GDF12’s previous studio’s closure was

partially due to the cancellations of several big contracts around the same period of time. This investment based funding option can sometimes leave developers with limited rights to influence on the development of the game. Thus, as some interviewees expressed: the best scenario is a “*previous project’s sales would be able to fund like the next project*” (GDF01).

Some companies have been working on shifting from a work for hire model to a self-publishing model. For instance, GDF10 is gradually reducing the amount of time on work for hire and contract work and moving to self-publish the games they developed. GDF08’s company had already completed the process:

“We expanded quite rapidly, we were doing a lot work for hire, we expanded to about 360 people we acquired B3, and that didn't work out. Then we made [the] transition from work for hire for other people to doing our own games [....] we don’t do any work for hire anymore.”

---GDF08

Self-publishing gives greater control over the game they developed and can be very profitable if they were able to fund the development in the first place. However, companies face greater risks in case of unsatisfied sales. Previously, if a game did not do well in terms of sales, then the publishers bear the loss. When developers take over the publishing role, they need to be self-funded which means they bear the loss in case of any commercial failure. GDF16 shared that in a hit-driven industry³⁰ with ever changing market trends, it is difficult to ensure every game will be commercially successfully. Further discussions on commercialisation and marketing are presented in section 5.5.

As a risky business with potential high returns, it turns away certain type of investors but attracts others. As GDF12 expressed:

³⁰ Hit-driven here means that failure is normal, but success is sensational, i.e. most games fail commercially but the small percentage that succeed (or can be called “hits”) fund the vast majority of failures.

“It means that VCs, er... Venture Capitalists that are excited about technology, are attracted to this because it's...because they are gamblers. [...] To be honest, if you want to play the big tables, kind of video games are the big tables, because it's very high risk but potentially high returns. But it does mean that if you are more conservative investors and portfolios...pension funds investing companies, they would never invest into video games [...] because it's just too high risk. So it's not good for the conventional investors.”

---GDF12

GDF12 believed that people in the industry understand the high risk but potential high return. Acknowledging that there are also a lot of failures, GDF12 shared that some venture capitalists are attracted into the games industry while conservative investors such as pension funds are not.

5.5.2. Business Acumen

Business acumen can play an important role in securing and utilising funding. For instance, in a funding pitch, founders are often questioned on business aspects such as cost structure, development strategies and return on investment. Investors have also started to prefer to invest in a team with a least one person who oversees the business side of activities. SO04, who manages a games investment fund said:

“The key thing with each one of those things is that they've got a really good..... sort of founder, CEO, who's managed to do the business side as well as overseeing the creative side. All completely differently. But nevertheless, so we begin to sort of see ‘Ah right. Does this person look like they could be another, one of those?’”.

---SO04

However, not all game developers have acquired the necessary business skills. Business acumen in a team can also be associated with decisions in developing a game. GDF08 shared his opinions on this issue:

“The problem you have with a lot indie developers is they actually making the game they want to make, er...which may not be the game other people want to play. Therefore it's inherently risky.”

---GDF08

Some game developers tend to focus too much on developing the game they love and neglect the importance of getting to know the target market (as stated by GDF08, SO07, SO01). As agreed by SO07, SO01 and SO06, such market awareness is part of business acumen and can influence on the success of the commercialisation of the games. Though funding providers do not expect game developers to be veteran business people, they do expect developers or as a collective team have basic business knowledge.

5.5.3. Budget Control

GDF08 and GDF12 were the only two owner-mangers interviewed that either currently manage, or have had experience of running games development studios with over 200 staff. One of the key success factors that both GDF08 and GDF12 shared was to be able to “*control the budget*”. Games development is generally a long process and involves a series of trial and error. It is hard to keep to the tight schedule which partly resulted in the “crunch” culture as discussed in section 5.2.4. However, running over time means losing profit margin. SO07 shared that it is important to consistently review the process and alter plans in order to stay within the budget.

5.6 Commercialisation and Marketing

As GDF16 shared, the games industry is still hit-driven and it is hard to predict whether a game will be commercially successful or not. Creating a game can be difficult and time-consuming. However, getting into the market and achieving commercial success is equally important to develop the games. Platforms such as Steam, Google Play Store and Apple App Store enable game developers to self-publish their games. Together with technologies such as Unity, this lowers the entry level to the games development market which alternatively also contributes to over saturation of the market. Also, as the market

becomes increasingly crowded and competitive, it becomes harder for a game to stand out from the rest. This is particularly hard for new game titles and indie developers in general.

“There are 500 games a day or a week or whatever is being released from the App Store. A few hundred a week on, on Steam and the market is now really really saturated.”

---SO01

“Biggest barrier is access to worldwide market, so internet penetration, and getting the word out. Ah... broadly speaking, it would be discovery, so we need game players to find out our products.”

---GDF08

5.6.1 Business Models and Monetisation Strategies

To be commercially successful, it is necessary to understand and choose the correct business models and monetisation strategies, as agreed by SO07 and SO01. There are a variety of monetisation strategies which can be broadly classified into pay to play, free to play and hybrid models (Davidovici-Nora 2014). Within pay to play, common strategies include premium purchase and subscription. In comparison, free to play also comes in various forms such as in-game advertising and in-game purchase. There are then a variety of specific methods to execute these advertising or purchase strategies. Lastly, pay walls is an example of a hybrid model where it is free to try the game for a period of time and then needs the users to pay for continuous access.

Different monetisation strategies can influence the gameplay design (SO07). For instance, if an advertisement video is to be inserted, developers need to think about how it will impact on the gameplay experience. It is essential to ensure that the advertisements are watched to be able to make money. However, the advertisements need to be designed in a way that players will not get annoyed that they stop playing the game. Poor gameplay experience can impact on players' decision of staying within the game and subsequently affect the monetisation opportunities and results. SO07 shared the experience:

“[...] saying we're going to have video advertising in the game. We're going to make it feel real valuable. We're going to make you want to watch the advert. [.....] We have all of our advertising in our game that is opt in. [.....] You're watching it because you know you get earn twice as much money. So there is a positive brand association. [.....] I think it's something like 98% adverts we offer in the game are watched by players because they value what we're giving. So it's those kinds of balances that we play around with.”

---SO07

However, there are risks in being solely dependent on these platforms. Any changes in the algorithm or the way games were appeared in consumers' devices can impact on the sales. As SO01 shared the story:

“So one of the things that has really negatively impacted the success of a lot of small games businesses over the last 12 months is changes that Steam has made to its storefront. Well, actually indie games get less visibility than they used to on the storefront. And therefore don't have that organic reach that they used to have. And that's something that's a huge, huge monumental impact on studios ability to do well.”

---SO01

Similar stories were also found around June 2018 where many indie developers suffered from a sudden downloads decline (Lanier 2018). The cause was believed to be the changes in the search algorithm on the Google Play Store. As the number of games developed increases exponentially, the listing display of the games affects the sales. Reflecting in the digital space, ranking and listing related algorithm plays a key role. Many games developers have shared their stories in online games communities (e.g. Chetrusca 2018; Forum.unity 2018; Singh 2018) of how their sales numbers were affected on Google PlayStore and Steam which was suspected to be due to the unnoticed change of algorithm. From a different perspective, it shows that though the digital platforms provide an easy and affordable route to publish their games, the platforms then have a deciding power on how well the game might perform commercially. With all the terms

and conditions developers need to agree on before publishing their games on these digital platforms, developers are generally in a vulnerable position against any negative changes. Therefore, this is a consistent risk they need to be aware of and prepare for.

5.6.2. Market Saturation

As briefly mentioned in early discussions, the digital games market is considered to be overly saturated. For instance, while Steam was moving away from manual selection, it resulted in hundreds of games being published on the Steam platform each year. According to SteamSpy (2019), there were 9,132 games published in 2018 alone, which was approximately 25 games a day. The overwhelming selection of games provides choices for consumers and attracts a lot of attention and interests. However, games developers have found it increasingly difficult to sell their games. Quality cannot guarantee success as they can be easily overlooked amongst some poorly made games. Interviewee GDF13 is an independent game developer and shared his experiences of publishing on Steam:

“As an anecdote, I remember speaking to.....the head of a games company here [...] He had started his company at a time when selling games on Steam was incredibly lucrative. So he, he bought the rights for a game, an old game that had been out for several years already, put it on Steam for the first time and they made £20,000 in the first weekend. [...] and when we released our game on Steam and we sold 26 copies in the first weekend. [...] That was several years ago now and it's even worse now.”

---GDF13

While it is already difficult to get noticed on Steam, the competition and market saturation in mobile platforms (e.g. App Store and Play Store) are even more significant. For instance, according to PcoketGamer.biz (2020a, 2020b), 935,860 games were active on App Store as in 06 March 2020 and 3,248 games were submitted to App Store in the month of January 2020. Therefore, how to differentiate from other games in the market and how to drive more traffic to the game is key to success. Interviewee GDF13 shared his experiences of publishing games on App Store and the opinions of the mobile market:

“iOS is also very difficult now.[...] The first game we made [...] released for free [...] in that first day, we had 15,000 downloads. I was speaking to a friend, [...] who had released their app for free [...] a couple weeks ago and got 100 downloads. There's just way too many [games]. The marketplace is very very very difficult now unless you have either a very strong following which some people do and had developed over the past few years. Or you have a huge marketing budget and you're willing to make games that are attract....sort of in a very accessible way.”

---GDF13

With an overwhelming choices of games, both Apple App Store and Google Play Store have a service called *Editor's Choice*, which provide a small selection of special curated quality games recommended for users. As the platform becoming increasingly crowded, being selected as *Editor's Choice* will generally result in high traffic at least when the game is first published. Interviewee GDF04 also shared that the reason their first game were sold well was because it was featured in the *Editors' Choice* section which gave the game great exposure to the buyers.

5.6.3 Practices and Lessons Learned

The commercial success of a game depends on a range of factors such as the quality of the product, the time of launching, and its marketing and PR strategy. There are some common good practices in relation to the marketing process. Firstly, as GDF12 explained, it is essential to “*look what your competitors are doing and where the market is going*” and “*analyse why they have been successful*”. Secondly, as games are now increasingly published through digital platforms like Steam, Google Play Store, Apple App Store or consoles, relationships with platforms are crucial to the commercial performance of a game. As GDF04 shared, the biggest contributor to the commercial success of one of their games was because the game was featured on Apple App Store's *Editor's Choice* which ultimately translated into downloads and sales. Thirdly, as the market becomes overly saturated, the innovativeness and overall quality can play a big role in standing out from the rest. However, it does not guarantee success. As interviewee SO03 said that “*critical*

success doesn't always match commercial successes", i.e. some games receive crucial acclaim but do not sell as well as expected.

"We can't always understand what makes the, the consumer tick necessarily. But yeah, it's a shame. Quality does not always equate to marketability."

---SO03

There are some common marketing related mistakes that can be easily avoided. For instance, developers need to understand the timeline on game releasing. Developers are advised to start thinking about marketing strategy early rather than leave it "too late" (SO01). It is essential and important to engage the community early during the prototype or Alpha stage. Determined by the algorithm platforms used, best exposure time is normally when the game first gets published. To maximum the opportunity, it is beneficial to build an existing community and grow the audience from the start. The time of releasing can also play a significant part when it comes to the commercial success. For instance, GDF10 shared that timing was the main reason for the unsatisfactory commercial results of two of their games.

"I think it was the timing that when we launched them [...] I think that was a big issue. Both of them were launched towards the end of the year when the big Christmas rush starting. And all the big games come out, Call of Duty and FIFA and all that. So you compete with those games for game play time, and people aren't interested. They just want to play Call of Duty. So you can release an indie game at that time, no one is gonna take notice of it."

---GDF10

5.7. IT Infrastructure

It is not surprising to learn that internet and broadband is the fundamental infrastructure required for games development and distributions. The UKIE's (2019) report shows that 88% of UK households can access the internet and half of these can be categorised as having super-fast broadband connections (with speed over 30Mbps). While the majority

of the UK are covered by a satisfactory level of internet/broadband speed, there are still improvements needed. For instance, though living in a major city in the UK, GDF04 suffers from slow internet speed in her flat and needs to visit a friend with better internet access in order to upload the coding developed for her game. GDF15 needs to pay “*like two and half grand a month*” to get a satisfactory level of internet speed despite the fact that they were locating in a digital hub. Under Brexit, there are also concerns on potentially greater technological differences between UK and the EU such as download speeds and internet access (McCallum 2019).

As mentioned in section 5.2.1 and 5.2.3, cloud gaming is currently on the rise which has significant requirements for bandwidth and latency (Morgan Stanley Research 2018). Although current internet providers have been providing the required connectivity to play many games, a higher level of internet service is expected to ensure player experience (Morgan Stanley Research 2018). In particular, 5G is expected to meet this demand and improve user experience by providing “faster data transmission and more reliable connectivity” with low latency (Department of Communications and the Arts 2018; Morgan Stanley Research 2018). In the UK, political decision-making uncertainty, such as whether to allow Chinese company Huawei to take part in building UK’s 5G network, has already posed questions on the future plan of setting up the 5G network in the country (e.g. Bowler 2020; Mohdin 2020).

5.8. Political Environment and Government Support

5.8.1. Tax Credit Related

Policy is another key factor in supporting the industry as a whole. For instance, the UK video games tax credit introduced in 2014 was given positive feedback by many interviewees.

“At the moment, the last 5, 6, 7 years, we had a very favourable government support the games industry. And in fact they gave us, first of all, the R&D tax credit and then

cultural tax relief for creating video games. That has been extremely helpful to the games industry.”

---GDF12

“I think the main thing that's been really helpful is been the games tax credits. So that allows us to claim back tax relief on all the innovation we do. That means there is more capital available for us to re-invest back into the business. That has been, pretty much a game changer for us, that has been really great. So [if] that level of support [is] continuing, that maybe extending, that would be very positive to the industry.”

---GDF14

However, such policy support also has uncertainties as GDF12 also expressed that although the tax relief has been extended to 2024, there is no guarantee what happens after that. The potential cancellation of the support may cause problems for the industry.

5.8.2. Brexit and Exchange Rates

At the time of interview until the day of writing, Brexit remains a topical issue for the UK games industry. The uncertainty and potential negative impact on accessing European and worldwide market raises concerns in the industry. From the interviews, the concerns were raised mainly in two areas: hiring ability and accessibility to the European and worldwide games market. Secondary data analysis also reveals a potential impact on accessing funding as some popular grants were European grants (McCallum 2019). Brexit may impact on UK developers' eligibility of applying for those grants in the future.

According to TIGA report (2017), 15% of the employees in the UK games industry are from the EU and 5% from non-EU countries. The change of political situation poses questions and concerns on whether the company would still be able to retain the ability to hire from EU where needed. As GDF11 expressed:

“I think the big thing is, not being able to hire from the EU when it's necessary. This country is very very reliant on...on workers from outside of the UK. Yeah... and it should be, always has been, that's what this country has been founded on.”

---GDF11

“Other barriers are access to talent. I think with Brexit particularly, that's a concern that we will find it harder to attract talent from... particularly around Europe which we have been rely on in the past.”

---GDF14

Accessing to the EU and worldwide consumer market due to Brexit was another concern raised by some interviewees. It was reported that a large percentage of the sales revenue of the games developed in the UK come from non-UK countries. For some interviewed companies (e.g. GDF10), the EU, together with North America and Brazil, were among the ones that contribute the most to the revenue of the games.

“I think..... some of the biggest barriers is just going to be some countries deciding that they want to close the borders and just.... not engaged with the global market because global market are fairly significant source of income for lots of people, especially independent developers who needs that income to pay their mortgage, to pay their rent. Er.... so Brexit being one.”

---GDF03

The changing political situation may also bring negative impact on tariffs and currency exchange rates which can subsequently affect the general accessibility of the wider market. For instance, under no deal Brexit, companies that sell digital products or services to EU customers need to register for the Value Added Tax (VAT) Mini One Stop Shop (MOSS) in an EU member state (Shin 2019). If no deal is agreed, complications over data sharing between UK and EU are also expected (Shin 2019). Moreover, exchange rates can also affect the competitiveness and profitability of the businesses. GDF12 shared that all of their big game contracts were international. The funding body obtains quotes from all over the world to choose from. If UK has a high exchange rate, then the UK developers

become more expensive to pay in a different currency which disadvantages them in securing publishing deals. The fluctuation of exchange rate can also cause financial loss for an already secured international projects.

“When we are at BXX³¹ where dollars exchange rate is 1.75 and while working on them, the exchange rate went up to 2.1 meaning that actually the contract we signed, we were committed doing, they all in dollars. We are actually losing money every day we worked on them just because of the exchange rate.”

---GDF12

5.8.3. Other Policy Supports

During the conversation, some interviewees expressed that some form of government supports can be beneficial. They believed that the government should pay more attention to the industry. For instance, SO08 expressed that government support is required and should be done in some form or another: *“By consolidating learning maybe, and setting up some kind of support structure, maybe.”* The British Games Institute had also been brought up during the interviews as a form of support for the industry in particular to resemble the support that TV and films industry currently receive.

“I think there needs to be something more focus towards games as a governmental level. [...] So I'm a big supporter of the British Games Institute, because I don't think games really [...] certainly not support in the same way that films and TV are, or music or anything. And it really should be because we've been in the industry now for 4 years and has more financial capacity than any other ones.”

---GDF18

“The objective I'm looking at the moment is trying to put together a kind of...equivalent to the screen, British Film Institute, British Games Institute, trying to bring games into the sort of cultural mainstream as a creative industry. [...] I want the government help to support and fund the British Games Institute.”

---GDF08

³¹ Company names are anonymous to ensure the anonymity of the interviewee.

Other potential support have been raised by interviewees include reducing administrative burdens and providing more opportunities for funding, training and networking.

5.9. General Business Support

UKIE and TIGA are the two main trade organisations for the games industry in the UK. Both organisations support the industry in various ways such as providing professional advice, facilitating the connectivity of the companies, participating in organised events and speaking with the government and media on behalf of their members (see UKIE 2020; TIGA 2020). For instance, both organisations were vocal about the tax break when representing their members and the UK games industry in front of the government. UKIE has been organising a series of industry events to bring together experts and professionals to share their experience and opinions to local developers. TIGA runs the TIGA University Accreditation System that accredits university degrees to ensure graduates are “industry ready”. TIGA also brings industry and education partners together to share best practice and current knowledge and information. Indeed, the majority of the interviewees said they had joined either UKIE or TIGA or sometimes both. Indeed, GDF12 believed that the UK games industry as a whole benefited greatly from TIGA.

To develop a commercially successful game needs collaborative effort from various disciplines. The development requires skills in areas like programming, art and design and music. However, it also requires various service providers to support the whole process. For instance, companies require help from an accountancy perspective. To benefit from the UK Video Games Tax Relief programme, accountants need to understand the business. A lawyer’s knowledge can be invaluable for legal requirements such as contracts or any merger or acquisition process. For example, SO09, an experienced lawyer with particular expertise in gaming industry, shared their experiences and pointed out that developers need to understand the fine details on a contract fully to avoid being tied into any unexpected clauses. The complexity of the industry means the benefits of hiring marketing or PR professionals are likely to out-weight the costs if done

correctly. It shall be understood that the uncertainty of the market means that success cannot be automatically guaranteed even if money is spent on marketing.

5.10. Diversity in the Workplace

Diversity in the workplace is another topic brought up in some of the interview conversations. One of the criticisms is on racism and sexism where the industry is accused for being white male dominated. For instance, GDF04 had worked in large games development studios before being an independent developer. As the only female interviewee among the developers' sample, she shared that:

“The industry is very racist and sexist. [...] It's focused towards able bodies. [...] We discriminate against disabled developers. I don't know what's the right way to say that. When I came on a game team basically everybody needs like, like social skills training. [...] It's very elitist. It's very..... you know, it excludes women, it excludes people of colour. [...] you have things like a bullying or harassment. We need better managers in games.”

---GDF04

SO01 runs a games marketing and public relationships (PR) company and also believed that the white male dominated games industry needs changing.

“People of different backgrounds, different genders, different races, different sexualities, whatever, they all bring something new and interesting to the table. And I actually think as an industry, as a creative fields, we will start do much more interesting stuff when we actually represent the world in the way that it needs to be.”

---SO01

SO01 also echoed thoughts of the games industry being racist and sexist. However, he added another perspective in terms of representation and diversity. SO01 believed that diversity and representation will be something that drives the industry forward rather than “business acumen or anything like that”.

5.11. The Myth of “Luck”

During the interviews, a topic was frequently mentioned by the interviewees was the risks and uncertainty of the industry. The critical reception or sales of a particular game is difficult to predict and the word “luck” has been used by many in describing some of their successes. The term has been used by both early stage companies and more established developers who have had some successes in the past. For instance, as the co-founder and CEO of a company that currently (at the time of interview) is experiencing relatively rapid growth and has produced a few well-received game titles, GDF11 said that luck played an important part in the success of those games. Some early stage companies that were looking to release their games also expressed their concerns over the uncertainty and the element of luck required to be successful. Sample quotes can be seen in Table 12.

Table 12. Sample Quotes on “Luck”

Type of company	Interviewees	Comments
Early stage (less than 2 years of trading)	GDF01	“And certainly there is an element of luck involved in, whether you kind of have the right contacts and you get in front of the right person at the right time kind of thing, ask for right budget.”
	GDF05	“Er...and.... what we need is luck. [...] Er...and luck. Haha...you need a lot of luck, hard work and luck.”
More established	GDF11	“We were just kind of lucky, a lot of it is luck, being in the right place at right time.”
	GDF04	“I don't know if you remember this game called Flappy Bird. Just like by this young guy, young men in Vietnam. And, and it was really low quality game, right? The production quality was really really bad and you could see that he was like a beginner. But his game made so much money, right? So you can't, you can't even say it's, it's developer's skill because it's clearly it's not. There are a lot of examples of people that had no idea how to make video games and the games are very badly made. But they made a lot of money so..... I don't, I honestly I don't know.”

As shown in Table 12, the experienced high quality game developer GDF04 discussed that it is hard to determine what makes a bestselling game particular with the example of Flappy Bird: a poor quality game sold well which may be contradictory to common beliefs. While the Flappy Bird example maybe hard to explain, there were some more acceptable explanations such as timing and being in the right place at the right time. GDF15 shared his opinion on being in the right place at the right time:

“So with us, we obviously in there early, so we're in a very fortunate position. You should read a book called Outliers. [.....] it starts talk about people like Bill Gates, [...] He was there at the right place at the right time when the internet came up and things. It's the same with us. Like if I graduate now and joined Embreonix, it will be a different journey, a lot harder. We were there when the App Store was born. So we were at the right time.”

---GDF15

GDF12, an experienced game developer who has been in the industry since the late 1980s, discussed the phenomenal success of the game Minecraft³² originally developed by one person. From GDF12's view, the game “looks ugly”, did not have “a very good learning curve” and “not very deep”. In short, it was not seen to be “very competitive with anything else at the time” such as games produced by Activation, a leading publisher and game producer. However, the game was very popular and achieved great commercial success. In studying this phenomena, GDF12 attributed the success into two main factors. Firstly, people were buying into the stories. The concept of Minecraft was different from popular game genres such as racing and it was originally developed by a one-man indie studio. Such combination attracted attentions in comparison with big studios producing popular games which were somewhat expected. The initial success and publicity generated further successes and publicity as it was not something rare to happen. Secondly, the game came out at the right place at the right time for YouTubers and Twitch players. The lack of guidance and the complexity of getting into the game provided YouTubers and Twitch players with good scope to produce related contents. Moreover, as it was developed by a one-person indie studio, YouTubers and Twitch players did not need to worry about any copyright issues or being sued as they might with big companies.

“I believe Minecraft was more about the..about what's happening in the environment people talking about the game, the amount of money it's making, the you set the stories, the Youtubers talking about it. I believe it's more successful down to that than the game itself.”

---GDF12

³² early access alpha version available in 2009 and fully released in 2011

In the games industry, it is not unusual to see great success coming from unexpected places, particularly for indie developers. Every success can be explained afterwards but not necessarily be clear before success occurs. Thus, many of those successes have been credited to luck. Just as GDF12 shared about the success of Minecraft: part of the success is associated with the emergence of other platforms which may not as popular or even exist before³³. While there are common good practices that can be learned such as market research, budget control and quality assurance. Other unexpected factors can also lead to success: there is this element of unexpectedness as people's knowledge is limited and there are always aspects that remain unknown.

5.12. Growth Measure

As discussed in section 2.2, measuring growth is a complex subject and people tend to have different opinions on how and what they should measure. Such differences also emerged and proved to be true during the interview conversations. Table 13 summarises the interview results into four categories: motivation of setting up the business initially; appropriate measures for growth; whether the objectives or growth measures change over time; future ambition of the business.

5.12.1. Motivation and Growth Ambition

As shown in Table 13, none of the owner-managers interviewed placed making money as their motivation of setting up their companies. The majority of the interviewees reported their initial motives to set up the company were to gain creative freedom, making games that they loved and working on interesting projects. These motives are also seen to be combined with other perspectives such as frustrations in previous jobs and change of personal circumstances.

³³ Twitch was launched in 2011

Table 13 Growth Measures

Interviewee		Motivation	Measures	Change over time	Ambitions	Notes
Game dev firms	GDF01	freedom to do interesting projects	improve skill, making better interesting products	most likely no	self-sustained and continue doing interesting projects	2017, 3 staff
	GDF02	frustration in previous job, want to work on own games	creative side: contacts, knowledge, experience; business side: monetary (profit and revenue)	yes	build a team with max 25 people working on interesting projects	2013, 4 staff
	GDF03	work for yourself	get games out and reduce client work ratio, employment	yes	get more games out	2013, 4 staff
	GDF04	creative freedom	don't think the factory biz concept work in games industry, more about the games	N/A	Continue making games as now, stay small and agile	2010, 1 staff
	GDF05	want to work in games	physically bigger, mentally learning a lot everyday	n/a	release more games and build company reputation	2017, 26 staff
	GDF06	freelance work grow quickly, do interesting projects, good work life balance	employment however with stability, learn new things	no	release a game, gain stable income, afford pay-rise	2012, 4 full time and 15-20 part time
	GDF07	make games, more creative freedom	quality of the game	yes	not quite decided, but a small company with size of 12 people would be optimal	2015, 1 full time and 9 part time
	GDF08	make computer games for a living	How successful our games are now, how much money we have in a bank	no	continue current operation and make good games, expand into other areas of the media	1992, 220 staff
	GDF09	feel capable and take the risk when still can	amount of games making and amount of money making	possible	depends on the sales of the current game, but would probably keep the current headcount even the game is selling well	2014, 3 staff
	GDF10	Family issue, make own games, control own destiny, reached a ceiling in previous company	revenue (perception and reputation are good but not tangible and hard to measure)	maybe	moving to the publishing side as well, become self-sufficient, license the engine out for extra income	2007, 12 staff
	GDF11	creative freedom, control over our own destinies	Revenue	yes	more games (not sure if want to exit or just carry on at the moment)	2009, 57 staff
	GDF12	making games and needed jobs	cash flow and revenue which is compatible with making great games	no	n/a (depends on the buyer)	2013, 104 staff
	GDF13	making creatively interesting games	creative growth: games/products making which may or may not generate much income	yes	not thinking of growing the company at the moment	2008, 1 grow to 3, now down to 0
	GDF14	felt had right team with right skills in right time, career ceiling in previous job	Profitability	yes	increase revenue and sell the company if at right time with right price	2006, 32 full time and 2 part time
	GDF15	be my own boss and inspired by David Jones	Turnover	no	more games and expand into other industry	2005, 30 in UK

	GDF17	Creative freedom & making games	experience, also indicated employment and financial measures	N/A	release more games	2014, 3 staff
	GDF18	make own games and have complete autonomy	length of survival and number of released titles	yes	release games and be self-sufficient and can hire a few more people	2015, 3 staff
Support Org	GDF16	N/A	employment and revenue	yes		2011, 15 staff, publisher
	SO08	experimental projects, collaborative projects not within games, with other sectors	quality of output	yes	grow the collective	Founder and game developer of game collective
	SO01	N/A	varies very much depends on situation	yes	N/A	Director of PR company
	SO02	N/A	sector/industry level growth would be more meaningful than company level	yes	N/A	Lead of Enterprise Programme
	SO03	N/A	Commercial viability; for successful games can measure ongoing player base etc.	depends	N/A	Senior Lecturer
	SO04	N/A	employment and revenue tend to be measured, but skills and talents involved is also important	n/a	N/A	Founder and CEO of funding organisation
	SO05	N/A	depends, but they see it more on employment	yes	N/A	Inward Investment Officer of local government
	SO06	N/A	being adaptable and not growing too quickly is important	yes	N/A	Founder and Programme Organiser
	SO07	N/A	profit per head of staff	no sure	N/A	Training/Consulting/Project Management
	SO09	N/A	Varies	yes	N/A	Lawyer

Linked with such motives, the majority of the interviewees' future ambitions rely on being able to release more games and being self-sustainable to carry on making more games. Three companies mentioned expanding into other industries or sectors in addition to producing more games and becoming self-sustainable. Only one interviewee prioritised increasing revenue and considered selling the company at the right price at the right time as a favourable option. It is identified that the four companies that expressed possible future plan as expanding into other industries or potential buy-out were also businesses with at least ten years' history. The journey they had been through and the fact that they survived this long may have widened their views in running the business.

5.12.2. Measures of Growth

When interviewees were asked what they would consider to be the most appropriate growth measures for games development companies, a variety of responses were provided as detailed in Table 13. If employment and financial measures (e.g. revenue, sales, profitability) were grouped as popular traditional measures as discussed in section 2.2, then the majority of the interviewees were also reported to consider non-traditional options as more appropriate choices. Such non-traditional measures range from internal growth (e.g. improved product quality and range, internal process) to the quality of the products produced, from length of survival to the number of the games produced. GDF04 expressed particular disagreement with the tendency to measure growth in terms of employment and revenue and argued that such way of measuring does not work in the games industry. Nine interviewees considered the financial situation as an appropriate measure either as a stand-alone aspect or combined with other aspects. The companies that either had over 30 employees or had been running for over ten years all included the financial situation as an appropriate measure. A possible explanation is that the experience the companies went through to maintain the size of the company and survive in a highly volatile industry had made them come to realize the importance of cashflow and having sufficient funding. Therefore, whether they would prefer to prioritise

financial success or not, the companies nevertheless include it as one of the measures.

Interviewees from supporting organisations also acknowledged the differences of opinions among game developers about measuring growth. However, some interviewees with certain backgrounds expressed their opinions on what should be measured. For instance, working for the local government, SO05 indicated that they, as a governmental body, place more value on employment. SO04, founder and CEO of a funding organisation that supports the UK games industry and also aims to increase employment opportunities, considered employment and revenue were the two important measures. Conversely, SO06 who ran a free games development programme and supported digital games start-ups particularly expressed that it is important to be adaptable and not grow too quickly. The interviewees' background and profession shaped their views to some extent which may or may not align with the views of the games development companies that they were supporting.

5.12.3. Changing Dynamic of the Measurements

Section 5.11.1 and 5.11.2 discussed the complexity in capturing the current thoughts on the owner-managers' motives, objectives and appropriate growth measures. Some interviewees believed such measurements or objectives do change over time as circumstances change while others either expressed uncertainty or believed the focus should stay the same.

“I think these things change all the time. And what I've been really interested in recently is, what's called the triple bottom line approach of measuring economic metrics, also social and cultural. I think that's being introduced to our sector a bit more.”

---SO08

“No... I think they always remain the same.”

---GDF15

“It depends, yeah. Whether or not the objectives changes [is] entirely up to the intentions and the aspirations of the developers.”

---SO03

What also mentioned in interview was the fact that the potential changing dynamics of measurements and objectives were partially related to the volatility of the industry. The change of growth measures may well influence the strategy and decisions made when facing a choice which may then affect the results and performance of the company. As SO02 and GDF04 argued and indicated, that a more meaningful way to look at growth measurements was not at a company level but at the industry level.

5.13. Summary

This chapter presents the data analysis results from the thematic analysis. It summarises the key characteristics of the digital gaming industry and the themes that emerged from the interviews and secondary data sources. Specifically, a brief history of the video games industry since the 1980s is presented with particular emphasis on the impact of technological advances, shifting power between publishers and developers, and business model innovations. Then, the project based nature of the industry, the clustering phenomena, and the concerns over work-life balance were discussed. Lastly, the key themes (talents, clustering and networks, funding, commercialisation and marketing, IT infrastructure, political environment and government support, general business support, diversity in the workplace, the myth of “luck”, and growth measures) that were derived from analysing the interviews and secondary data are discussed in detail. The next chapter presents data analysis results from case studies.

Chapter 6 Results and Analysis – Case Studies

This chapter moves on from the thematic analysis at the UK industry level to investigate business growth and the role of entrepreneurial ecosystems through case studies. Two types of case studies are presented. The first type focuses on individual companies. One of the main emphasis is on the development journey of each of the chosen businesses. Through exploring the historical events and associated processes, the dynamic states approach can be studied. In addition, each of the companies is also discussed and presented from an entrepreneurial ecosystem perspective. The second type of case studies focuses on digital gaming clusters in the UK. It maps out the entrepreneurial activities associated with the cluster and explores the role of digitalisation in the ecosystems.

6.1. Case Study – Survival and Growth of Games Development Businesses

Seven case study companies were selected to ensure broad representation of the industry by considering the number of employees, business model, years in operation and key events experienced. Though this research focuses on small and medium sized digital games companies, the potential differences induced by employment numbers (between 1 and 249 people) can be significant. The number of years in operating can also impact on businesses' vision, experience and resources which in turn influence on their performance. As discussed in sections 5.2.1, 5.2.2, 5.2.3, 5.6.1 and 5.11, the different business models adopted and key events experienced by the companies can also influence their performance. Table 14 provides an overview of the individual companies selected for the case studies. Staff number refers to the number of employees in the company at the time of interview.

Table 14. Overview of Case Studies Companies

Company code	Staff No.	Year of formation	Business model and key events
G001	220	1992	Transited from work for hire to fully self-publish in 2014
G002	100	2013	A work for hire studio formed after previous company went bust in 2013. The founders' previous venture was formed in 1990 and had around 220 employees at the time of closure. G002 was later acquired by another studio not long after the interview.
G003	30	2005	Focused on making mobile titles and transited from relying on publisher to self-publish. The studio was bought by an overseas' company in 2012.
G004	58	2009	A work for hire studio initially and gradually expanded their service to other areas such as publishing, quality assurance and porting games onto different platforms.
G005	4FT+15PT ³⁴	2012	Started by doing work for hire projects mainly, but has been investing profit into making own games
G006	3	2014	Started with a small grant and then took on work for hire projects and hired more people, as project finishes, down sized the team to 3 people; has been working on work for projects and investing profits into making own games
G007	4	2013	Relied on personal saving and investment (£70,000 investment for 5% of equity share in 2016) to make the game which is still in development

Each case study comprises four main parts: 1) a timeline outlines the company business journey including key information such as number of employees and turnover; 2) a detailed discussion of the operating history of the company including key events and lessons learned; 3) a map of the company's key entrepreneurial activities from an ecosystem perspective and discussions on the relevance of a digitalisation empowered ecosystem at a global level; 4) my reflection with focus on the business growth dynamic states approach and digitalisation empowered entrepreneurial ecosystem at a global level.

Disclaimer on timelines:

Data regarding the number of employees and revenue were primarily based on interviewees' memory and complemented by information extracted from Company House and other internet sources such as the companies' websites where possible. The reason for using these two indicators were due to considerations of data availability and measurability. Revenue include sales of games, investments and grants, i.e. any kind of sources of income reported by the interviewees. Employment number also includes the founders. Interviewees declared themselves that numbers were estimates only as they

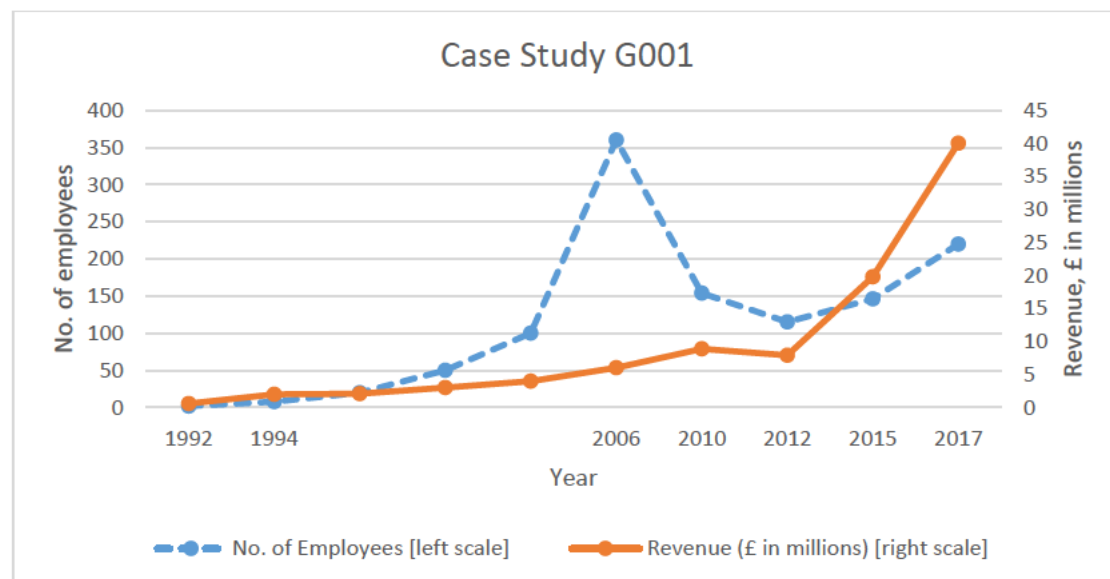
³⁴ FT refers to full-time staff and PT refers to regular part-time staff

were relying on imperfect memories and many did not really keep a detailed record of the exact number. Thus, the graphs drawn and data discussed in the following section are more indicative rather than definitive.

6.1.1. Case Study G001

Company Historical Development Journey

G001 is a games development and publishing company. At the time of interview (Oct 2017), interviewee GDF08 indicated that the company had about 220 employees. Formed in 1992, G001 is a limited company with two directors. Graph 2 depicts the changes of employment and revenue over time, from formation until the time of interview.



Graph 2. Case Study G001

Company G001 was formed in 1992 by the two founders without any outside funding. Like many British game development companies during the 1990s, they started with taking on some freelance work in the games industry. Later, they secured a publishing deal with Company AT. Upon securing this deal, the company was able to expand to eight people in 1994. With some successful games titles already developed for Company AT, Company AT then commissioned them to make some more small games. They were then able to reinvest the profits into the company and expand the team gradually and started to make bigger games with bigger budgets. Co-owner GDF08 considered their growth as “purely organic”:

“Purely organic, basically we reinvest the profits that we made in expanding the company. It's as simple as that. We haven't had any investment outside investors. I'm not a strong believer in venture capital as a long-term way of growing your company.

It's short term fix with an exit.”

---GDF08

In 2006, the company decided to acquire another British games development studio located in a different city which explained the sudden increase of employee number as shown in Graph 2. However, due to disappointing sales by the newly required studio, the company G001 decided to close down the studio in 2010 which explained the sharp drop of employment number around that period of time in Graph 2. Up until around 2010, G001's main business model had been taking on contract work or work for hire projects. This was partially due to the huge up-front cost required to publish a game prior to digital distribution channels becoming available and popular. Work for hire projects essentially means that the publishing company pays for the production cost. It takes away the financial burden from developers and ensures financial stability during production to some extent. However, this type of model is often associated with relatively low additional profitability even when the game is well-received as the publishers often take all or the majority of the profits. Thus, recognising the potential that digital distribution brings, G001 made a strategic decision to gradually switch from a work-for-hire model to a self-publishing model.

“[We] starts to make bigger and bigger games, big figure budgets for other people, then the rise of digital distribution came along, we transition from working for other people to working for ourselves.”

“People want work for hire, they want to hire us towards games development, we...it's not profitable enough for us, so we don't bother”

---GDF08

The company G001 started with making their own games and outsourced marketing agencies to sell the games. They then started to form their own in-house marketing team

in 2012. In 2015, the company stopped working for hire completely. This move had been one of the key contributors to their rapid rise of revenue since 2012.

Other Lessons Learned

The successful growth of the company also benefited from a series of other notable practices and strategies. As GDF08 firmly said:

“Every single game we ever been made has been profitable. [...] Some marginally profitable, some significantly profitable.”

---GDF08

In a highly risky and unpredictable industry where the reception of a game is extremely uncertain, ensuring every game produced so far has not made any loss is a great achievement in itself. GDF08 then shared some best practices that he considered to be key to achieve this: controlling the development budget and being realistic about the expectations of the game at the beginning. Budget control has played an important role in the running of the business since the start. GDF08 said that external publishers may not always be good at what they are doing, but developers can at least control the budget so that they will not need to go back and ask for more money whilst making the game. As they now make and publish their own games, the budget control is even vital. For instance, smaller budget will be allocated if a game is not perceived to become too commercially successful.

“The two things we control are the scope of the game and budgetary cost. What you will find that a lot of people are not very good at controlling the scope of the game and how long is gonna take. We use our own technology and we control everything we do internally, so we are very careful, very careful about what we do. If we think a game is not gonna be too successful, we make sure the budget is appropriate for that.”

---GDF08

Other practices and strategies that the company adopted included staying frugal and sensible and avoiding borrowing money unless absolutely necessary. In a risky industry, they also adopted a portfolio approach where they always had multiple products

(normally 3 or 4 in a year) on offer to spread the risk of a game that not bringing in its expected revenue.

“We avoid borrowing money because borrowing money costs money. And we try to be frugal and sensible, and make sensible decisions. Generally, we have what we called a portfolio approach to everything we do. We don't gamble the company on one product.”

---GDF08

Company G001's effort in diversifying the risk was not only on the number of new games in production at any given time but also branching out to other revenue streams. For instance, since 2000, they also have a small team working on publishing comic books and magazines and launched their book imprint in 2006. They have also started to do TV shows and films since 2016. Though new game releases tend to sell quite well digitally worldwide, their back catalogue sale of the games *“add quite a lot of incremental revenue for not much cost”* (GDF08).

Another key element is the fact that the owner, GDF08 believed in making the game they themselves wanted to make and play. GDF08 claims that they are *“exceptionally good at”* what they do and they *“concentrate on making good games that sell as oppose to anything else”*. They also considered to be very important to have their own technology and be able to stay independent. As engines like Unity and Unreal make the games development process much easier than before, many companies relied on such technologies to develop their games. Although this has reduced the barrier to make games, it comes with risks (see discussion in section 5.2.1 Technology Advances). Thus, being able to stay fully independent and not rely on other people's technology has enabled the company to gain great control over the budget and the development process.

Entrepreneurial Ecosystem Map

Figure 14 depicts key elements related to the company G001's entrepreneurial activities including any networks and linkages under the global-local framework during its

development journey. The representation is not exhaustive but rather indicative given information available.

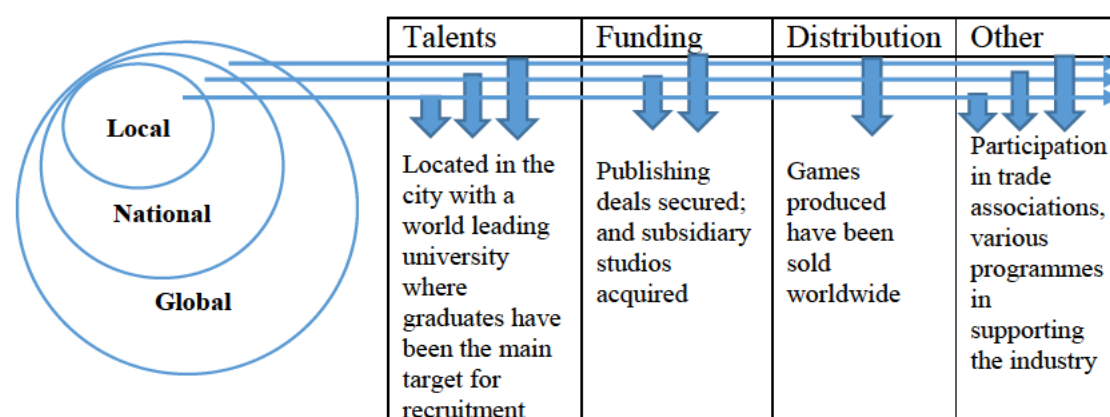


Figure 14. Mapping of the Key Elements under the Global-Local Framework of G001

The main resource allocation of G001 at local, national and global levels were classified into four main categories using the available information. From a financial capital perspective, though G001 is very much self-contained at present, the early development of the company benefitted from various publishing deals secured. These publishing deals provided funding for their productions and helped them to accumulate initial wealth and develop experience and connections. The funding providers were either UK based or overseas (e.g. Europe, North America). Sales from the games developed were worldwide and also contributed to their revenue stream. In terms of financial capital allocation, G001 acquired several UK based games development studios, though some of them had ceased trading by the time of the interview. Nevertheless, such acquisition came with financial resources relocation.

From a human resource perspective, being located in a city with a world-class top university, GDF08 expressed that the university graduates had formed their main local talent pool. While local graduates have ensured a good supply of talent, the company also recruited employees nationally and internationally.

From a distribution perspective, benefiting from the digital nature of the industry, G001's games were distributed worldwide. In supporting the development of the industry both nationally and internationally, G001 has taken part in various activities

such as games events and joined trade associations. It also supported junior developers through participating in various programmes such as being on judging panels of pitching events and provided advice.

Reflections: Business Growth and Role of Entrepreneurial Ecosystems

During over 25 years of history, G001 had gone through a series of events with rises and falls. It did not seem to follow any stage models especially considering the fact that G001's journey comprised a series of iterations especially with expansions and contractions due to new studios being acquired and subsequent closures. Instead of following any set number of stages, the company had been utilising its resources and altering its business model in order to capture rising opportunities and creating value. For instance, realizing the limitation of the work for hire model and the opportunity brought by digital distribution channels, G001 shifted from the work for hire based model into a self-develop and self-publishing model. As indicated by GDF08, the company faced two choices at the time: work for hire and self-publishing. The company was capable of either staying in the work for hire model or moving into self-publishing. The decision was influenced by the owner-managers' judgements that work for hire was "*not profitable enough*" and other agencies (e.g. marketing or publishing companies) may not do a good job in selling their games. While financial reward was important, GDF08 did express that making successful games should always be the primary goal and money is "*secondary*". However, companies need to be profitable enough to be able to produce next games.

During its transition process, the company utilised its existing resources to build an in-house marketing and publishing team over time. Though the shift of business model can be considered as fundamental, the transition process is gradual and incremental. Such a strategy reduced the potential risks of any radical changes it might bring. The whole process took three years to complete. Work for hire and self-publishing can be considered as two different states as defined by Levie and Lichtenstein's (2010) (as discussed in section 2.2.3) a company may be in. G002 has shifted between two different states: work for hire → self-development and self-publishing, which can be explained by Levie and Lichtenstein's (2010) dynamic states approach.

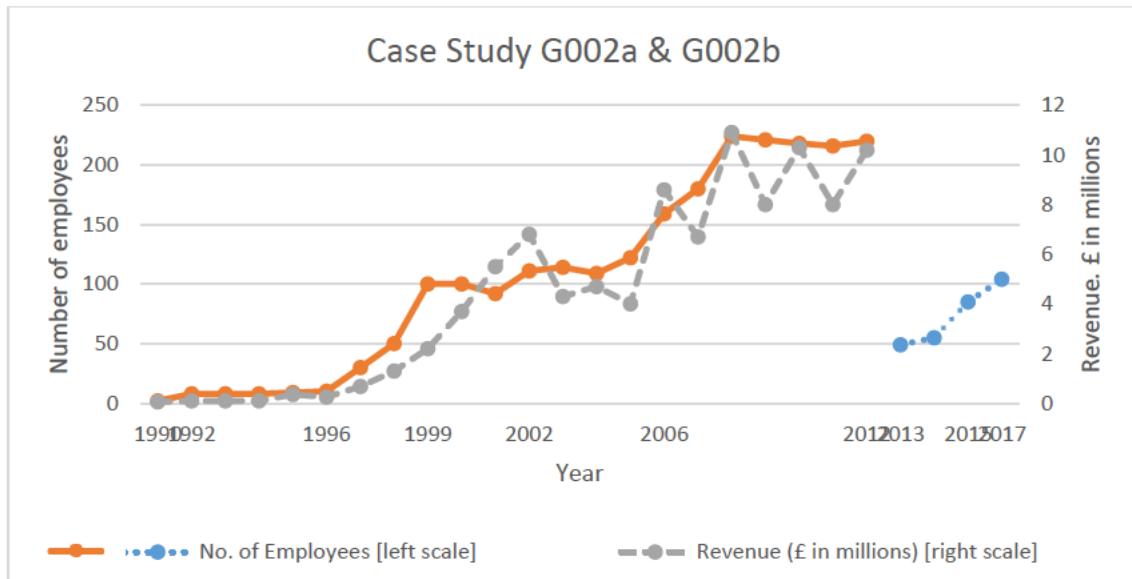
While transitioning between states, resources allocation played a key role in enabling this process. During G001's entire development history, key actors in its entrepreneurial networks included the local university who provide continuous talent pipeline; the publishers who provided funding for the production until 2015; the marketing agents partnered with prior to form their own marketing team. Particularly benefiting from digitalisation, G001's entrepreneurial network extended from local level to the global level. Indeed, key entrepreneurial activity enablers at global level existed from the start. In addition, the global audience brought by digital distribution was also key in the success of the business. The global network has been an essential part of G001's entrepreneurial activities. If an entrepreneurial ecosystem is discussed as a means to best facilitate entrepreneurs' activities, then it is necessary to extend the focus from the local-regional level to a global level and understand how the business can be best supported in an international setting.

6.1.2. Case Study G002

Company Historical Development Journey

G002 was a games development company based in England. It differs from the other case studies as it essentially comprises two companies. The first company (here after referred as G002a), as interviewee GDF12 indicated, had about 220 employees when it went into administration in 2013. Formed in 1990, G002a was a limited company with two directors. Soon after the closure of G002a, the same founders secured a publishing deal and started trading under a different company (here after referred as G002b) a couple months after G002a ceased trading. More details are discussed in a later section.

The case study below presents the development journey with key events that the company has been through since formation drawing from available data sources. Graph 3 depicts the changes of employment and revenue over time, from formation until the time of interview.



Graph 3. Case Study G002³⁵

Company G002a was formed in 1990 by two founders without any outside funding. Similar to G001's journey and many British game development companies during the 1990s, the company started with taking on work for hire projects and had largely remained as a work for hire studio ever since. Unlike G001, G002a went through a series of unfavourable partnerships with publishers but nevertheless still managed to grow gradually to 220 employees with £10.2 million turnover in 2013. GDF12 expressed that publishers hold dominant power over developers and can act in a very unreliable way which can negatively impact on a company's performance.

"They [the publishers] very easily cancel games mid project. The problem is in order for those contract, publishers reserve the right to cancel the contract for their own reasons. So there's always a clause that you can cancel the contract with like a few weeks' notice."

---GDF12

To help overcome this challenge, a portfolio approach, to work on multiple projects for multiple clients at any given time was adopted to spread the risk.

³⁵ The orange (G002a) and blue (G002b) lines refer to the employee numbers. The reason why there is no revenue shown for G002 is because they company was only working on one game and that game has never been published. The interviewee did not reported how much funding they have secured from the publisher to develop the game.

“It was a good idea to have 3, 4, 5 clients at any one time.”

---GDF12

However, such a portfolio approach also came with its own problems in G002a's case. Working on multiple projects at the same time made some publishers suspicious and concerned over the confidentiality and efficiency over their own project. Such concerns can increase the likelihood of a decision to cancel a project. GDF12 recalled that one third of the projects they had worked on were cancelled during development.

“Publishers would always complain that we were not necessarily putting all of the effort, all of the people we had onto their games. And things like the technology we developed as a result of one game would be used on a competitors' game because it was the same studio. They would also complain about confidentiality. They never felt we would be loyal to them so as a result they would not feel loyalty towards us. So so many games were cancelled, so I would say 1/3 of all of the games we started contract for were actually cancelled during developed which is hugely costly.”

---GDF12

As GDF12 said, the cancellation of games that had been in development not only added extreme pressure over financing but also de-motivated the employees and weakened their confidence. In fact, the direct cause of G002a's closure was projects cancellation by four clients within two months. With such a limited time to recover, they were unable to secure a new publishing deal to pay the employees and sustain the company.

A couple of months after G002a declared bankruptcy, the founders (including GDF12) secured a deal from an Asian games publisher. G002b was then quickly set up to be able to take this project and started with just under 50 staff who were all former employees of G002a. As the founders were reportedly to believe that loyalty was the main cause of the cancellation of the projects for G002a, they decided to adopt a business model where they would only serve one client. In doing so, they hoped to maintain a loyal and sustainable relationship with the publisher. GDF12 said, the relationship “*worked well from Sept 2013 to Aug 2017*”. For instance, in 2014, G002b convinced the publisher to produce a mobile version of the game which resulted in adding another 25 people into their production team. At the end of 2015, as they started to produce publicly released Alphas versions for testing, they once again convinced the

publisher to fund an additional 11 people (estimate) for testing, marketing and managing public relations. The following year, in 2016, they then added another 18 people working on mobile publishing. By August 2017, company G002b had grown to have 104 employees.

However, this relationship did not last until the end. G002b was notified by the publisher that the game will be put on hold for at least a year in a meeting in August 2017, without any prior warning. They were once again in a situation of nearly closing down the company as they were unable to maintain their cash flow. While they were in the process of giving 45 days' notice to lay off staff as well as talking to any potential clients, another company approached them and offered to purchase G002b. At the time of interview (Nov 2017), the purchasing deal was still in process and yet to be confirmed. However, the deal was finally completed and announced a few months later.

Other Lessons Learned

During the operating history of company G002a, there were a number of strategic decisions made. Firstly, when PlayStation first came out in 1996 in the UK (1995 in the USA), G002a decided to fully back it. At that time, there were not any PlayStation developers around yet. At the time, GDF12 said, majority of people thought the PlayStation idea would fail and the machine will never be mass produced. While other developers missed out on the first couple of years of developing games for PlayStation, G002a worked on several games and experienced a very profitable few years due to the success of PlayStation consoles. By the end of 1999, G002a had managed to grow from 10 people (in 1996) to over 100 people. They were typically working on three or four games at a time which were all fully funded by publishers. On average, each project took about 12 months to develop. When PlayStation 2 released in 2000, G002a continued to enjoy the first adopter advantage and grew further to around 200 employees by 2012. The increase of employment was directly related to the upgrade of consoles as this required more manpower to develop the games. The upgrade of consoles also required increased budgets as consumers' expectations grew.

Another fact behind of the growth of G002a was the type of games produced. The games commissioned by publishers were often related to certain existing IP and

licences. For instance, some games were based on existing well-known cartoon or movie characters, which already had an existing fan base. The games were also “*relatively well marketed*” (GDF12). Some of those games were even in line with the promotion of a movie. However, it should also be noted that the commercial success of those games were also inseparable from their “*relatively good*” (GDF12) quality and that G002a were able to deliver them on schedule. Although not formally recorded, GDF12 believed all their games had made profits.

“All of the games probably all made their money back, some massively successful.”
---GDF12

The third critical growth factor was regarded the rise of digital distribution and the shift of market trend. As discussed in section 5.1.1, from 1990 until about 2007 and 2008, it was inconceivable for a developers to publish their own games without the backing of a publisher due to the high cost of production required. In 2008, the emergence of digital distribution made it possible to self-publish a game through platforms like Steam. The rising popularity of social media now means viral marketing is gradually taking over the dominant power of traditional marketing strategy such as TV adverts. Another rising trend is the increasing popularity of mobile games which quickly weakened the dominant position of console games. As GDF12 expressed that the company G002a indeed thought about “*developing own games titles and put some games on mobile*”. However, they nevertheless still decide to work on contract projects as their priority and maintained the work for hire business model. This implies that company G002a’s cash flow was very dependent on publishers’ good will. When the publishers decided to pull out the funding, the company were put into a difficult situation and this ultimately resulted in the closure of the business.

From a different perspective and particularly when compared with G001’s journey, the differences in strategic decisions made and the performances to date hinted that failing to respond to the changing trends and the external environment significantly affected the survival and performance of the business. While G002a closed in 2013, from 2013 onwards, company G001 started to experience a rapid growth of turnover. Part of the reason for this was G001’s successful completion of the strategic move of switching from a work for hire business model to a self-develop and self-publishing model.

Furthermore, two former employees of company G002a mentioned that they believed that the root causes of the closure of G002a were (i) not able to move with the changing consumer trend and (ii) not having any notable success on mobiles.

Entrepreneurial Ecosystem Map

Figure 15 depicts key elements related to the company G002's entrepreneurial activities under the global-local framework during its development journey. The representation is not exhaustive but indicative given information available.

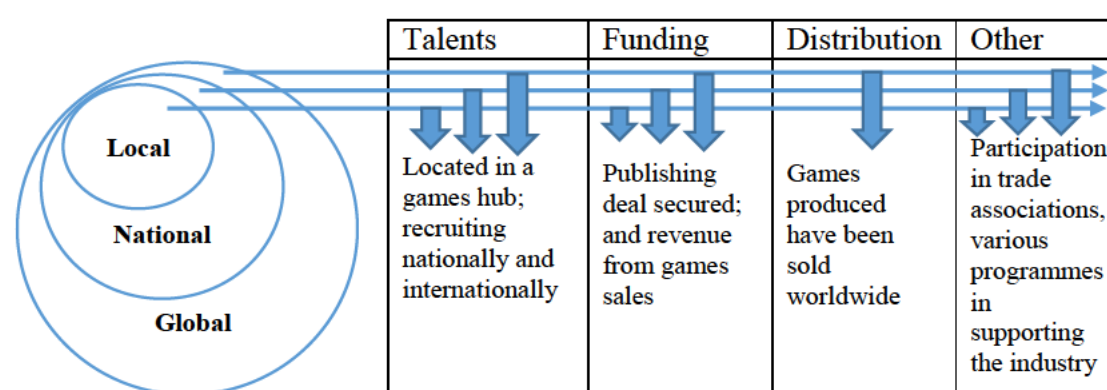


Figure 15. Mapping of the Key Elements under the Global-Local Framework of G002

The main resource allocation of G002 at local, national and global levels were classified into four main categories. From a financial capital perspective, the company G002 had heavily relied on securing publishing deals with publishers. These publishing deals provided funding for their production. Funding providers were locally, nationally (UK based) and globally (e.g. north America and Asia) located. The sales from games developed were worldwide.

From a human resource perspective, being located in a major UK games cluster, gave company G002 the benefits of the local talent pool. While the local cluster ensured a good supply of talent, the company also recruited employees nationally and internationally. For instance, when a major games development studio closed in Scotland in 2010, company G002a contacted the studio's head of HR and setup recruitment meetings with the displaced staff for job opportunities with G002a.

From a distribution perspective, benefiting from the digital nature of the industry, G002a's games were distributed worldwide. Indeed, GDF12 recalled that some of their games achieved their highest sale in America. In supporting the development of the industry both nationally and internationally, G002 (including both G002a and G002b) had taken part in various activities such as games events and joined trade associations. It also supported junior developers through participating in various programmes such as being on judging panels of pitches and providing advice.

Reflections: Business Growth and Role of Entrepreneurial Ecosystems

During over 27 years of history, the company G002 has gone through a series of events with rises and falls. It did not seem to follow any stage models especially considering the fact that G002 had been through a series of iterations especially with expansion and contractions due to projects initiation and completions or suspension. The relationships with various publishers and other funding bodies were also perceived to be unpredictable. Instead of following any set of stages, the owner-managers had been managing the business based on the resources available and opportunities recognised. For instance, recognising and believing in the opportunities that the new technology PlayStation brought, the company strategically supported the console and made a number of well-received games for it. Such movement earned them a first-mover advantage which they then enjoyed for a decade.

However, G002 did not fully respond to the opportunities brought by digital distribution nor mobile games as the owner-managers felt that the work-for-hire model still worked well and their business clients had given them a good amount of development funds. While two of the company former employees believed that failing to respond to the market trend was the root cause of the business closure, the co-founder GDF12 said that the cause was the sudden withdrawal of four clients over a two months period. The two opinions may seem contradictory at first sight but may also be seen as complementary to each other. The sudden cancellation of four deals can be seen as the direct cause of G002a's closure. However, if G002a had been prepared for such a situation by reducing their dependency on external funding partners and taking advantage of the digital distributions and rising popularity of mobile games, their story might have ended differently.

Comparing the journey that G001 and G002 had been through, both similarities and differences can be found. Both companies started off and grew their companies by making console games since late 1980s and early 1990s. However, their paths diverted after a certain amount of wealth had been accumulated. G001 chose to expand their business through purchasing several studios and invested in publishing their own games. Whereas, G002's practice was more on the conservative side: there was no significant investment in any strategic move after the late 1990s. The reasons are complicated. For instance, as GDF12 expressed, they did not feel any urgent need to change their directions when they have already been paid well by other people. Owner-managers' attitude was another key factor. During the interview with GDF08, owner-manager of G001, it had been brought up multiple times that passion and love for the work they were doing was essential. They would like to make games that they love. As GDF08 said:

"I'm very keen on running a business to make something that people want to buy which is a bit old school."

---GDF08

Working with publishers and investors comes with certain levels of restriction in terms of creative freedom. The self-publishing model can address this issue. Moreover, G001 stressed that working with publishers and other investors had not been profitable enough while self-publishing could increase their profit margin greatly. On the topic of risk, while both interviewees acknowledged the risky nature of the business, the thoughts behind were different. GDF08 from G001 believed that risk can be mitigated in several ways such as adopting the portfolio approach, being realistic about expectations and control budget. GDF12 from G002 emphasised on the risky and unpredictable nature which justified the company's decision on maintaining a work-for-hire business model. Such model takes away the risks associated with the publishing of the games: regardless of the actual sales of the games, G002 had been paid for the development cost already and shall, in theory, at least not make a loss. The conversation reflected the owner-managers' attitude towards risks and the philosophy of running of their businesses which in turn influenced the operation of the business particularly when exploring and responding to potential opportunities.

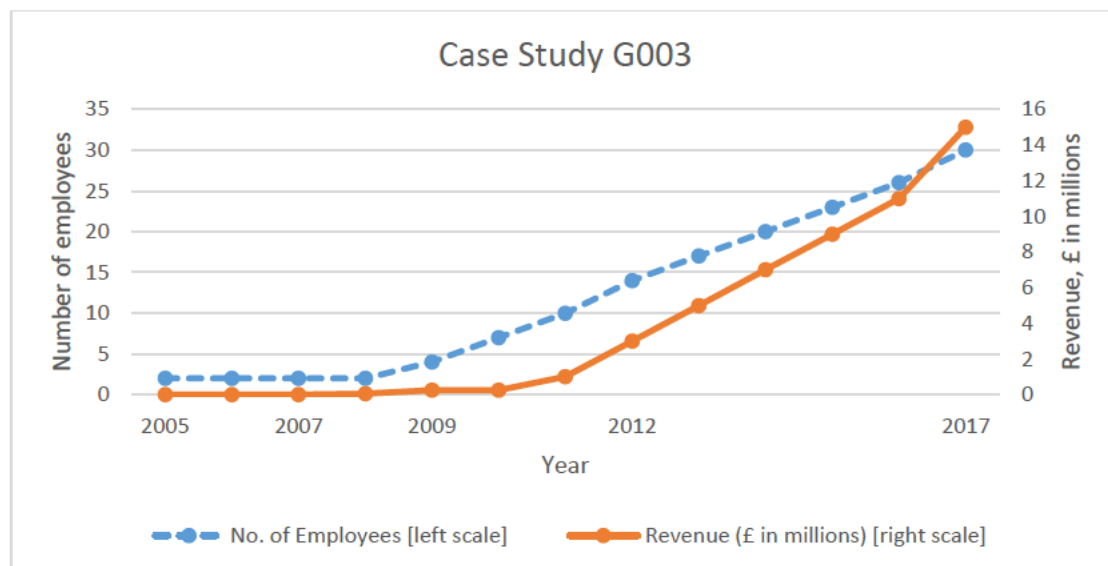
When G002 moved between states, resources allocation played a key role. For instance, the local games cluster provided continuous talent pipeline which was particularly beneficial for G002 during the expansion and contraction processes (see section 5.4). The publishers who provided funding for the game production enabled the company to hire developers and grow the company. Digitalisation had expanded G002's entrepreneurial network to a global level. Indeed, key entrepreneurial activity enablers at a global level existed from the start such as the overseas publishers they worked with originally. In addition, the global audience brought by digital distribution was also key in the success of the business. The global network has been an essential part of G002's entrepreneurial activities. Thus, if an entrepreneurial ecosystem is discussed as a means to best facilitate entrepreneurs' activities, then it is necessary to extend the focus to a global level and understand how the business can be best supported in an international setting.

6.1.3. Case Study G003

Company Historical Development Journey

G003 was a limited games development company formed in 2005. In 2012, G003 was acquired by an overseas games development company. After the acquisition, G003 remained in their original UK city and the UK office still had a high level of independence. This case study only looks at the UK office and data does not include the overseas office (i.e. G003 only refers to their UK office wherever mentioned).

The case study below presents the development journey with key events that the company has been through from formation. Graph 4 depicts the changes of employment and revenue over time, from formation until the time of the interview.



Graph 4. Case Study G003

Company G003 was formed in 2005 by two people who were friends from university. They studied not only the same computer games related degree together but also a diploma course on entrepreneurship. They subsequently founded their company, G003. The company started by making games for the Java mobile market in the pre-App Store era. Those games were made for the “*old, old phones, so not these smart phones*” (GDF15). After they finished developing their first game, the pair managed to find an experienced business mentor, through a sponsored non-departmental body, to help them on the business side of the company. For example, their mentor showed them how to achieve a profit in mobile markets. They then quickly realised that at the time (around 2007) it would be very difficult to publish their first mobile game because they would need a publisher in order to generate income in mobile. However, publishers generally only published games developed by developers who had previously published a game. As GDF15 recalled:

“We got the publishers, we spoke to the publishers. But no publisher would publish a game without any previous games published”.

---GDF15

While they were stuck in this “Catch 22” situation, a friend (hereafter referred to as PFT), who used to work for a mobile game publishing company and then set up his own company in the same city, came in and assisted them. PFT had contacts who helped to publish one of G003’s games. G003 were then able to publish their subsequent

games. In the first couple of years, the two founders were both working two jobs: one at G003 (which generated no income at that stage) and another job to actually earn some money. As GDF15 recalled:

“He [the co-founder] was working in Tesco’s filling the shelves, I was at hospital security as we were trying to get this going.”

---GDF15

GDF15 recalled the releasing of a mobile game in Java market almost “*guaranteed to make £30,000*” at that time. However, their game was released around the same time as when the iPhone came onto the market and went on to dominate the mobile games market. As a result, they only made around £250 a month from the game at this time.

“We thought that was it. That would be £30,000. It just crashed because the iPhone came out, nobody was buying them now with iPhone touches.”

---GDF15

After two years of trying, around 2008, one of the co-founders came up with an idea of turning an old flash game³⁶ into a game for the iPod touch. They believed the game would fit very well with the iPod’s finger touch feature. They managed to get in touch with the people who developed the original flash game (an overseas company, hereafter referred as NC) and secured a deal to make the game for the App Store. In 2009, they launched the game (hereafter the game is referred to as B01³⁷) in the App Store with a 50/50 revenue split with company NC. The game B01 was “*hugely successful*” (GDF15). It became the best-selling game in the USA and generated around £250,000 for G003. The company was then able to hire two more employees. Up until then, the two founders just hired students or graduates to do some contract work when required. G003 was previously funded by an £80,000 personal bank overdraft and a £15,000 loan from the Prince’s Trust. The revenue from the B01 game helped the co-founders to pay off all their company debts.

³⁶ Games play online that require flash player

³⁷ Sequels of the game are indicated with numbers such as B02, B03

In addition to the financial rewards, the success of the B01 game also enhanced the reputation of the company. GDF15 recalled, after this first success, many other flash games developers started to contact them to convert their games for App Store. The company then did some contract work in this area but none of the subsequent games were as successful as the B01 game. They decided to make a B01 sequel game (B02) and released it in 2010. The sequel was once again very successful and sold 10 million copies. As its other games were not as successful as the B01 games, G003 decided to focus on B01 related games and they extended the license deal with the company NC. With the continuous success of B01 and its sequel games, the company G003's revenue had increased to around £1 million and it employed 14 staff by 2012.

The year 2012 was a critical year for company G003 as their five-year license deal with company NC was ending. If the two companies did not achieve any further agreements, G003 would not be able to work on the B01 game anymore. In addition, due to ownership complications, neither of the companies would be able to benefit from the previous successes of the games, for example, the opportunity for cross promotion and utilising the existing customer base.

“It was a shame cus[because] we worked together for 5 years. And we had so much success, and we grow the B01's brand as much as grow G003 and NC. But if we separate like this, all the cross promotion, all the audience we've got on the phones, like all our pre-existence players we wouldn't be able to utilise it, cus nobody really own them, it was all like that...”

---GDF15

The co-founders then had a lunch meeting with their previous business mentor who advised them to explore the option of being acquired by company NC so that both organisations could continue to enjoy the benefits of the B01 games. The two founders contacted the NC office and discussed this option. As a result, NC acquired company G003. G003 was then renamed as NC Europe Office. From an ownership perspective, NC were then owned by four people: NC's two original co-founders (who had a majority share-holding) and G003's two co-founders. G003 had continued to grow in size and had 30 employees in the UK office at the time of the interview. GDF15 described their growth as “*organic growth*” benefiting from the success of previous

games and “*never had investment*”. At the time of the interview (Nov 2017), G003 had developed around 15 to 20 games since 2005. Whilst working on a new game (a sequel game of B01), G003 also was also investing a significant amount (exact amount not disclosed) of their resources into constantly updating and supporting their pre-existing games.

Other Lessons Learned

During the interview, GDF15 mentioned that the development cycle of games increased greatly in the last decade:

“As the app store developed, as the games get harder, games now can take 2-3 years, for the mobile game. Back in 2008, B01 would have taken us 2 months to do. And yeah...at one point, we were aiming to try to get games out 4-6 weeks. [...] but players expect so much now. [...] Players just expect so much more because they get used to it and it's totally true.”

---GDF15

GDF15 claimed that majority of the games they developed were successful at different levels. However, when asked what made them so successful, GDF15 expressed that “*there isn't gonna be a magic formula, just what we think will work*”. Based on the owner-directors' collective opinions on how successful a game idea is likely to be, decisions will be made on whether or not a new game should be produced. As an indicative figure, GDF15 said that a game idea would not be taken forward if the directors think it will make less than a million dollars.

On the marketing side, G003 had not “*spent much money on it*” (GDF15). GDF15 shared their experience from four perspectives. Firstly, GDF15 said that “*most of market on the mobile game is done by the features*”: the relationships with Apple and Google can play an important role. The promotions on the platform can make a significant difference on the sales performance of a game. Secondly, benefiting from previous successes of the B01 games, G003 was able to do cross promotion on their previous games in addition to other social media marketing. Thirdly, while recognising

user acquisition³⁸ is a popular marketing practice, GDF15 said they are “*more interested in making games*” and currently not considering this method. The last thought that GDF15 shared was related to timing. GDF15 expressed that they were in a “*very fortunate position*” to be in the market early and accumulate a large user base and establish a “*quite good relationship*” with platform editors. GDF15 advised that he believed that trying to get into the mobile market from scratch now might be too late and getting into an emerging field early such as VR might be a better choice.

Entrepreneurial Ecosystem Map

Figure 16 depicts key elements related to the company G003’s entrepreneurial activities under the global-local framework during its development journey. The representation is not exhaustive but rather indicative given information available.

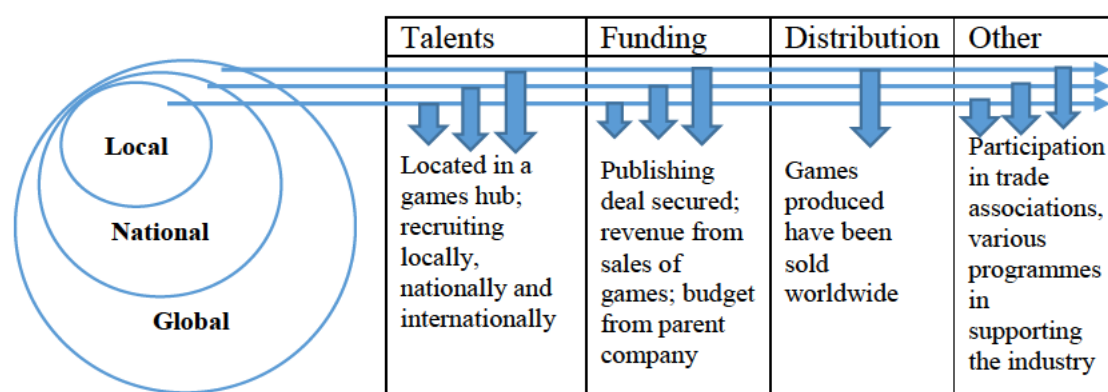


Figure 16. Mapping of the Key Elements under the Global-Local Framework of G003

The main resource allocation of G003 at local, national and global levels were classified into four main categories. From a financial capital perspective, the two founders started the company with personal loans from a bank and a regional charitable organisation. The success of the B01 games built their reputation and subsequently secured a number of development deals. However, as GDF15 said, the company had grown organically based on the successes of previous games; sales income from their successful games titles had been the main revenue stream for the company. After being acquired by the

³⁸ Spend money to acquire users in the hope that the user can then spend more money on the game on average

overseas company NC, the company was allocated a set amount of budget from NC as the parent company.

From a human resource perspective, being located in a major UK games cluster, G003 had benefited from the local talent pool. The local cluster with universities offering games related degrees ensured a good supply of talent. GDF15 said the company had also recruited employees nationally and internationally.

From a distribution perspective, benefitting from the digital nature of the industry, G003's games were distributed worldwide. For instance, their signature game B01 became the best-selling game in the USA. In supporting the development of the industry both nationally and internationally, G003 had taken part in various activities such as games events and it had joined trade associations. It also supported junior developers by participating in various programmes and activities.

Reflections: Business Growth and Role of Entrepreneurial Ecosystems

In over 12 years of history, G003 went through a series of events with rises and falls. It did not seem to follow any particular stage models especially given that G003's development was related to the success of the games it developed and that it was acquired by the overseas company NC in 2012. Instead of following any existing stage models, the company had focussed on its own strengths and altered its business models to maximise its potential profit. For instance, realizing the limited success achieved through the work for hire projects in comparison to their B01 games, G003 decided to focus on what they were good at and what was most profitable: making B01 sequels.

Some key connections played important roles in helping G003 at critical times during the process of transiting between states, namely: the experienced business mentor that taught them how to make money after developing the mobile games, and the friend who helped them to publish their first game on mobile. The same business mentor also suggested the option of securing an acquisition deal with the overseas company NC so that they could continue to work on the B01 sequels. The success of their signature B01 games could not be achieved without digitalisation and the global reach it enabled. For instance, G003's current parent company NC was based overseas. Without the

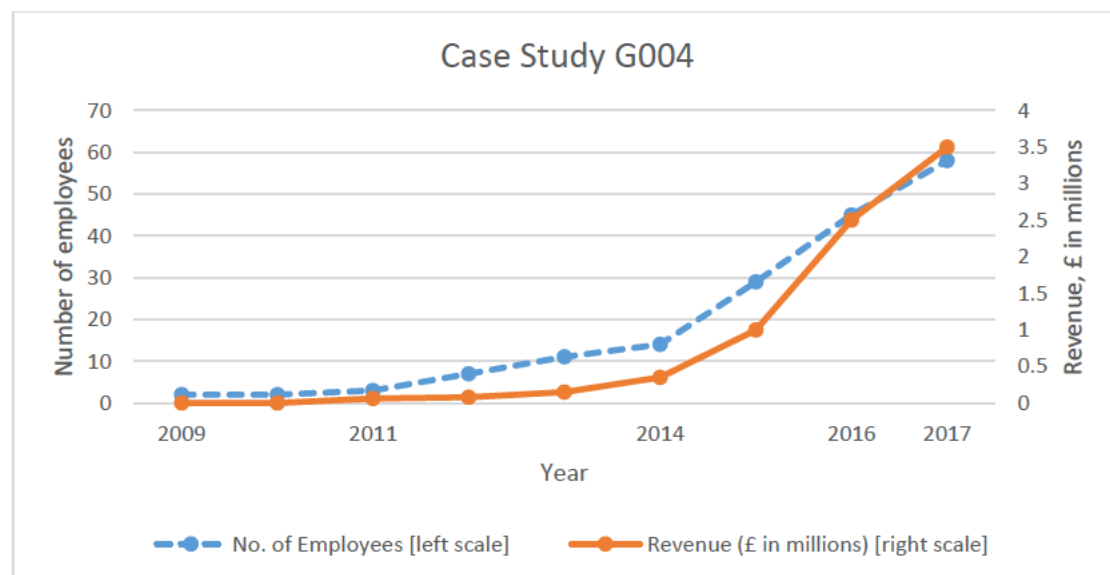
permission from NC for porting the game onto App Store, the development journey of the company would have been different. Moreover, as GDF15 proudly recalled, the first B01 game sold very well in the USA. Indeed, the majority of all sales were in the USA.

This shows that G003's entrepreneurial network extends from the local level to the global level. Indeed, key entrepreneurial activity enablers at the global level existed from its early operations. The global audience brought by digital distribution was also key in the success of the business and the global network was an essential part of G003's entrepreneurial activities. An entrepreneurial ecosystem in both local/regional and global levels should be considered as a means to facilitate entrepreneurs' activities.

6.1.4. Case Study G004

Company Historical Development Journey

G004 was a games development company officially formed in 2009. Graph 5 depicts the changes in employment and revenue over time from its formation until the time of interview.



Graph 5. Case Study G004

Company G004 was started at the end of 2009 in the form of a Limited Liability Partnership with two co-founders, who worked from home. It was not until March 2011, that the company was incorporated as a Limited Company, with an additional employee.

The company started by doing prototype projects and then took on smaller projects below £100,000 and it now works on projects that worth over £1 million. For instance, Publisher A contracted a game for 50,000 dollars and Publisher B contracted another game for 60,000 euros around the years of 2014 and 2015 respectively. Continuing to take on more projects with some successes, co-founder and director GDF11 said G004 was growing “*organically*”.

A few critical events happened in 2014. Firstly, the company G004 secured a few fully funded development deals which proved to be fruitful in later years. For instance, they worked on games that were funded by Publisher A and B which led to further projects. They had also became involved in a couple of other very commercially successful games. At the time of the interview (November 2017), G004 had worked with Publisher A on four projects with two more in progress. With all these projects and successes combined, the company grew from 14 employees in 2014 to 58 employees in November 2017. GDF11 considered the company growth as “*slowly over time*”, “*hire when could organically*” and “*not making huge jumps*”. However, GDF11 also expressed that growth had been “*fairly rapid*” since 2014 with 11 new employees hired between September 2017 and Nov 2017.

“Not as rapidly as it would be if we set up a load of millions of pounds worth of investment. It’s because the growth has been organic, because it has no investors in the company. It’s just been projects and games have sold. Growth has been organic as a result.”

---GDF11

Other Lessons Learned

As discussed in earlier section, Publisher A, which was acquired by a US company (F) in 2014, played an important part in shaping the development journey of G004. GDF11 recalled that G004 first got in touch with Publisher A through a friend who “*happen to be in Newcastle who was working for Publisher A before they got bought by company F*”. Publisher A originally started as a Kickstarter funded company. They raised two million dollars and subsequently contracted G004 for a prototype game with a very limited budget. That game turned out to be “*very well received*” (GDF11). After being

acquired by company F for a billion dollars, Publisher A decided to continue to work with G004 on bigger games with a larger budget. This helped G004 to achieve a growth momentum.

From a revenue perspective, two thirds of G004's revenue came from VR games and one third from non-VR work. It is necessary to understand that G004 entered into the VR space very early on and established a good relationship with a key player (Publisher A) in the VR industry. Whilst they started as a games development studio, G004 had also been expanding their service into areas such as publishing, quality assurance and porting games onto different platforms.

GDF11 also shared some information about the work for hire contracts they signed with companies like Publisher B and Company F. Whilst the specific revenue split depended on the deal, it had been 30-70 in G004's favour after the other party (e.g. Publisher B and Company F) took a large percentage to recoup their initial investment.

“But I can say that both Publisher B and Company F are very generous and yeah.... I think when you get to a point when you working on very large project with them, it taking really large amounts of money like tens millions, then they gonna be a lot stricter because I think in those cases, it's more like they wanna....er....I don't know about Company F, but in Publisher B's case, they would typically in those cases probably own part of the studio they working with when they were....so they would large, large, large percentage. But yeah, Company F in particular really generous. Er...and Company B was very good as well.”

---GDF11

Entrepreneurial Ecosystem Map

Figure 17 depicts key elements related to G004's entrepreneurial activities under the global-local framework during its development journey. The representation is not exhaustive but rather indicative given information available.

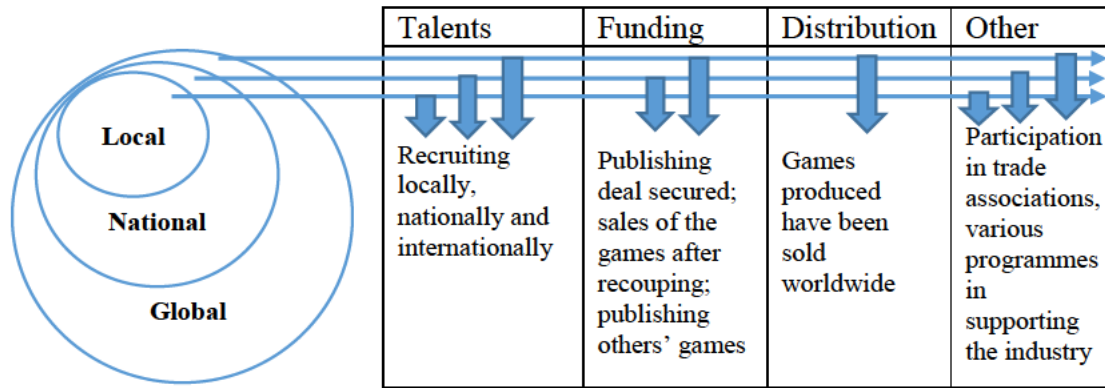


Figure 17. Mapping of the Key Elements under the Global-Local Framework of G004

The main resource allocation of G004 at the local, national and global level were classified into four main categories. From a financial capital perspective, the early development of G004 had relied on the publishing deals they secured, particularly with Company A. While Company A is an American based company, G004's first deal was through a friend that was working close to where G004 was located in the UK. The company also had partners that were located in different parts of the UK and overseas (e.g. Sweden, Japan, US). In recent years, the company had expanded their businesses into providing a publishing service. As of June 2019, G004 had published three games developed by three independent game development studios.

From a human resource perspective, G004 had recruited employees locally, nationally and internationally. The company had previously hired many of their employees from the part of the UK that was geographically close to them. As discussed in section 5.7.2., GDF11 expressed concerns over Brexit and the impact it might have on the company's hiring ability.

From a distribution perspective, benefiting from the digital nature of the industry, G004's games were distributed worldwide. In supporting the development of the industry both nationally and internationally, G004 had taken part in various activities such as games events and had joined trade associations. It also supported junior developers through participating in various programmes and activities.

Reflections: Business Growth and Role of Entrepreneurial Ecosystems

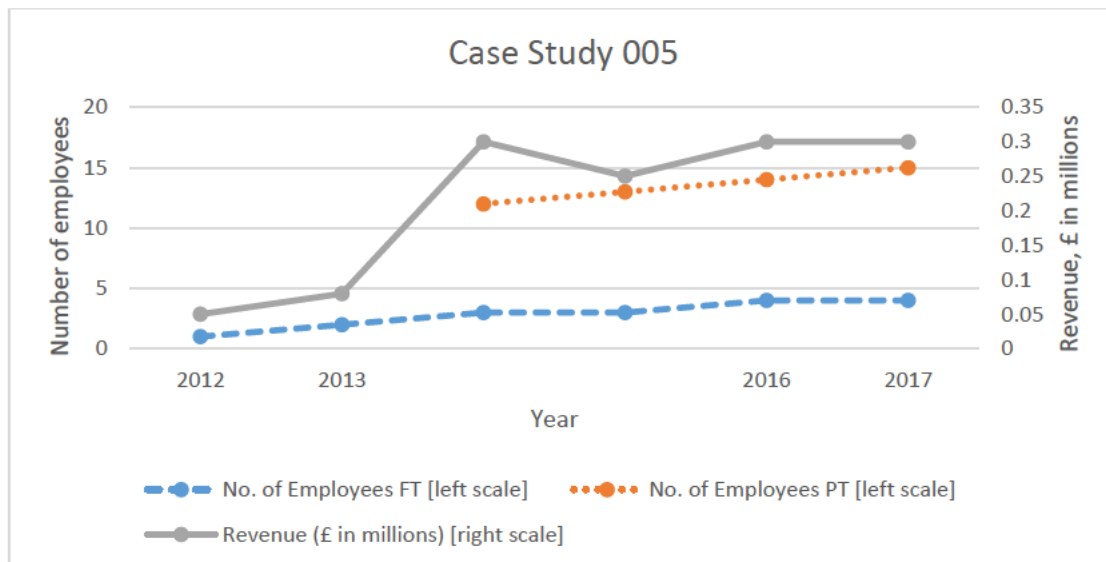
In the space of less than a decade, G004 had gone through a series of events and overall depicted a growing trend both in terms of employment numbers and turnover. It is not clear whether the business followed any stage models especially considering the fact that G004's development has much related to the success of the games developed or published. In the development journey, the company had been utilising its own strengths and altering its business models to maximize their potential profit. For instance, with initial wealth accumulated and the experience of working on a number of VR games, the company expanded its service into publishing. The diversification of their services helped to reduce the risks of focusing too much on work for hire projects.

During G004's operating history, resources utilisation at different levels played a key role in enabling their success. At the regional level, the initial project with Company A was established through a friend who worked in a nearby city. Some of the company's key staff members were recruited regionally. At the national level, G004 had partnerships in various forms with companies located at different parts of the UK (e.g. Scotland, Wales, and England). At the global level, G004 had been working on projects with various overseas partners (e.g. US, Sweden, China, and Japan). Moreover, benefiting from digitalisation, G004's games had been sold worldwide. This shows that G004's success was a result of combined regional and global efforts. Facilitated by their local connections, their entrepreneurial activities had taken place at the global stage from the start. Therefore, if an entrepreneurial ecosystem is considered as a means to best facilitate entrepreneurs' activities, then it is necessary to extend the focus from local-regional level to a global level and understand how the business can be best supported in an international setting.

6.1.5. Case Study G005

Company Historical Development Journey

The founder of G005 first started as a sole trader. G005 was incorporated as a limited company in November 2012. Graph 6 depicts the changes of employment and revenue over time from formation until the time of interview.



Graph 6. Case Study G005

The company G005 was founded by a sole founder (GDF06) in 2012 who started by doing freelance work. GDF06 recalled that the completion of various contract work at a satisfactory level had led to more work and enabled the company to expand and hire more people. The company's marketing was mostly through word of mouth. The second full time employee was hired in in 2013. Subsequently, the company was able to hire a third and fourth full time employee over the space of three years. These three additional employees were freelancers that GDF06 had previously contracted to assist him on various contract work. GDF06 then decided to hire them full time. G005 had also been working with a number of freelancers on a part-time basis. As of October 2017, G005 had a group of 15 part-time developers that they called upon at various times, depending on the workload demands. Many of these 15 "regular" part-timers, who GDF06 happen to know and trust were based in Southeast Europe Country G.

The business model that company G005 adopted was to provide both services and products for clients. They also invested their profit into developing their own game titles where possible, in the hope of generating more income. The majority of their clients were creative agencies or game developers. G005 often worked with them to develop digital games or other software programmes. A large percentage of their work was related to VR and AR experience. The type and purposes of these projects varied: for software development, for marketing, for fixing bugs, for pitching for investment or others. GDF06 expressed that one service that they provided and others often did not

was that they sometimes sent developers to work at the client alongside in-house staff. By 2015, the company had reached about £300,000 revenue a year. As an indicative number, GDF06 said the company usually had at least five clients a year.

As of October 2017, company G005 had released around 15 to 20 games. Most of these were for clients and around five were the company's own game titles. Two game tiles were released (in 2015 and 2016 respectively) out of the five, though neither generated any significant revenue. GDF06 explained that the two games were made for a competition and they did not push for sales. However, as a result of the competition, they won a Unity license which was worth around £1,500 a year and some marketing related bonuses from a multinational technology company M.

Other Lessons Learned

During the interview, GDF06 raised the topic of growth and stability. GDF06 believed that his company had a great development team and only lacked a good sales team to secure more clients in order to expand their business. However, having seen many companies gone through rapid expansion and contraction, GDF06 said he would grow the company only with stability which is difficult to achieve.

“Because I've seen in many companies that they don't have stability, they hire a lot of people, they hire more than they could afford and then they shut it down, they gambled it, everything. Whereas I want to be stable, so that my..... the people who work with me, they they are stable. They're not worried about like what's gonna happen tomorrow.”

---GDF06

Entrepreneurial Ecosystem Map

Figure 18 depicts key elements related to the company G005's entrepreneurial activities under the global-local framework during its development journey. The representation is not exhaustive but rather indicative given information available.

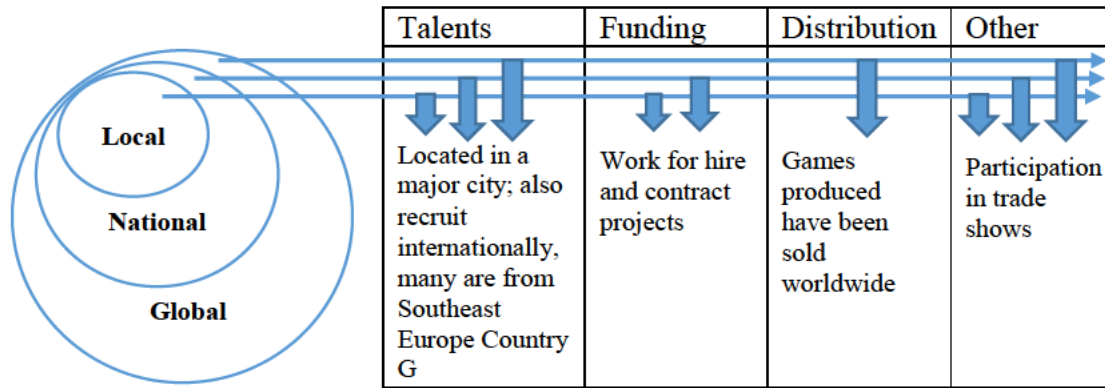


Figure 18. Mapping of the Key Elements under the Global-Local Framework of G005

The main resource allocation of G005 at local, national and global level were classified into four main categories. From a financial capital perspective, G005 had heavily relied on work for hire and contract work. The majority of their work came from clients located either locally (i.e. in the same city) or nationally (i.e. in the UK). Whilst the company had also been investing in producing their own game titles, the revenue had been so far been minimal (i.e. up to the time of the interview, October 2017). From a human resource perspective, G005 had recruited locally, nationally and internationally. In particular, a large percentage of the part-time contractors of the company were from a Southeast Europe Country G. From a distribution perspective, benefiting from the digital nature of the industry, G005's games were distributed worldwide. As a young firm, G005's focus was on securing more deals to expand with stability, as expressed by the owner-manager GDF06.

Other than participating in various trade shows to showcase their current game in production, G005 had not participated regularly in other activities. GDF06 expressed that he did not find locating in the major city with a big games cluster was very helpful. As GDF06 explained, he believed that they were good at what they were doing and did not really require much support other than securing more development deals. Therefore, GDF06 believed that a sales team would be more helpful for them at this stage but did not feel that been locating in a cluster helped them in this way.

Reflections: Business Growth and Role of Entrepreneurial Ecosystems

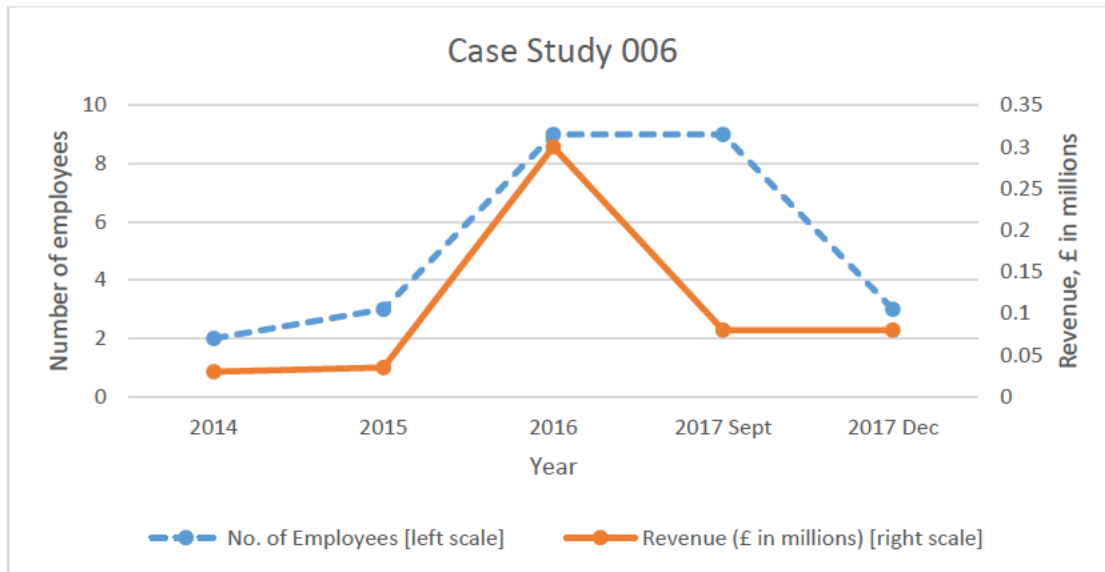
As a micro sized company, G005 was still working on establishing itself in the industry. The business had not experienced many events or states, unlike previous case studies. Currently (at the time of interview, October 2017), G005 still heavily relies on work-for-hire or other types of work contracts to sustain the company. GDF06's future plan was also based on gaining more clients and ensuring stable (and possibly increasing) sources of income. It is hard to determine whether G005 had followed any stage models as the company is still at its early stage of development. However, it is clear what state the company was in and what it would like to transit into in the future. Therefore, a dynamic state approach can still be useful even at such an early and uncertain situation.

G005 had shown relatively less extensive connections in general compared with companies in the earlier case studies. Indeed, GDF06 clearly expressed that they did not find locating in a major cluster or network helpful, apart from the fact that this may open more doors to get more clients: some people (or certain type of potential clients) think companies “*are not doing it seriously if they are not in that major city*”. However, despite being an early stage start-up, the company had depicted a rather geographically widespread network, though maybe less extensive compared with other companies (e.g. G001, G002, G003 and G004). The company G005 has key connections not only locally and nationally but also internationally. Thus, an entrepreneurial ecosystem with a global perspective can still be useful and essential even for an early stage business.

6.1.6. Case Study G006

Company Historical Development Journey

G006 was a games development company formed in 2014. Graph 7 depicts the changes of employment and revenue over time from formation until the time of interview.



Graph 7. Case Study G006

G006 was first set up in mid-2014 by two industry veterans and officially started trading two months later. The two co-founders left their jobs in major video game companies and received a small grant from Creative England to buy some equipment to develop a VR game. They started off with just themselves, but soon hired an artist as they realised they could not do everything required. They had been working on a game over the course of 18 months before releasing it. A major turning point was in early 2016 when they had the opportunity to work on a contract with a major studio, Company V, to develop a VR version of an Company V's game. This contract provided them with funding such that they could hire more people to work on the project. They then hired an additional six people in order to produce the content for the game. When the project came to the end, the following year, in 2017, they then used the rest of the team to do a small self-funded VR project. When this small VR project came to an end, the two co-founders needed to cut back on employee numbers over the course of a few months and went back to having only three staff as they did not have any further project and funding secured.

From September 2017 until the time of the interview (October 2017), G006 was working on promoting their work and sending pitch documents out to platform holders and publishers. They were hoping that these budget holders would then approach them for a new game so that they could expand their company and produce more content. During this period of time, G006 was also working on updating their two existing VR games to add additional content and give more value for money for the players who

have already purchased the game(s). GDF17³⁹ said “*it’s never really finished I guess*”. The first VR game took around nine months to develop before releasing on Gear VR and Oculus Rift. G006 continued to update it. The second small VR game took around six or seven months to develop.

Other Lessons Learned

Focusing on developing VR games, GDF17 considered both of their VR games as “*slow burners which is quite often for VR games in general at the moment*” as “*the global audience for virtual reality games are still kind of a slow burner*”. As such, the sales of both games increased slowly.

Having worked in two different games development companies previously, the two co-founders mentioned that they would not have met if it they had not worked in the same games cluster. They also believed that being located in a games cluster helps recruit employees when needed.

“I mean we would have never met if it was not for this location. So M01⁴⁰ is a great games hub in the UK. [...] Lots of studios expand within the area. So location is great especially if you want to hire people or....or kind of work with 3rd parties. Er...most studios that we've worked with outsources who in a region that do animation or audio. So.... having a pool of talent in any one area.... er... is very useful.”

---GDF17

The quotes from GDF17 echoes with previous discussions on clustering in section 5.4.

Entrepreneurial Ecosystem Map

Figure 19 depicts key elements related to the company G006’s entrepreneurial activities under the global-local framework during its development journey. The representation is not exhaustive but rather indicative given information available.

³⁹ Both founders participated in the same interview and coded as GDF17.

⁴⁰ In ensuring anonymity, M01 refers to the games cluster G006 located in.

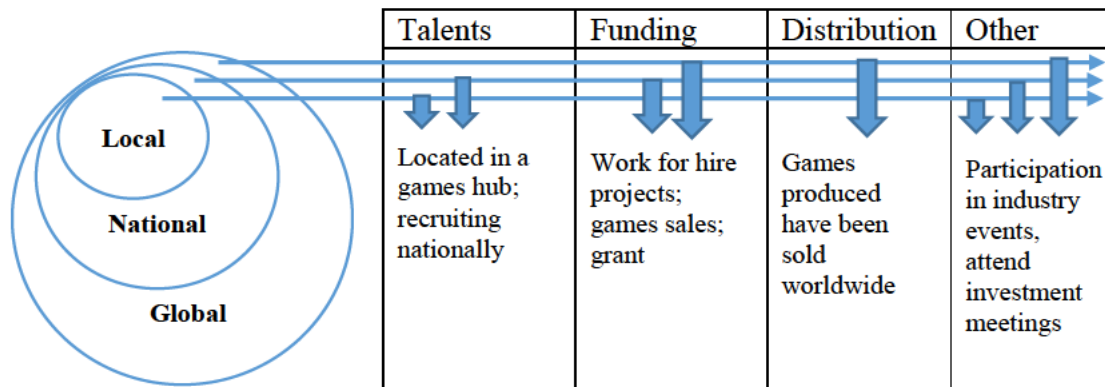


Figure 19. Mapping of the Key Elements under the Global-Local Framework of G006

The main resource allocation of G006 at local, national and global levels were classified into four main categories. From a financial capital perspective, G006 was still working on establishing their place in the industry. At the time of the interview, the periodic growth was because G006 secured a work for hire project. The grant from Creative England and the sales revenue from their previous games only allowed them to maintain a team of three staff (including two co-founders). The majority of the staff who were hired and then let go decided to stay in the region.

From a human resource perspective, being located in a major UK games cluster gave G006 the benefit of the local talent pool. While the local cluster ensured a good supply of talent, the company also recruited employees from other parts of the country. When the company reduced its size, the majority of the employees then chose to stay in the cluster. Some decided to start their own studios while others chose to work as a freelancer or found a job in another company (which echoes with discussions in section 5.2.2 and 5.4).

From a distribution perspective, benefiting from the digital nature of the industry, G006's games were distributed worldwide. G006 was also approached by an Asian publisher to export their VR game for the specific Asian market. GDF17 also travelled worldwide in hope of securing further funding. However, GDF17 expressed that after a couple of international trips, they found themselves struggling to fund such trips

financially. In this case, they found locating in a games hub very useful as they can benefit from local or national⁴¹ opportunities.

Reflections: Business Growth and Role of Entrepreneurial Ecosystems

As a micro sized company, G006 was still working on establishing itself in the industry. As GDF17 expressed, securing funding was the main challenge as they believed they were very capable of developing games. Even with only three years of operation, the company had already experienced a sizable expansion and contraction due to the work for hire project's initiation and completion. At this stage, it is not clear whether G006 follows any stage models nor whether it will in the future. However, it is clear what state the company was in and what state the company would like to transit into in the future. Therefore, a dynamic state approach can still be useful even at such an early and uncertain situation.

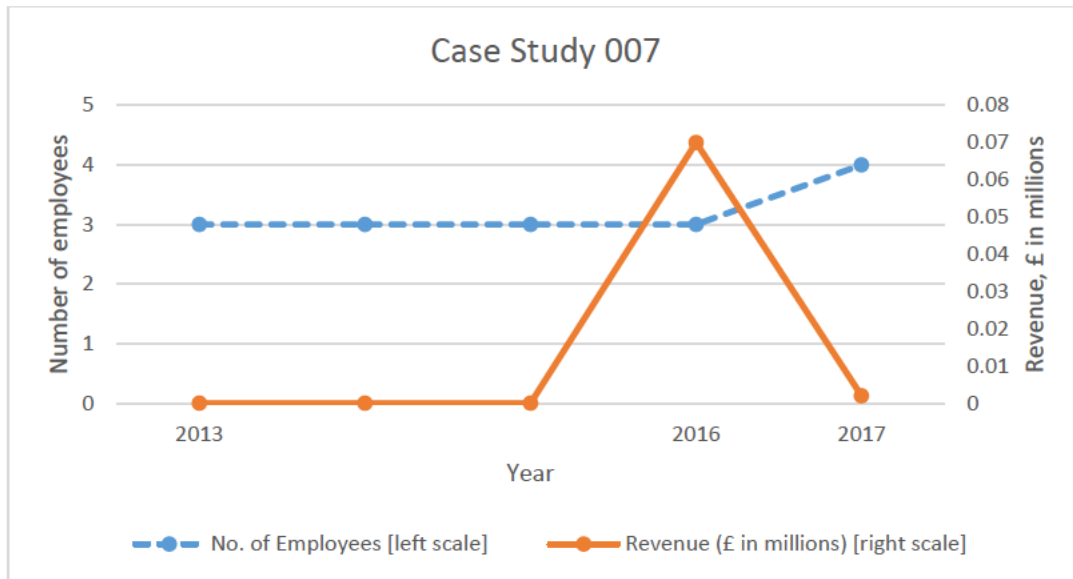
G006 showed relatively less extensive connections in general compared with companies in earlier case studies (e.g. G001-G004). However, even with the limited connections over its short operating history, the company depicted a rather widespread network. It had key connections not only locally and nationally, but also internationally. Thus, an entrepreneurial ecosystem with a global perspective can be useful and essential for an early stage business.

6.1.7. Case Study G007

Company Historical Development Journey

G007 was a games development company formed in 2013. Graph 8 depicts the changes of employment and revenue over the time of formation until the time of interview.

⁴¹ As organisations such as UKIE sometimes organised visits and take overseas' investors/publishers to local games clusters.



Graph 8. Case Study G007

G007 was a games development company formed in 2013 by three founders. G007 worked on four games before working on their current game (hereafter referred as Game F). The first project was a mobile puzzle style game which was ceased and unfinished as the related freelance artist left the company. At the time, the development was heavily relied on this artist who was also busy with other work (and G007 was not able to pay him at that time). The second project was with the members of a well-known British band that the co-founder GDF02 had known personally. G007 was developing two games for the band. However, after six months working on the project, the band's manager refused to let G007 continue to work on the games. The third project was put on hold also due to the loss of their lead artist after six months. Game F was their fourth project and came out of their internal 'game jam'⁴² in 2014. The company started to work on Game F in November 2014. Up until April 2016, all their projects were completely self-funded and all members of the company were working part-time for G007.

In April 2016, the company G007 received £70,000 investment for 5% of their equity which soon "*burned out*" (GDF02) by May 2017. Then GDF02 used his personal savings to pay some of the wages until July 2017. Since 2016 until the day of the interview (October 2017), G007 was actively looking for a publishing partner to take

⁴² A game jam is a hackathon type of activity for video games. It gathers people to create games within a short period of time, usually 2 to 3 days.

their Game F to market. GDF02 recalled, that they almost signed with a major multinational game development and publishing company. However, the deal fell through because the multinational company purchased a video game development studio and a video game publisher, both located in Europe, in late 2016. GDF02 explained, the purchasing deal meant the multinational company could not hit the target because G007 asked for “*quite a lot of money*”.

“That VC fund requires them to fund at least five projects per funding round. But they know they never seem to hit the targets in order to be able to fund us because we’re asking for quite a lot of money.”

---GDF02

GDF02 indicated that the minimum required to finish the game, with three to four months leeway to add additional contents, was £600,000, but the ideal amount was between £1.4 and £1.7 million. G007 also had an opportunity to sign a deal with another major games company. However, the deal was not successfully signed as the two parties cannot achieve agree on the last minute changes required by the publisher. After continuous attempts, G007 secured some investment from an Asian partner in early 2018 which enabled them to develop the game further. Then in mid-2018, the Asian partner provided a small amount of additional investment to add additional content for the game (e.g. key levels and functions). In the meantime, G007 had been working on marketing since early development of the Game F. For instance, they had been building the community for Game F, working with a print games magazine and running accounts on Twitter, Twitch, Youtube from the beginning of development.

Entrepreneurial Ecosystem Map

Figure 20 depicts key elements related to the company G007’s entrepreneurial activities under the global-local framework during its development journey. The representation is not exhaustive but rather indicative given information available.

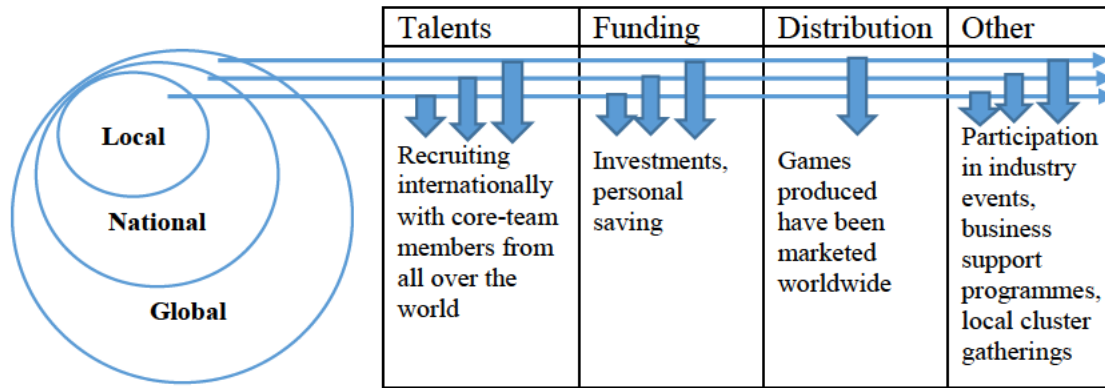


Figure 20. Mapping of the Key Elements under the Global-Local Framework of G007

The main resource allocation of G007 at local, national and global level were classified into four main categories. From a financial capital perspective, G007 had not been able to release any games and relied on external investment and personal savings to develop their current game title. The investment had come from both UK and Asian investors at different times.

From a human resource perspective, the company had its core team members from all over the world. At the time of the interview (Sept 2017), five team members were based across five different cities in four different countries: two in the UK, one in central Europe, one in West Europe, and one in North America. The remote working virtual construct of the team was partly because the company was not sufficiently funded and therefore the members needed to work elsewhere to generate income. Whilst the team had been working well together virtually, GDF02 expressed he would prefer to bring the team together in the same physical location when finance allows. Moreover, GDF02 shared that one of reasons he did not find there was a skills shortage in the industry was because he recruited people worldwide. Indeed, GDF02 expressed concerns over the capabilities of British programmers and artists. He believed that some talents trained in some European or American countries are more capable (see section 5.3.2 for discussions on skills shortages).

From a distribution perspective, though G007 had not released any games as yet, the current game was developed for an international audience which can be evidenced by the worldwide community they were building. Moreover, G007 had participated in various local, national and international industry events to showcase their games to both

attract potential investors and get initial publicity. In addition, the company had also been working on several business support programmes which the co-founder GDF02 found beneficial. GDF02 also said that living in a main games cluster had been helpful. For example, the close proximity of various service providers (e.g. for UX design and usability testing) had been convenient. The monthly game development meetup had also helped GDF02 to get to know people who had provided useful advice or offered to test their game.

Reflections: Business Growth and Role of Entrepreneurial Ecosystems

As a micro sized company, G007 was still working on producing and releasing their first game and establishing itself in the industry. As GDF02 expressed, securing funding was the main challenge as they believe they were very capable of developing games. Even with only around four years of operation at the time of interview, the company had already experienced a number of rises and falls for various reasons. Two games ceased due to loss of staff members and two games ceased due to the withdrawal of the partner. The initial investment for their current game could not support the whole development cycle. The company was then trying to find further funding. They turned down a potentially promising deal due to last minute changes of the terms and conditions by the potential investor. The two small investments from Asian investors had enabled the company to further develop their game with a planned releasing date in 2020. Therefore, it is difficult to say whether G007 follows any stage models or will it be in the future. However, it is clear what state the company is currently in and what state the company would like to transit into in the future. Therefore, a dynamic state approach can still be useful even at such an early and uncertain situation.

Generally, G007 had shown relatively less extensive connections compared with companies in earlier case studies (e.g. G001-G004). However, even with the limited connections in its short operating history, the company had shown a rather widespread network (though maybe less extensive). It had key connections not only locally and nationally but also internationally. Thus, an entrepreneurial ecosystem with a global perspective can be useful and essential for an early stage business.

6.2. Case Study – Entrepreneurial Ecosystems

The case studies in this section move on from looking at individual games development companies to focus on gaming clusters in the UK. Entrepreneurial activities associated with such cluster were mapped out. The role of digitalisation in the entrepreneurial ecosystems were explored by looking at it from both local and global perspectives.

6.2.1. Leamington Spa: Mapping of the Entrepreneurial Ecosystem

Dubbed as ‘Silicon Spa’, gaming related companies account for roughly three quarters of the digital media companies in Leamington (Clarke 2015). This section aims to provide an overview of the development of the cluster including some of the key actors and key activities within the cluster.

The development history of this cluster can be traced back to the success of Codemasters, a game developer and publisher originally set up in Banbury in 1986 that later moved to Warwickshire, and the subsequent establishment and growth of game studios such as Blitz Games Studios from the 1980s to 2000s (Clarke 2015; two interviewees⁴³). In particular, it is reported that 7% of all video games sales in Britain in the 1980s were credited to the Oliver Twins, the twin brothers who later founded Blitz Games Studios (formerly known as Interactive Studios) in 1990 (Coe and Moulton 2017). Spill-over effects and resource recycling activities greatly contributed to the development of the region where staff may leave a studio but still stay locally (Clarke 2015; one interviewee). To date, accounting for approximately 10% of the total people working in UK games industry, there are more than 2500 employees working in over 50 studios in and near the cluster (UKIE and CWLEP 2017a; Interactive-Futures 2019). In addition to dozens of other small and medium sized companies, the cluster now has a number of studios with industry big names such as SEGA Hardlight, Ubisoft, Sumo Digital, Rebellion, Playground Games in addition to the long standing Codemaster. Other services such as legal, local councils and counselling firms also operate in the local area. In addition, nearby education institutions, such as Warwickshire College and Coventry University, also offer gaming related degrees.

⁴³ To ensure anonymity, interviewees’ coding are not disclosed here, but only indicate how many interviewees have agreed with certain statements.

In the case of Blitz, it had worked with international partners on producing a number of best-selling games. Radiant Worlds was set up by the Oliver Twins after Blitz Games closed down and was funded by a Korean publisher, SmileGame. In Jan 2018, Radiant World was then purchased by Rebellion, a game developer and publisher with headquarters in Oxford. It was subsequently renamed to Rebellion Warwick. Radiant Worlds' co-founder Richard Smithies departed and then founded Unit 2 Games in late 2017. After working under Rebellion for just over a year, the Oliver Twins left the company and set up their own consultancy firm, Game Dragons, in March 2019. Bodies like UKTI and UKIE have organised and facilitated various visits of delegates from China to UK clusters, including Leamington.

FreeStyleGames is another example of development within this cluster. Six former veteran game developers from Codemasters and Rare founded FreeStyleGames in 2002 in Leamington. The publishing and distribution of their first game *B-Boy* was handled by Sony for the Europe market in 2006, and published by Evolved Games and distributed by SouthPeak Games for the North America market in 2008. In 2008, FreeStyle Games was bought by the American video game publisher, Activision. Some key employees of FreeStyleGames opted to leave the studio following a staff cut in April 2016 and they then formed Slingshot Cartel in London. Freestyle Games was then purchased by Ubisoft, a French video game company with offices worldwide, in January 2017 and renamed to Ubisoft Leamington.

Figure 21 conceptualises the process and summarises the development history of the cluster as described above. As indicated, the figure symbolises the “busyness” of games related activities in Leamington Spa with the various actors involved. Echoed with discussions in section 5.4, the clustering phenomena has retained talents in the region by them either moving between different companies or setting up own ventures in the region. Moreover, it has also attracted resources from players originally outside of the cluster, from both national and international levels and formed connections. Although there are apparent instabilities involved in the cluster (e.g. company closures), stabilities can still be observed at a cluster level (e.g. talent retention, external resources attracted to the region, and the growing scene of the digital games industry).

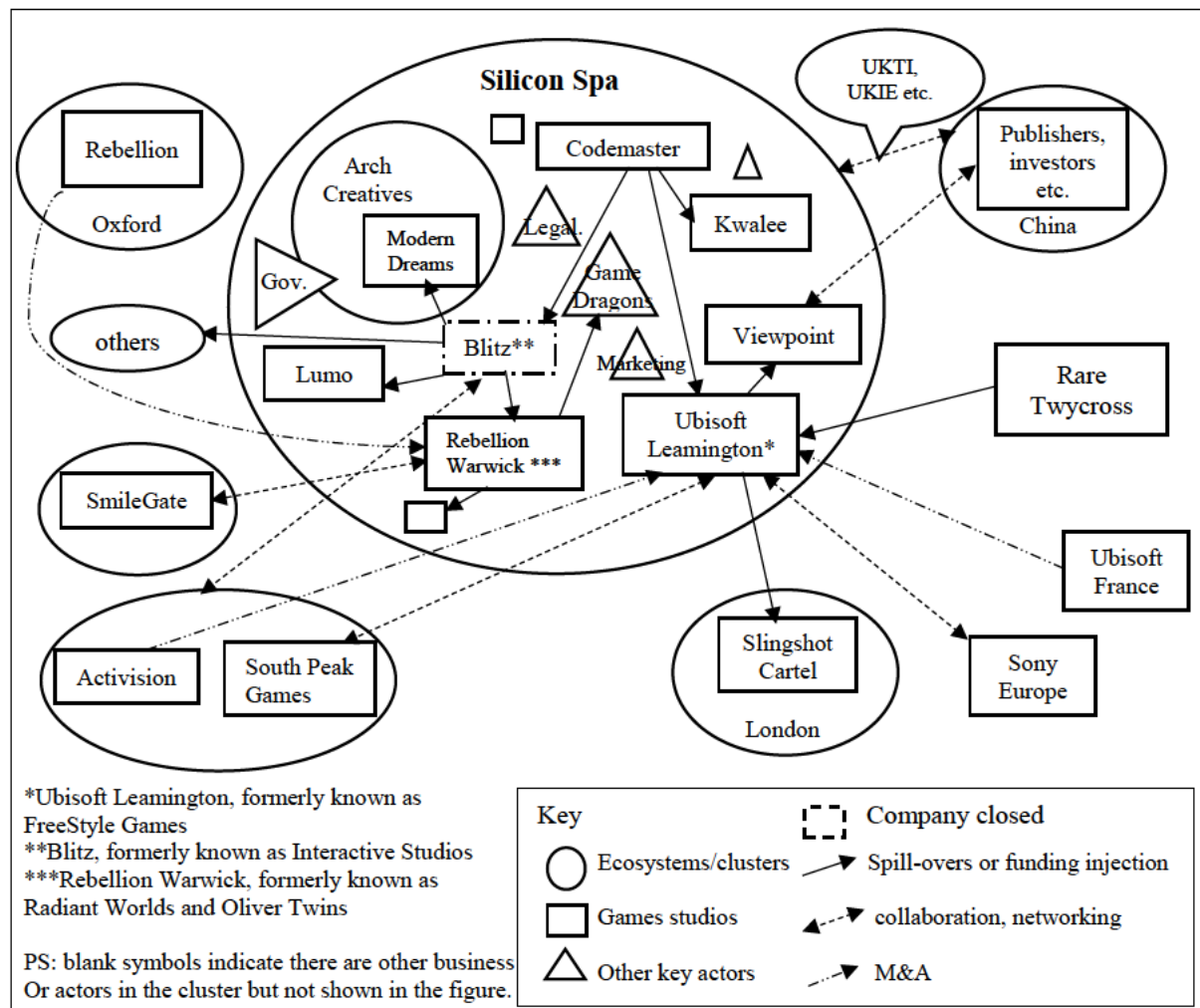


Figure 21. Silicon Spa Ecosystem – A Partial Indicative Mapping⁴⁴

6.2.2. Dundee: Mapping of the Entrepreneurial Ecosystem

Slightly different from Leamington's story, the Dundee gaming concentration started with rich computer savvy talent pools and easy accessibility of home computers (Day 2014; Harris 2017; Creative Dundee 2018). This section provides an overview of the development of the cluster including some of the key actors and activities within the cluster.

When the personal home computer, ZX Spectrum, launched in the early 1980s, it was assembled in Dundee by an American owned manufacturing company, TimeX (Day 2014; Creative Dundee 2018). Therefore these home computers were very accessible

⁴⁴ Interactions may or may not happen at the same time. Mapping are not exhaustive but indicative

in Dundee and had a huge influence on the then kids and future game developers who had the opportunity to learn computing at an early young age (Creative Dundee 2018). In particular, many benefited from the computing courses offered at Abertay University (formerly known as Dundee Institute of Technology) and later the University of Dundee (Day 2014). These computer literate talents then started to make computer games and some found great international successes such as the *Lemmings* and *Grand Theft Auto* sequels in the 1990s. These ground-breaking successes attracted more talents and further grew the place. In the meantime, Abertay University began to offer specialised degrees in computer games in 1997 with both political and financial backing which have since sustained a pipeline of talents (Newbigin 2014). Many of those graduates decided to stay in the local area either to join existing studios or start their own ventures (Newbigin 2014). Dundee saw continuous growth with further successes from companies like 4J Studios (famous for porting Minecraft onto consoles), Ninja Kiwi (formerly known as Digital Goldfish) and Outplay Entertainment. It is now home to over 40 games companies (Digital Dundee 2019) employing over 3,300 people (The Royal Society 2015).

The Dundee digital gaming industry's development history is also associated with a series of local, national and international activities (Newbigin 2014). Other than the university courses offered at Abertay University and University of Dundee, there are also a range of programmes and organisations that support the start-up activities. For instance, Dare to be Digital games competitions and festivals have not only supported graduates to get started with their digital endeavours, but also attracted considerable inward investment like Outplay Entertainment relocating to Dundee in 2010 from California (The Royal Society 2015). Having secured government funding, the UK Games Fund is based in Dundee and provides grants up to £25,000 to support UK-based new and young games companies in developing their prototypes. Channel 4 invested £1 million in Dundee through commissioning three Dundee based studios to create games (Pearson 2010). Another £9 million R&D investment was announced in September 2018 for the Innovation for Games and Media Enterprise (InGAME) project in Dundee to benefit SMEs in Dundee and across the UK (Handrahan 2018).

The Rockstar North (formerly known as DMA Design) is an example of one of the most significant game studios contributing to the development of the Dundee games scene.

After the success of *Lemmings*, the studio had also developed games for Nintendo before having their ground-breaking success *Grand Theft Auto (GTA)*. The studio was then acquired by Gremlin Interactive based in Sheffield which themselves were then acquired by another French company. It was then sold to American firm Take-Two Interactive that owns GTA's publisher, Rockstar Games and finally renamed to Rockstar North in 2001. The studio was relocated to Edinburgh in 2014 but some of the employees decided to start their own studios (Ellison 2012). Even before the studio was relocated, a number of former employees have set up their own ventures in Dundee such as Realtime Worlds, YoYo Games, Tag and Denki.

As a highly volatile industry, Dundee had also suffered from the closure of a once major studio of the city, Realtime Worlds, which was set up by DMA Design (now Rockstar North) co-founder David Jones. The first game *Crackdown* was a reasonable success but the second game *APB* had set the company to fail despite \$50 million of funding received from the US and London. The closure made over 150 employees redundant in Dundee (Stuart 2010). While this happening, companies located outside the region like Sega, Blitz and Activision immediately set up recruitment events two days after the closure announcement (Stuart 2010). Despite that, some of those employees found jobs in other local studios while some decided to start their own studios. In between the two games, Ruffian Games was co-founded by two former DMA and Realtime Worlds employees in 2008 and started to work on *Crackdown 2* which was then published by Microsoft Games Studios and turned out to be a commercial success. While having some misfortunes, Ruffian Games managed to get enough work for hire projects (some of them were collaborative work with other studios located in places like US or other parts of the country) so that they could work on their own games. As for the founder David Jones, he went on to found two more companies in Edinburgh. One of these was later acquired by an American firm.

Other local companies were also frequently involved in regional and international activities. For instance, Tag Games developed mobile games for Finnish company Rovio, Activision, EA, Ubisoft, Channel 4 and funded a new company ChilliConnect, a backend platform in supporting game development. The formerly known Digital Goldfish (where both co-founders are Abertay University alumni) received mentoring support from another local firm and worked with a New Zealand publisher on some

successful titles and were later acquired by the publisher and renamed to Ninja Kiwi. Puny Astronaut, founded by a team of Abertay graduates, received a six figure sum from 4J Studios in 2018. Similarly, Bit Loom, also founded by a group of Abertay graduates, is now working with a Sunderland based studio, Coatsink, on their very first game.

Figure 22 conceptualises the process and summarises the development history of the Dundee cluster as described above. As indicated, the figure symbolizes the “busyness” of games related activities in Dundee with the various actors involved. Echoed with discussions in section 5.4, and similar to the Leamington Spa case, the clustering phenomena has retained talents to stay in the region by them either moving between different companies or setting up own ventures in the region. Moreover, it has also attracted resources from players originally outside of the cluster at both national and international levels and formed connections. Although there are apparent instabilities involved in the cluster (e.g. company closures), stabilities can still be observed at a cluster level (e.g. talents retention, external resources attracted to the region, and the growing scene of digital games industry).

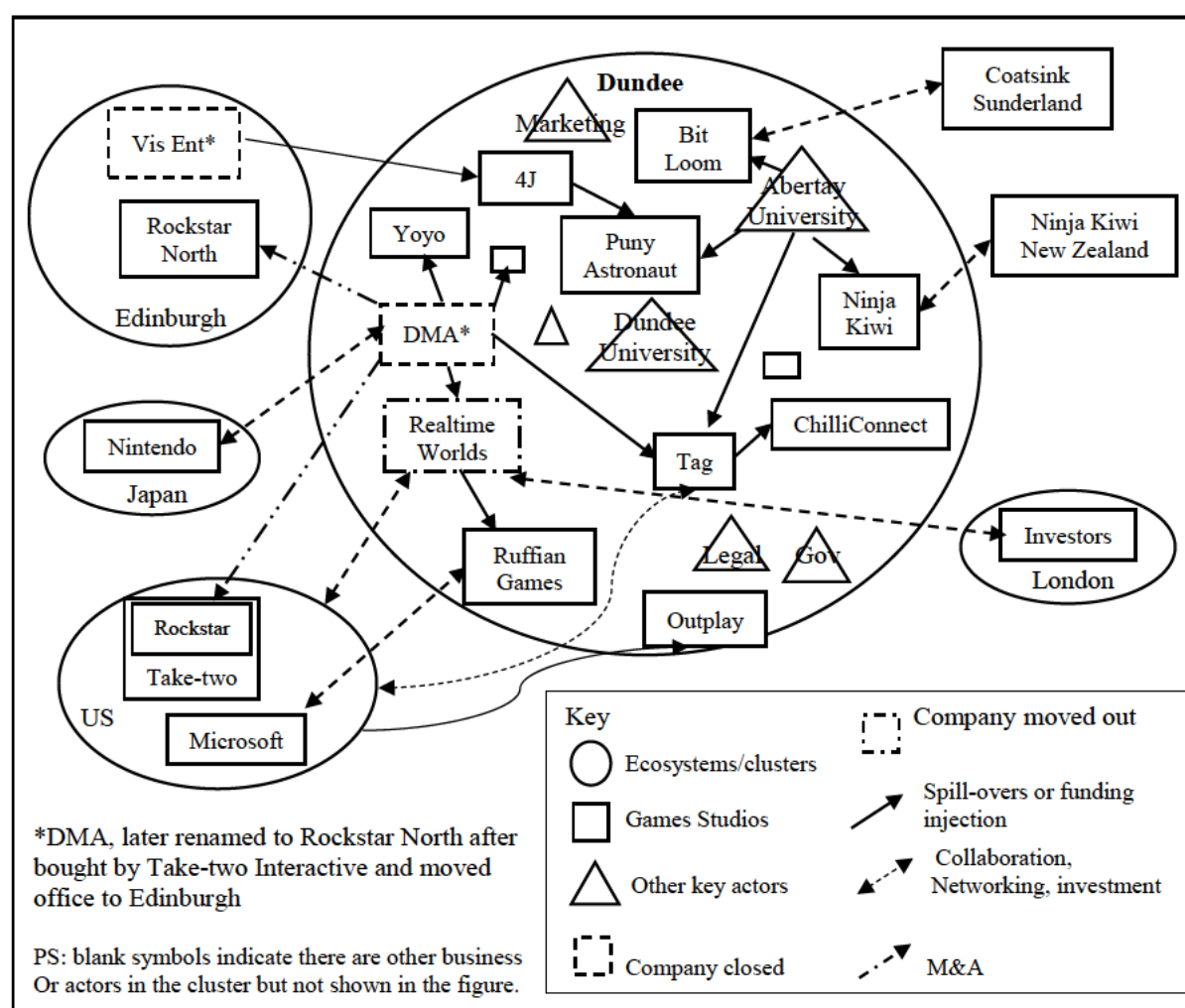


Figure 22. Dundee Ecosystem – A Partial Indicative Mapping⁴⁵

6.3. Summary

Chapter 6 presents results from two types of case studies. Firstly, it explores the development journey of the seven selected individual companies. Within each of these case studies, the concepts of business growth and role of entrepreneurial ecosystems are discussed. In particular, through exploring the historical events and associated processes, the dynamic states approach has been studied and demonstrated empirical applicability. In addition, each of the companies is also discussed and presented from an entrepreneurial ecosystem perspective at local, national and global levels. The second type of case studies focuses on analysing two digital gaming clusters in the UK, namely Leamington Spa and Dundee. It maps out

⁴⁵ Interactions may or may not happen at the same time. Mapping are not exhaustive but indicative

the entrepreneurial activities associated with each cluster and explores the role of digitalisation in the ecosystems. The next chapter discusses results from Chapters 5 and Chapter 6 and particularly addresses the digitalisation empowered entrepreneurial ecosystems and the dynamic states framework.

Chapter 7 Discussions

This chapter discusses the results presented in Chapter 5 and Chapter 6 with reference to findings in the literature review chapters. It comprises three sections. The first section entails discussions on the characteristics of the digital gaming industry and influencing factors of business performance. Following which, the concept of entrepreneurial ecosystems empowered by digitalisation is discussed. Lastly, discussions on dynamic states framework are advanced from section 2.2.3 by incorporating empirical findings in Chapter 5 and Chapter 6.

7.1. Discussions on the Characteristics of Digital Gaming Industry and Influencing Factors of Business Performance

A range of influencing factors on business performance have been presented in Chapter 5 and Chapter 6, which echoes with previous literature findings (as presented in Table 3 and discussed in sections 2.3.1, 2.3.2 and 2.3.3). These factors can be broadly categorised into three aspects: owner-managers' capability and aspiration, external environment, and the nature of the business or industry. However, many of these factors are inter-related. Therefore, these categorisations should not be treated in absolute isolation with each other.

Although business growth has been closely associated with entrepreneurs' goals and motivation, having the intension to grow does not automatically imply growth in reality (Edelman et al 2010; Gupta et al 2013; Levie and Autio 2013). In regard to the digital gaming industry, none of the owner-managers interviewed has placed making money as their primary motivation of setting up their businesses (see section 5.12.1 and summarised in Table 13). Instead, gaining creative freedom, making games they love and working on interesting projects have been identified as their main reasons to start businesses. Frustrations in previous jobs and change of personal circumstances are also contributors to the decision of setting up own ventures. Such motives are also reflected on interviewees' future growth ambitions where releasing more games and being self-sustainable are the main goals. Only four companies, all with at least ten years' history, have considered growing and expanding the company in their future plans. However,

as Wiklund and Shepherd (2001) and Delmar and Wiklund (2008) argue that to grow or even consider growing, adequate resources, opportunities and appropriate strategies are required. For the digital gaming industry, adequate resources are difficult to obtain, opportunities are hard to capture, and appropriate strategies require good business acumen. For instance, as discussed in sections 5.3 and 5.5, the majority of interviewees have reported that there is still a shortage of skilled talents in the industry and it is difficult to secure sufficient funding. Moreover, not all game developers have sufficient level of business knowledge. As stated by interviewees GDF08, SO07 and SO01, some game developers tend to focus too much on developing the game they love and neglect the importance of understanding the market. Such market awareness is part of their business acumen and can influence the success of the commercialisation of games (as stated by SO07, SO01 and SO06). This partially explains why many companies have not yet experienced any rapid growth.

The change of external environment also exerts influence on the performance of businesses (Wiklund et al 2009; Machado 2016). Relating to the digital gaming industry, the change of market, technology advancement and political situation all have great impact on not only the performance of individual companies but also the whole industry at large (as discussed in 5.2.1, 5.6.2, 5.8). For instance, game development engines such as Unity and Unreal, games publishing platforms such as Steam, Google Play Store and Apple App Store have all lowered the entry barriers to the market for the developers (as discussed in 5.2.1). This enables more people to get into the industry which helps to drive the diversity of the market. However, Janssen (2009) argues that entry barriers differ among industries which can result in differences in supporting growth of existing businesses or even lead to market saturation. Results show that the games market has indeed become overly saturated and the quality of games has also become inconsistent. As a result, even high-quality games find it difficult to differentiate themselves from the market. It is also challenging to predict market trend and consumer preferences which would ultimately have impact on the games' commercial performance. It is therefore necessary for developers to not only focus on game development but also establish awareness for the commercial side of the business, echoing statements made by interviewees SO07, SO01 and SO06 (in section 5.6). For instance, developers should be aware that there are places from which they can seek

general or professional advice and support on aspects such as marketing, accountancy or legal matters.

Policies and political environment can also influence business performance (Wiklund et al 2009, Machado 2016). At national level, the UK video games tax relief has received positive feedback from the industry (as discussed in section 5.8.1). The tax relief has become another source of funding for eligible companies to finance further development and growth. From the political environment perspective, the most significant and recent incident is Brexit. According to TIGA report (2017), 15% of the employees in the UK gaming industry are from EU countries and 5% from non-EU ones. Brexit has firstly posed concerns in terms of recruiting talents from European countries in this industry. The instability of EU workers' employment status discourages potential talents who are currently taking up a significant percentage of the industry. Secondly, it affects funding options and sources. Some games development studios have expressed fears that they might not be eligible for future EU funding opportunities. Thirdly, under a no-deal Brexit, companies that sell digital products or services to EU customers will need to register for the Value Added Tax (VAT) Mini One Stop Shop (MOSS) in an EU member state (Shin 2019). Complications over data sharing between UK and EU are also expected (Shin 2019). Lastly, political instability may also influence currency exchange rates which can then affect the competitiveness and profitability of the businesses as discussed in section 5.8.2.

Characteristics and dynamics of the industry or sector also impact on business growth opportunities (Nichter 2009, Wiklund et al 2009, Machado 2016). For a business, developing a game entails a complex process and requires multidisciplinary skillsets such as programming, arts, design, music, project management and creative writing. Moreover, as discussed in section 5.2.2, the project-based nature of games development implies that many digital games businesses are in a continuously expanding and contracting process. The hit-driven nature of the industry indicates the importance of commercial success and reliance on the market. As discussed in sections 5.2.2 and 5.4, clustering is a common phenomenon in the industry and helps to address the continuous expansion and contraction issue. Upon finishing a big funded project, employers normally disband the development team, leaving employees with three options: self-employment or freelancing, set-up their own companies, or joining a different

company. It is observed that people often stay in the same cluster if they choose to become freelancers or set up their own companies. Although it is common for them to join a company in a different region, it is also very typical for them to find their next employment in the same region and within the same cluster. Here, this research has uncovered a binding effect of clustering in regard to talent retention in the gaming industry.

Building on existing findings in the entrepreneurial ecosystem literature (see detailed discussion in sections 2.4 and 3.5), I believe that over time, various support services providers are attracted and then set up businesses nearby. All these service providers together with games companies play a vital role in enriching local skills pool. The various skills and knowledge accumulated locally are transferable which will strengthen the region and contribute to sustainable regional development. Under careful guidance and with collective efforts, an entrepreneurial ecosystem could be formed and developed. The region becomes more resilient and competitive in the face of future market change as a result. As suggested by some industry practitioners (e.g. SO02), a more sustainable way to look at and measure growth is by focusing on a region's growth or the whole industry's growth rather than an individual company. However, this is not to de-value the importance of supporting individual games business' entrepreneurial activities. Rather, it is essential to support each business' development whilst be aware of the uncertainty and the nature of the industry and introduce appropriate measures into the system.

7.2. Framework Development: Digitalisation Empowered Entrepreneurial Ecosystems

7.2.1 Digitalisation, Resources and Social Networks

Funding, talent and market are key elements in developing and sustaining a company (as discussed in Chapter 5). From interviews and secondary data, it is evident that social networks can play a key role in the flow of resources (Spigel and Harrison 2018) where digital technologies facilitate the process (Autio et al 2018). In both Leamington and Dundee (section 6.2), resources are seen to be shifting beyond regional level. For instance, both locations are actively engaged with international actors from places such

as Europe, China, Japan, Korea and US. Similar phenomena are also observed in the cases of individual companies (see section 6.1). Resources may shift in forms of knowledge and information sharing, mergers and acquisitions, work-for-hire projects, investments and talent recruitment. For instance, with the help of digital technology, companies can afford to have staff located outside of the office to work on the same project with those located within (e.g. company G005 and G007); marketing and publishing can operate from anywhere in the world whilst targeting audience globally; international collaborations between companies can also be facilitated.

As evidenced in Chapter 5 and Chapter 6, I argue that social networks contribute significantly in facilitating the process of securing necessary resources. For entrepreneurs to benefit from such social networks, an open and supportive culture is essential (Isenberg 2010; Mason and Brown 2013; Stam 2015). However, face-to-face communication is still considered as irreplaceable in some scenarios which will be discussed further in section 7.3.

Spigel and Harrison (2018) have pointed out that it is not enough to just have resources in place. More crucially, entrepreneurs need to be able to access such resources. This is where social networks can play a key role. Aligned with the findings from Leamington and Dundee in this thesis, social networks play a facilitating role in the process of acquiring talents, funding and knowledge at a global level, which is particularly valuable for early-stage entrepreneurs. Echoing with Autio et al (2018), this thesis argues that digital technologies have eased the process of attracting and acquiring resources beyond the local community and extended the reach and impact of the social networks. Moreover, it is through digital technology and digital platforms that digital distributions can be done which makes it possible to self-publish games and further contribute to the flourishing of the industry (see sections 5.2.1 and 5.6). Social networks also play a key role in social media space which is a crucial part of a game's commercialisation strategy. Furthermore, reflecting on the development of the Leamington and Dundee clusters and the journey of individual companies, it is evident that the two places and the businesses operate within would not have been where it is today without resources pulled from outside of the region (particular from a funding perspective) as well as the global audience for their products.

Based on insights from the entrepreneurial ecosystem literature (see detailed discussion in sections 2.4 and 3.5) and empirical findings in Chapter 6, I argue that digital technology bridges gaps between different actors and places and facilitates the shift of resources in a global context. Results from individual companies and the two local clusters also confirm the concept of digitalisation empowered entrepreneurial ecosystems developed in section 2.4.2 (see Figure 6). If the global linkages and resources are key to the success of the ecosystems at a local level (as evidenced in sections 6.1 and 6.2), it is arguably rational to study the local ecosystems with a global view and discuss the feasibility of having an entrepreneurial ecosystem in a global context empowered by digitalisation.

7.2.2 Opportunity and Challenges

The mapping and discussions of the two emerging ecosystems (Leamington Spa and Dundee) and the individual companies (in Chapter 6) are aligned with the proposed framework of entrepreneurial ecosystems in a global context empowered by digitalisation (see section 2.4.2). Under this framework, resources are proposed to be studied and managed in a global view. These resources can further facilitate the growth of local businesses, clusters and economies and enrich the benefits of previously potentially location-restricted social networks. However, challenges remain for the practical implementation under such digital and global entrepreneurial ecosystems.

As discussed in the results section (e.g. 6.1.6), it is still common for investors to ask potential studios to meet in person before making a final decision. The cost of attending such initial events is often very high for developers, especially when they take place in overseas venues as evidenced by GDF17 (see section 6.1.6). There are also territory barriers induced by differences between societies, cultures and languages. Moreover, it is possible and common for smaller teams to operate remotely with the aid of modern communication technologies. Such practice cultivates the emergence of the contractor and freelancer communities. Larger companies sometime employ a number of contractors and freelancers for certain projects. However, the process of games development involves consistent troubleshooting, bug finding and testing which requires effective communication (as evidenced by SO07 in 5.4). Software project management methods such as Scrum are often implemented which implies there is a

preference and need for staff to be present at meetings and activities for enhanced communication and increased efficiency (see section 5.3.1). In addition, the project-based nature of digital gaming businesses poses challenges on job security. Thus, at current state, digitalisation has increased the mobility freedom of human resources to certain degree where a local concentration of talent pool still plays an important role in the industry. Other challenges may also come from the fluctuation of currency exchange rates when working with foreign partners. The skills shortage may also be associated with competitions with other industries such as banking and finance where salary tend to be much higher (as shared by GDF08 and SO07 in section 5.3.2).

I shall re-stress that studying entrepreneurial ecosystem in a global context does not devalue the significance of local or regional power. Rather, a globalised entrepreneurial ecosystem benefits from strong local and regional concentrations as particularly evidenced in empirical findings in Chapter 6. The effectiveness of a global entrepreneurial ecosystem often relies on local networks. For instance, in the case of Leamington Spa (see 6.2.1), it is the strong local concentration that attracts external resources including big brands such as Ubisoft to set up their regional office. In the case of company G003, the initial success of the company benefits from a strong local network (e.g. mentor scheme and referral for publishing deals). This has enabled the company to attract overseas' resources later on. The open and supportive culture in the region has enabled games companies to share their resources. The global perspective also responds to Alvedalen and Boschma's (2017) call for a better understanding of the significance of both local and non-local linkages and adds another level to the multi-scale concept. Investigating the concept from a global context can help explore effective supporting mechanisms required which may previously be ignored at regional level. As discussed in earlier sections, many of the challenges need international efforts and collaborations which cannot be addressed at regional level.

7.3. Framework Development: Dynamic States framework

Section 2.2.2 briefly discusses the dynamic states framework proposed by Phelps et al (2007) and Levie and Lichtenstein (2010). I have not found any papers with significant advancement to Levie and Lichtenstein's (2010) dynamic states framework at the time of writing. This section aims to adopt this framework and develop it further for the

digital gaming industry and more widely the risky technology project-based businesses. Figure 23 illustrates a revised dynamic states framework for the digital gaming industry which is adapted from Levie and Lichtenstein's (2010) work.

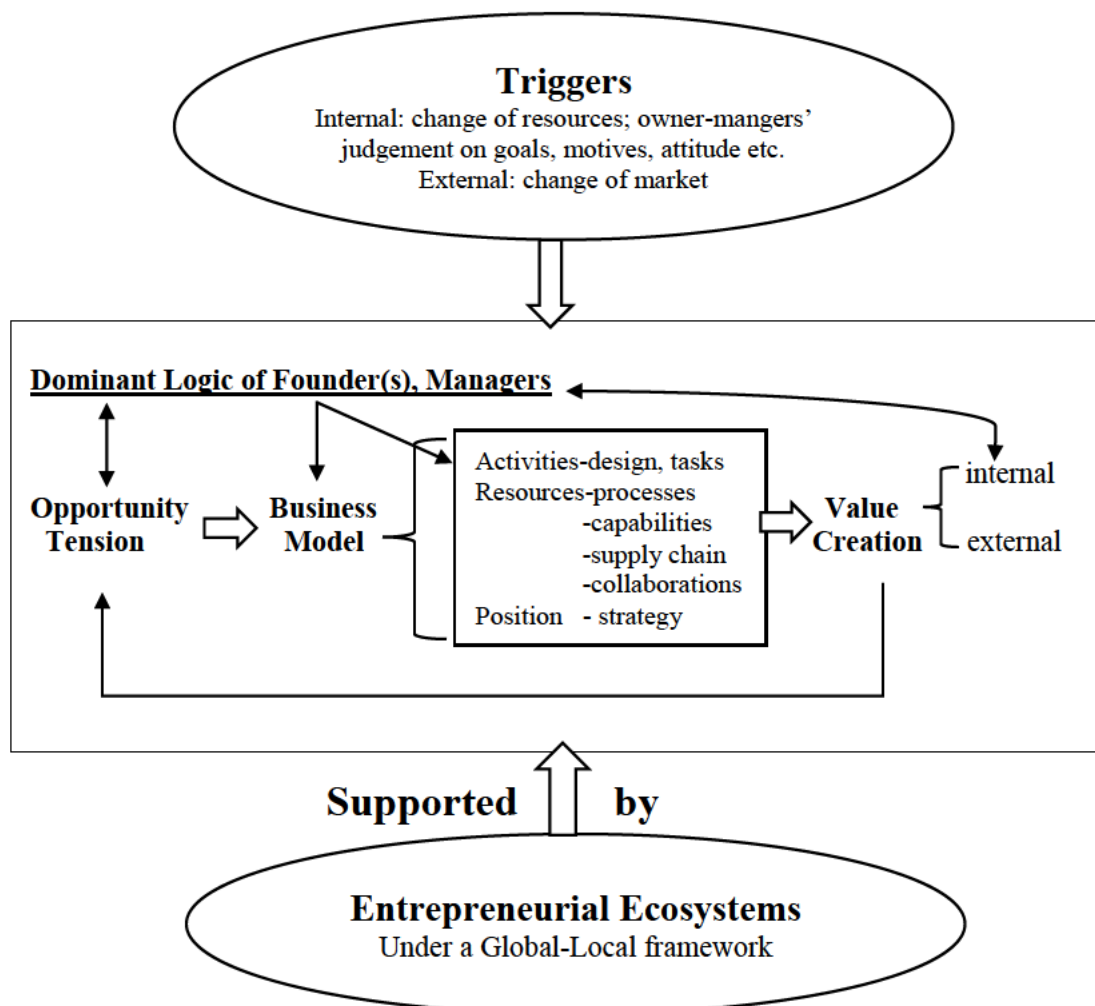


Figure 23. A Revised Dynamic States Framework [Adapted from Levie and Lichtenstein (2010)]

Section 6.1 discusses the applicability of the dynamic states framework in the seven case studies. From a practical perspective, the concept demonstrates its usefulness which can guide companies' decision-making process. It may not seem to be as straight forward as stage models which describe potential challenges and prescribe possible solutions. However, it shall be reminded that the future is very uncertain in nature. While lessons generated from past experience have undoubted value for future practice, it shall not be relied on solely and in its entirety as there is always an element of uncertainty involved (Levie and Lichtenstein 2010). By acknowledging the potential

usefulness of the stage models (Jones 2009; Jacobs et al 2017), their elements can potentially complement the dynamic states framework if used appropriately. Rather than assuming that challenges only occur at a specific time, in a set sequence, and with pre-determined stages, practitioners can benefit more by learning them in principle and be flexible and prepared to handle any challenges the organisation may be in. As discussed in Chapter 6, development paths of many digital games businesses are very unpredictable. For instance, companies such as G001, G002, and G006 have all gone back and forth between different states rather than following a linear development path. Moreover, with technology advancements and other changes, companies may always be on the move instead of being in a static stage.

Levie and Lichtenstein (2010) argue that the dynamic states model is driven by market change and opportunity creation. They assume that each state is achieved through management's attempt to "most efficiently/effectively match internal organising capacity with the external market/customer demand" (Levie and Lichtenstein 2010: 335). However, results from empirical findings in this study demonstrate another possible route for businesses in the games industry in transitioning into a state which links closely with the owner-managers' judgement in relation to goals, motivations and attitudes. As discussed in section 5.11, a good proportion of the owner-managers do not prioritise financial gains but are more motivated by the games (or other digital products) they are creating and feel passionate about. Indeed, even among the ones that take financial gains as a growth measure, their ultimate motive is self-sufficiency and self-sustainability. So that they have more independence to work on the games they really want. In other words, the creative freedom is found to be the motive behind the decision-making process while financial gains become secondary, or as a means to achieve this freedom.

Therefore, transition between different states happens for a different reason: maintaining or achieving creative freedom (or other non-monetary goals) through self-sufficiency and self-sustainability. Therefore, understanding motives of the decision-making is also key. While Levie and Lichtenstein's (2010) framework is more focused on business and profit, it is necessary to acknowledge that there is a group of people who are driven by non-financial factors such as creative freedom. Therefore, I have expanded Levie and Lichtenstein's (2010) framework by firstly acknowledging that

triggers for the change of states shall take into consideration of the owner-managers' motives, attitudes and judgements. Secondly, as discussed in sections 3.5 and 7.2, organisations exist in larger ecosystems, thus their states transition processes are supported by those entrepreneurial ecosystems. In particular, such entrepreneurial ecosystems shall be viewed under a global-local framework. The digitalisation empowered entrepreneurial ecosystems have reduced the limitations brought by geographical boundaries to a large extent.

Moreover, further to Levie and Lichtenstein's (2010) discussion, I argue that value created through business models can be viewed from two perspectives: internal value and external value. The external value is customer and market oriented whereas the internal value relates to the owner-managers judgement. As an addition to their framework, this study finds that the internal value is determined by and associated with the owner-managers' motivation, goals and judgements. For instance, as finance is one of the most frequently mentioned topics during the interviews, achieving a sustainable revenue stream is a key parameter in measuring the internal value. However, the definition and level of sustainability that owner-managers would like to maintain can differ. Whereas GDF04 (see Table 13 in section 5.12.1) chooses to stay small and agile when the company has the resources to grow, GDF08 (see Table 13 in section 5.12.1) decides to grow the company to achieve the desired level of sustainability. Both businesses can be defined as stable as the interviewees have explicitly expressed that they would like to continue their businesses as is, at least in the short term.

Levie and Lichtenstein (2010) have raised three questions for empirical research to explore: what sustains a dynamic state, when and where the states change, and what the most essential contextual variables in the process are. Evidenced generated from this study partially address the above three questions as follows. Firstly, sustaining a dynamic state, I argue, relates to the sustainability of business models. One may argue that there is perhaps no absolute sustainability over a long period of time. But temporary and periodic sustainability can be achieved and determined by owner-managers. In other words, they determine whether the current situation meets their expectations, goals or motivations. For instance, GDF04 (see Table 13 in section 5.12.1) decides to stay small and agile and GDF02 (see Table 13 in section 5.12.1) strives to draw more funding. These are related to their goals and whether they can achieve them with what

they have. Secondly, the states will continue to change (mentally or physically) until such goals are achieved, which addresses the question on when and where. The when and where are determined by owner-managers' aspiration in relation to their business realities. If their current reality does not match with their aspiration, the state will start to shift to close the gap between aspiration and realities. Lastly, the most important contextual variables in the transition process are hard to determine. In fact, it varies. Drawing from interview data, finance and talents are the two most frequently identified variables. A sustainable revenue stream that can support entrepreneurs to do what they want is essential. Talents that can carry out the tasks effectively are also key. While the three questions have been partially addressed, I am also aware that conclusions were drawn from a very specific demographic group with limited sample size. Therefore, there is no intention for this study to be generalised in a simple manner. However, I believe that findings of this thesis can inspire future research in other industries.

7.4. Summary

This chapter has discussed the empirical findings in Chapter 5 and Chapter 6 with reference to existing literature in Chapter 2 and Chapter 3. It firstly summarises key influencing factors (owner-managers' capability and aspiration, external environment, and the nature of the business/industry) of the UK digital gaming industry by considering industry-specific characteristics. Secondly, through synthesizing the concepts of digitalisation, resources and social networks in the context of digital gaming industry, the concept of digitalisation empowered entrepreneurial ecosystems is further discussed with reference to the conceptual framework developed in section 2.4.2 (Figure 6). Lastly, discussion on dynamic states framework is advanced from section 2.2.3 by incorporating empirical findings presented in Chapter 5 and Chapter 6 where contributions are briefly mentioned. The next chapter concludes the thesis with an in-depth elaboration of contributions made by this study.

Chapter 8 Conclusions and Future Research

8.1. Conclusions and Contribution to Knowledge

8.1.1 Recap on Aim and Objectives

The aim of this research is to critically analyse business growth in small and medium sized UK digital games development companies. Three objectives have been identified in order to address this aim:

Objective 1: Analyse the digital gaming industry with particular focus on the influencers of growth

Objective 2: Investigate the theoretical base of business growth in the UK digital gaming industry

Objective 3: Evaluate the entrepreneurial ecosystem supporting business growth in the UK digital gaming industry

Firstly, it is necessary to critically analyse the digital gaming industry and evaluate the influencers of survival and growth. Industry characteristics can influence the way business operates. Therefore, it is important to understand the industry in which the business is situated. Understanding of the characteristics of industry can further guide investigations into individual businesses and into the two concepts identified (i.e. the dynamic states framework and the entrepreneurial ecosystem empowered by digitalisation). Secondly, it is evident from the literature review that current literature on the digital gaming industry is mainly focused on individual elements such as the marketing techniques or specific technologies used in developing games. However, a wide range of factors can influence the performance of the businesses, so, employing an appropriate conceptual framework can help towards a holistic conceptualisation of the survival and growth process. In particular, the growth stages and states theories are analysed in detail in determining whether any of them can support the conceptualisation of the growth phenomena in the UK digital gaming industry. Thirdly, entrepreneurial ecosystems have been considered to be an effective environment in supporting entrepreneurial activities and business growth (Jackson 2011; Mason and Brown 2014). In this digital age where geographical restrictions have been increasingly reduced, it is

essential to understand different layers of entrepreneurial ecosystems and particularly whether adding a global perspective can be beneficial.

8.1.2 In Responding to Objective 1: Analyse the digital gaming industry with particular focus on the influencers of growth

In addressing the first objective, I first reviewed literature on business growth and entrepreneurial ecosystems in general and summarised findings (see Chapter 2 and Chapter 3). A large number of variables have been studied previously which can be broadly classified into three levels: individual, firm and industry/environment (Wiklund et al 2009 and Machado 2016). At the individual level, the personality traits and characteristics of the entrepreneurs can influence business growth (Davidsson et al 2010; Rauch and Rijskik 2013; Wakkee et al 2015). With respect to personality traits, influencers include attitude towards failure and work-life balance, motivation of running the business, ambition for growth and the internal locus of control. Other characteristics include the age, experience, education level, rank in personal carrier and the entrepreneur's insertion in social networks. At the firm level, the characteristics of the firm such as size, age and location can influence business performance (Wiklund et al 2009 and Machado 2016). Other firm level variables are generally related to the companies' strategy and practices in relation to human resources, marketing, networking and other expansion and management practices. At the industry and environmental level, discussions are around market conditions, dynamics and characteristics of the sector, networks, availability of resources and public policy support (Van Stel and Carree 2004; Davidsson et al 2010; Machado 2016). Scholars have also revealed that different industries often come with distinct characteristics which require different strategies for coping with these characteristics. For instance, different industries may differ in terms of the level of entry barriers (Janssen 2009) and vary in the value chain and growth opportunities (Nichter 2009). It is therefore essential to consider the industry differences and understand the variables specific to the industry studied.

Following this thought, sections 3.2 and 3.3 together with the data collection and analysis chapters are devoted to understanding the digital gaming industry and the growth variables for businesses operating within this. Digital gaming businesses have

demonstrated characteristics in both technology-driven and creative industries (see Chapters 5 and 6). Clustering is found to be a common phenomenon in the digital gaming industry as discussed in sections 5.2.2 and 5.4. This phenomenon is partly driven by the project-based nature of the industry where constant expansion and contraction is observed (see section 5.2.2). This expansion and contraction process entails the need to recruit and deploy talents in a short space of time. By locating closely in the same region, companies can benefit from the large readily available talent pool. Employees can also benefit from wider opportunities with little or no relocation cost. Such characteristics have also been confirmed during the interviews (e.g. SO07 in section 5.2.2).

Talents and funding are two other key influencing factors on business growth (see discussions in sections 5.3 and 5.5). As a knowledge intensive industry that requires a rather specific set of skills, quality talents are the fundamental drivers of smooth business operations. At the same time, funding is also a factor frequently brought up during the interviews. Just as with any other businesses, sufficient finance is required for continuous operation. As shown in section 5.5.1, among UK SMEs, five main types of funding are mentioned: loan, investment, grant, personal savings and profits from previous games. Each type of funding comes with its own advantages and disadvantages. In the meantime, political stability has also been discussed. Concerns were particularly raised over Brexit as this could affect the ability of UK-based businesses to access overseas talents, funding and markets (see 5.8.2). From the human resources point of view, the UK games industry has a history of relying on overseas workers, in that European nationals make up 15% of the total industry employment in the UK (TIGA 2017). Thus, the uncertainty induced by Brexit poses potential threats towards maintaining a continuous talent pipeline from overseas regions, particularly Europe. From the funding perspective, Brexit has already impacted on the ability of companies to obtain certain European grants and other types of funding. Complications over data sharing between UK and EU are also expected (Shin 2019). Moreover, exchange rates can also affect the competitiveness and profitability of the businesses.

As a technology intensive industry, the digital gaming businesses have high requirement on the internet infrastructure (as discussed in section 5.7). High speed broadband is an essential requirement for the smooth running of the businesses. A slow

internet connection will either cost the company money to upgrade to the high speed option or disrupt the daily operation (see discussion in section 5.7). From the business support perspective, many businesses have reported having benefited from various policy or business support initiatives. For instance, the UK Games Tax Relief introduced in 2014 has helped qualified developers financially. Several interviewees (e.g. GDF02, GDF15, GDF03, GDF07, and GDF18 in section 5.9) have also reported how they have benefited from the business support they received such as free office spaces, general business guidance, mentoring and networking opportunities. However, some interviewees expressed the view that more attention and support at government level should be put into the industry (e.g. SO08, GDF18 and GDF08 in section 5.8.3). For instance, the British Games Institute has been mentioned during the interviews as a form of support for the industry drawing inspiration from the support that the TV and film industry receive through the British Film Institute. Other potential support raised by interviewees includes reducing administrative burdens and providing more opportunities for funding, training and networking.

The industry has also demonstrated constant changing dynamics where much of it is driven by advances in technology (see section 5.2.1). For instance, the introduction of digital distribution channels has fostered the evolution of business models and offered an alternative channel for games developers to publish their games without relying on traditional publishers (Davidovici-Nora 2013). The advent of iPhone devices and the App Store have replaced the traditional Java mobile market and started a new way of designing and playing mobile games. The sudden rising population of the indie developers in the early 2000s is seen to have been triggered by the availability of digital evolution. While publishing games has been made easier than before, being able to differentiate from the market has become vital in profiting from the product (more discussion in section 5.6). There are some strategies that are generally considered to be good practices such as utilising social media platforms and starting to build the community early, being realistic about the expectation and control of the budget, understanding the audience and choosing appropriate monetisation strategies (see section 5.6.3). However, uncertainty has become part of the in-built nature of the games industry. There have been no strategies that can guarantee commercial success. In this, “luck” has been credited with explaining some of the significant successes in that every surprising success seem to be reasonable afterwards but not all efforts are necessarily

made intentionally at the start (see section 5.11). Therefore, while good practices should be followed, outcomes can still be uncertain as people's knowledge is limited and there are always elements that remain unknown.

In summary, objective 1 has been successfully addressed through synthesizing findings from literature review findings and empirical data. Key influencing factors can be categorised into three areas: the capability and aspiration of owner-managers, the external environment, and the nature of the business/industry. These factors need to be understood by first considering the specific characteristics of the digital gaming industry: the project based-nature, the intersection between technology driven industry and creative industry, and the hit-driven nature of the business. By putting the factors into this specific context, one can make sense of how each influencer individually and collectively can impact on business growth. Moreover, I have also revised the dynamic states framework by adding the lens of internal and external triggers and distinguishing the internal and external value created (see Figure 23 in section 7.3).

8.1.3 In Responding to Objective 2: Investigate the theoretical base of business growth in the UK digital gaming industry

In addressing the second objective, I first reviewed literature on business growth and entrepreneurial ecosystems in general before narrowing the discussions down into UK digital gaming businesses specifically. Chapter 2 discussed the heterogeneity of business growth such as the complexity of measuring and studying growth. Among the various approaches in studying growth, the thesis discussed and compared the growth stage models and the dynamic states framework in detail. While acknowledging the usefulness of the popular stage models such as the potential practical guidance offered by the discussions on possible challenges and solutions, the criticisms shall not be overlooked (Levie and Lichtenstein 2010; Farouk and Saleh 2011; Abdelshafy et al 2015). First of all, the fundamental assumptions of stage models, that organisations grow like organisms in a pre-programmed manner with a set number of stages and sequences to go through, is flawed (Levie and Hay 1998 cited by Gupta et al 2013; Phelps et al 2007; Levie and Lichtenstein 2010; Jacobs et al 2017). Indeed, empirical testing on various stage models disagreed with the claims and no one stage model has found to be reliable as a universal model that can be applied to different sizes and types

of companies (e.g. Tushman, Newman and Romanelli 1986; Eggers et al 1994); Garnsey et al 2006). Other criticisms of growth models concern the general negligence of external factors and mainly focusing on internal factors (Farouk and Saleh 2011). However, external factors such as characteristics of specific industries and the change of external environment (e.g. technology advancement) can greatly affect business performance and the growth trajectories (Jabłoński and Jabłoński 2016). It is therefore not surprising to see that a number of scholars (e.g. Gibb and Davies 1990; Farouk and Saleh 2011) have argued that the stage models fail to explain sufficiently the growth of businesses.

As a result, in addressing the shortcomings of stage models, the states framework (e.g. Phelps et al 2007; Levie and Lichtenstein 2010; Jacobs et al 2017) has been proposed as an alternative. The states framework rejects the idea of a universal linear process of business growth but takes into consideration the dynamic nature and the potential iterative processes during the development journey. Phelps et al's (2007) issue-based typology states framework and Levie and Lichtenstein's (2010) dynamic states approach were discussed in detail. Phelps et al (2007) identified six tipping points, namely people management, strategic orientation, formalisation of systems, new market entry, obtaining finance and operational improvement. The framework proposed that business can indeed travel back and forth between different states. To survive and grow, businesses need to address the tipping points by utilising their absorptive capacity. Similarly, Levie and Lichtenstein's (2010) dynamic states approach also believes that businesses can go through and be in any number of states so long as they can adapt to the changing environment, ensure their business model is sustainable and can respond to opportunities effectively. The transition between states is triggered by "opportunity tension" which is driven by market opportunity and the entrepreneurs' desire to exploit it for value creation. When a viable business model has been found, it can then be sustained for a period of time until further changes are triggered. Compared with Phelps et al's (2007) model, Levie and Lichtenstein's (2010) states framework goes further in recognising the uncertainty and dynamic nature of business growth and eliminates the potential restrictions that the six tipping points may enforce. Both articles discussed the frameworks at the conceptual level and did not present any empirical testing. In particular, Levie and Lichtenstein (2010) raised three questions for empirical research; to reveal: what sustains a dynamic state, when and

where the states change, and what the most essential contextual variables in the process are.

In addressing the second objective on investigating the theoretical base of business growth in the UK digital gaming industry, this thesis has also discussed both stage models and the dynamic states framework with detailed empirical case studies (see Chapter 6). Seven in depth case studies have been discussed in section 6.1. Through analysing the developmental history of the businesses, it is apparent that the stage models are not able to capture the entire sample population. Companies G001, G002 and G006 have demonstrated clear trajectories showing that they did not follow any linear growth path. Rather, they have been constantly moving between different states and in an iterative changing process of expanding and contrasting which has been proved to be common in the industry as discussed in section 5.2.2. While G003 and G004's growth paths have so far demonstrated a relatively linear process in terms of revenue and employment, the major breakthroughs have been achieved through the successes of particular games. Close examination of G003 reveals that the company did not seem to follow any stage models particularly when considering the fact that it was purchased by another overseas company in 2012. While it is difficult to determine whether G004, G005 and G007 follow any stage models, it did not change the fact that stage models are incapable of conceptualising growth in the digital gaming industry. Instead, all seven case study companies have demonstrated their efforts in utilising its own strengths and altering its business models to maximize their surviving and growing potentials in their respective development journeys.

From the perspective of practical applicability, the states framework has demonstrated its usefulness and can guide the decision making process of companies. It acknowledges the uncertainty of the future ahead and can guide the decision and sense making process by recognising the opportunity tension and adapting through resource allocation and business models. While the value of Levie and Lichtenstein's (2010) states framework shall and have been assessed and noted, I find that the framework can still be improved by incorporating entrepreneurs' motivation towards the running of the businesses. Levie and Lichtenstein (2010) argue that the dynamic states framework is driven by market change and opportunity creation. They believe that each state is established by "most efficiently/effectively" matching the organisation's internal capacity with the

external market and customer demand (Levie and Lichtenstein 2010: 335). However, as demonstrated in sections 5.11 and 6.1, the owner-managers' motivation to set-up and run the businesses are not always driven by financial rewards. Rather, they choose to prioritise the creative freedom and the positive experience of working on games. The financial rewards are seen as a means to achieve such creative freedom and positive experience. Therefore, their states transitioning process is most likely not driven by most effectively matching the company's internal capacity with external demand for financial gains. Rather, they transitioned into a new state towards the goal of being self-sufficient and self-sustainable in order to maintain or achieve creative freedom and a positive working experience. Such motivations may not result in decisions that most effectively match internal capacity and external demand from the perspective of financial rewards. For example, Interviewee GDF04 expressed that she only really needs money to be able to work on the next game title and does not need a surplus. As a result, she did not aspire to enlarge the company when she had the opportunity but chose to stay small and agile to fulfil her goal as an independent developer.

In summary, I have successfully addressed objective 2 by first comparing different approaches (e.g. stage models and states framework). Recognising the flaws of stage models, a dynamic states framework has been adopted to study the UK digital gaming industry for the project. From empirical studies, I find there is a need to extend the existing theory by also incorporating entrepreneurs' motivations and goals into the decision making and transitioning process. Drawing from available empirical data, this research also contributes to an answer to the three questions raised by Levie and Lichtenstein (2010) as discussed at the end of section 7.3.

8.1.4 In Responding to Objective 3: Evaluate the entrepreneurial ecosystem supporting business growth in the UK digital gaming industry

In addressing objective 3, I first reviewed literature on entrepreneurial ecosystems which have traditionally focused on a local/regional level (e.g. Isenberg 2010; Autio et al 2014; Mason and Brown 2014; Motoyama et al 2014; Brown and Mason 2017). However, empowered by digitalisation, social networks can play a key role in facilitating the process of resource allocation and help entrepreneurs to access resources beyond a local level (Autio et al 2018). As the world becomes increasingly globalised,

resources are moving in a global context. While digitalisation is a global phenomenon, limited studies have addressed the entrepreneurial ecosystems concept from this perspective (Li, Du, and Yin 2017; Sussan and Acs 2017). Therefore, drawing from relevant literature, I propose an entrepreneurial ecosystem framework in a global context empowered by digitalisation (see section 2.4). Chapter 6 has addressed this question in detail.

The thematic analysis of the interviews (Chapter 5), seven case studies of individual companies (Section 6.1) and two local clusters (section 6.2) have shown that UK digital gaming businesses have been broadly supported by ecosystems that provide talents, funding opportunities, markets, an increasingly supportive culture, policies and other types of general business support. Such ecosystems can be reflected in different layers. At the local level, the commonly seen clustering phenomenon has demonstrated the advantages in recycling resources in relating to talents, funding and knowledge sharing (e.g. 5.2.2 and 5.4). This resources recycling scene echoed with the findings in the ecosystem literature as discussed in section 2.4 (e.g. Pitelis 2012; Ruggill et al 2016; Spigel and Harrison 2018). At the country or national level, resources recycling activities still take place but relatively loosely linked (as indicated in section 6.2). The UK Games Tax Relief is an example of national level government policy and support that has received positive feedback from the industry (see section 5.8.2).

In addition, analysis of entrepreneurial activities at company level and local level has demonstrated frequent and crucial links with international partners. Resources are exchanged beyond the local and national level and active at an international level. Much of the resource exchange activities are fundamental in running the businesses (see examples of G001, G002, G003, G004, G005 and G007 in section 6.1). For instance, games produced can now be easily distributed worldwide. Indeed, many developers have found that the majority of their sales come from overseas markets. For example, company G004's games sold well in America, and GDF10 found their games sold well in America and Brazil. Their financial success cannot be achieved without access to the international market. Moreover, many companies have reported acquiring their funding from overseas partners located in places like US, various Asian countries, Oceania and Europe (e.g. G002, G003, G004 and G007). Other key global resource utilisation enabled by digital technology includes remote working, marketing and publishing

activities (as discussed in section 6.1). Thus, it is safe to conclude that the UK games industry benefits greatly from international collaboration and the global market. Therefore, if global linkages and resources are key to the success of the ecosystems at a local level, then it is rational to study the local ecosystems with a global view and discuss the feasibility of having an entrepreneurial ecosystem in a global context empowered by digitalisation.

In summary, objective 3 has been successfully addressed through analysing both individual companies and the two local clusters. While regional ecosystems supporting the local digital gaming businesses have been identified, a global view has also emerged in complementing the local/regional focus. As discussed in section 7.2.1, digital technology has bridged the gap between actors and places and facilitates the shift of resources in a global context. The concept of the digitalisation empowered entrepreneurial ecosystems developed in section 2.4.4 (see Figure 7) has proven to be applicable empirically. I have also revised the dynamic states framework by adding the lens of entrepreneurial ecosystems which operates under a global-local framework (see Figure 23 in section 7.3).

8.1.5 Summary on Contribution to Knowledge

This research makes its unique contributions to the development and enrichment of two key concepts, namely the dynamic states framework and the concept of the entrepreneurial ecosystems. These in turn play a vital role in informing and enhancing understanding of the practice and policies that impact on the digital gaming industry. What follows reiterates and summarises the above contributions of this thesis in greater detail.

Theories: Dynamic States Framework

First of all, this research makes contributions to the advancement of the dynamic states framework proposed by Levie and Lichtenstein's (2010). Through analysing empirical data and particularly investigating the development history of the businesses, this study finds that the dynamic states framework can capture the trajectory of the businesses in principle. In particular, all seven case study companies have demonstrated their efforts

in utilising their own strengths and altering their business models to maximize their surviving and growing potentials in their development journeys. This thesis has therefore complemented the previously conceptual framework from an empirical lens.

Through empirical analysis, I have also discovered that the entrepreneurs'/ owner-managers' motivations to set-up and run the businesses are not always financially driven. Indeed, many of the entrepreneurs interviewed did not prioritise financial rewards but rather value the creative freedom and positive working experience. The financial rewards are only regarded as a necessary step to achieving their goals of having creative freedom and positive experience. As a result, they make decisions in transitioning into new states in the hope of being self-sufficient and self-sustainable so that they can maintain or achieve such goals. However, this perspective has not been captured in the current dynamic states framework where emphasis has been put on most efficiently and effectively matching the organisation's internal capacity with the external market and customer demand. The differences in motivations and goals will ultimately impact on their decisions in running the businesses which explains why some businesses choose to stay small and agile when they have the opportunity to grow. Therefore, the revised framework not only acknowledges the role of market change and opportunity creation, but also incorporates owner-managers' motivations and goals into the decision making and transition process.

Moreover, I find that the value created needs to be measured from both external and internal perspectives. The current dynamic states framework emphasises the external value created through the entrepreneurial process such as the product or service created for the customers. However, as evidenced in the empirical findings (Table 13 in section 5.12), the majority of interviewees believed that internal value created, for example enhanced skills and experiences should also be taken into consideration when measuring their growth in addition to finance related measures. Thus, the revised framework has incorporated both internal and external value created through the process. All internal and external factors should be taken into consideration when feeding back to both the opportunity tension and entrepreneurs'/owner-managers' dominant logic (as shown in Figure 23 in section 7.3).

This research therefore additionally complements the existing framework that is heavily skewed towards businesses that prioritise financial gains. Drawing from empirical data, I have also contributed to answer the three questions raised by Levie and Lichtenstein (2010) as discussed at the end of section 7.3.

This study does not intend to dismiss the value of stage models in its entirety. Indeed, the challenges and possible solutions have valuable practical value which should not be overlooked. However, over time, the stage models have been proved to be unable to act as a generic guide to explain or predict growth. Thus, readers should be aware of the limitations and the rationale in the way of using such models.

Theories: Digitalisation Empowered Entrepreneurial Ecosystems

This research also contributes to the study of entrepreneurial ecosystems in three areas. First of all, it expands current discussions of the entrepreneurial ecosystem concept to a global context and demonstrates that it is indeed rational to do so (as is presented in the case studies in Chapter 6). As evidenced in both Leamington and Dundee's case (section 6.2) and case studies of seven individual companies, resources are seen shifting beyond the local/regional level. Resources may shift in forms of knowledge and information sharing, mergers and acquisitions, work for hire projects, investments and talent recruitment. Indeed, being able to acquire and utilise resources internationally has been key to the success of some businesses to date. For instance, with the help of digital technology, companies can afford to have staff located outside of the office to work on the same project. Marketing and publishing teams can operate from anywhere in the world to target worldwide audiences. International collaborations between companies can also be facilitated. Such propositions can help entrepreneurs and other actors to think and acquire resources in a global context in supporting their entrepreneurial activities.

Secondly, previous studies have provided extensive discussions on actors where this research complements the ecosystem study from the point of view of resource allocation and the role of social networks. As evidenced by the data analysis in Chapter 5 and Chapter 6, I argue that social networks can contribute significantly in facilitating the process of securing necessary resources. For instance, aligned with the findings

from Leamington and Dundee, social networks can help with the process of acquiring talents, funding and knowledge at a global level which is particularly valuable for early-stage entrepreneurs. For entrepreneurs to benefit from such social networks, an open and supportive culture is essential. Moreover, digital technologies have made it possible to attract, acquire and utilise resources beyond the local/regional level and have extended the reach and impact of the social networks globally. It shall also be noted that case studies have revealed a number of challenges within a global context. For instance, face-to-face communication is preferred and often required by investors before developers can secure any funding. However, the cost of attending such initial meetings can be high for overseas developers. I argue that these current challenges should be seen as initial guidance and prompt further discussions about supporting entrepreneurial activities in the current digitalised environment.

Thirdly, the research contributes to the early discussion of a digitalisation empowered entrepreneurial ecosystem and provides a different perspective that is not restricted by either location or types of entrepreneurs. This view is particularly relevant for businesses operating in today's digital economy: the view of entrepreneurs and practitioners should not be restricted by the regional locality but should consider collaboratively nurturing the ecosystem from a global perspective. The extended scope can help nurture the ecosystem in a holistic way by drawing on networks and resources globally. Recognising the role of digitalisation and its potential in facilitating the development of businesses, it is necessary and timely for practitioners to adopt this digitalisation empowered entrepreneurial ecosystem concept and act upon it by addressing the current challenges that have been identified.

Practices and Policies

From a practice perspective, this research is particularly useful to enable less experienced game developers to understand how the industry works and what they should be focusing on in addition to making games. Owner-managers/entrepreneurs can draw lessons from the revised dynamic states framework and the concept of digitalisation empowered entrepreneurial ecosystems. For instance, they should understand that the business environment is constantly changing and therefore requires them to be responsive and adaptive. When considering acquiring and utilising

resources, owner-managers should think beyond the local/regional level at a global context. In this process, they should understand the importance of social networks and their roles and potential benefits in forming both weak and strong ties. In summary, the discussions on the dynamic states framework and entrepreneurial ecosystems can broaden the views of owner managers/entrepreneurs and guide their decision making process.

Secondly, this research can also contribute to future policy development. As evidenced in the ecosystem discussions, collaborative efforts are required to nurture an effective and sustainable entrepreneurial ecosystem. It is critical for all actors involved in the ecosystem to work collaboratively and to be supportive towards entrepreneurial activities. However, it is essential to recognise that each region has its own specific characteristics and conditions. The differences in culture, resources, local networks or even physical location imply that simply imitating world best practices without adjusting to local circumstances is most likely to fail. Instead, local authorities should work closely with local businesses in understanding their specific requirements and build a well-connected supportive local community.

To be more specific, at the regional level, local governments (e.g. local councils and LEPs) can take the lessons learned into consideration when designing programmes to support entrepreneurial activities. As discussed in Chapter 5 and Chapter 6, programmes can be set up to support owner-managers to gain industry relevant business knowledge in areas such as financing, marketing, legal and administrative duties. Mechanisms can also be put into place to nurture and enhance networking opportunities and build a supportive culture. Moreover, local councils and LEPs could work together with local universities in creating affordable workspace or incubators for start-ups and design the space with the need for flexibility, networking and collaborations in mind.

As an important player in the local economy, universities can also support the local ecosystem development. For instance, universities can help with promoting entrepreneurship and fostering an enterprising culture, or a culture embraces and recognises digital games as a viable career paths more specifically. It can be done through facilitating students in developing networks of entrepreneurs or special networks for entrepreneurs/students interested in games or offering recognition and

awards for relevant entrepreneurial endeavours. Creating opportunities (e.g. events, public lectures or guest lectures) to introduce games businesses to a wider audience beyond just specific games degrees can raise awareness. This in turn can help foster a supportive culture.

From a human resources perspective, universities have a crucial role in producing talent. In addition to offering specialised degrees, universities can also help nurture the ecosystem by intentionally forming close relationships with the industry and understanding what the market requires. For instance, universities can collaborate with the industry in forms of joint programmes, industrial visits, internships opportunities and guest lecturing sessions.

At the national level, findings of the research can help guide government in designing practical policies. For example, the UK Government should first understand the industry's needs and conditions before designing new immigration policies especially when facing political uncertainties such as Brexit. Aspects to be considered may include, but not be limited to salary requirements, application fees, processing times and length of stay.

I also challenge the current emphasis on employment numbers imposed by the government. As discussed in section 5.12, one of the key measures that governments (e.g. local councils, LEPs or Innovate UK) tend to adopt when awarding grants or other types of support is employment numbers. The faster a company can grow in terms of employment numbers, the higher chance it would have in securing government grants. However, digital gaming businesses are operating in a volatile industry where growth is hard to predict. Indeed, expanding too fast or being pressurised to expand fast may even prove to be problematic and result in a negative impact. Meanwhile, building an ecosystem requires a long-term vision. There is an evolutionary process involved in nurturing a well-functioned entrepreneurial ecosystem which requires careful strategic planning that evolves together with the ecosystem. Thus, it is beneficial for the government to take into consideration the specific industry characteristics and the growth measures proposed by the owner-managers rather than just the employment numbers (see Table 13 in section 5.12). Indeed, an enhanced way to assess success is to measure it at the industry level or regional level rather than at the individual company

level. The shift of focus can then lead to further modifications of specific policies and regulations. Emphasis should be placed on creating an environment and ecosystem where resources can be retained and expanded within the region or the industry across the country as a whole rather than one particular company.

8.2. Limitations of the Research

While maximum efforts have been made to ensure the quality of the research, there are still limitations. Firstly, the discussion on the dynamic states framework was based on a limited sample size in a specific industry. Applying and assessing the framework in different industries with distinct characteristics may lead to new insights. Secondly, although every effort has been made to be inclusive and capture different perspectives from different actors within the ecosystem, primary data was UK restricted. Broader perspectives from actors outside the UK can also enrich the understanding and form a holistic picture. Thirdly, the sample size of interviews was limited and this could be strengthened by an increased number of responses. In addition, analysis of empirical data very much relied on the interviewees' memories and interpretations of what happened in the past. Although I have used complementary documentary resources to validate the information where possible, bias still exists. Thus, in depth longitudinal studies can potentially help provide further insights on the development history and the decision-making process. Lastly, a consideration of the wider contexts for Leamington and Dundee's business interests, such as animation, performing arts, digital design and other digital technology related businesses, could help further enrich the understanding of the local cluster development. However, this is beyond the scope of this study.

8.3. Future Research

While findings align with the proposed entrepreneurial ecosystem framework in the global context, to develop a fully globalised entrepreneurial ecosystem, various challenges need to be addressed in supporting such an ecosystem in a local-global framework. There are some key questions that need to be answered. For example, what is the appropriate governance structure in supporting such an ecosystem? How does the social network evolve and how can it be maintained in a global context? How can

resources allocation and relocation be best supported? How can we balance the relationship between local and global entrepreneurial ecosystems?

In addressing the research limitations, comparative studies can be conducted in different countries such as China, Brazil and US. The differences in cultural and economic development and government political systems can reveal new practical insights into the subject and potentially contribute to the further development of the theories. For instance, the global perspectives on the digital gaming industry can be expanded when the scene is looked at from multiple viewpoints. Moreover, the dynamic states framework can be further tested in other risky project-based businesses.

8.4 Reflection of the Doctoral Journey

My philosophical journey

Various discussions, especially the conversation with my viva examiners, had triggered me to dig deeper in terms of my philosophical origin and how it has developed to date. Growing up in China with a strong interest in traditional Chinese arts since an early age, it is inevitable to be influenced by various philosophical schools of thoughts, including Confucianism and Taoism. Each of which has a rather long rooted history embedded in the Chinese culture including the education system. Nevertheless, one of the stories influenced me greatly is the Debate of Hao-Liang, documented in the ancient book *Zhuangzi The Floods of Autumn*⁴⁶. One of the passages used the “joy of fish”⁴⁷ as an analogy in discussing how one should recognize the external reality. The conversation goes as follows:

Zhuangzi: The minnows are darting about free and easy! This is the ‘Joy of Fish’.

Huizi: You are not a fish. How do you know what constitutes the joy of fish?

Zhuangzi: You are not I. How do you know that I do not know what constitutes the joy of fish?

⁴⁶ The ancient Chinese text *Zhuangzi* is from the late Warring States period (476-221 BC) which has significant influence on many famous writers from the Han Dynasty (206BC-AD220) to the present.

⁴⁷ It is always clumsy and extremely difficult in translating this type of ancient text into English. Here I have combined several different versions of translation in hope of piecing together a best version to my knowledge.

Huizi: I'm not you, and so I can't know. It follows that since you are not a fish, you can't know the joy of fish. So there!

Zhuangzi: Let us keep to your original question. You said to me, "how do you know what constitutes the joy of fish?" You knew what I knew it, and yet you put your question to me. Well, I know it from our enjoying ourselves together over the Hao.

In this passage, I was particularly struck by the sentence "*You are not a fish; how do you know what constitutes the joy of fish?*" All creatures are unique. One might have different opinions towards the same thing/reality. Individual differences need to be recognised and in many ways respected. Reflecting in life, I started to understand and develop the belief that everyone is unique to themselves and may have different opinions and logics than others. In the process of trying to discover the truth or reality, it is important to be sensitive in understanding other people's perspectives and underlying logics. This forms the initial basis of adopting an interpretivist perspective in this thesis.

This belief has then been further enhanced as I grew up, particularly when I was practicing Chinese painting for years where I did a lot of outdoor sketching. During those times, one of the lessons I learned is the importance of angle. For instance, when I draw a tree or rock, where I sit will not only influence how the objects are being presented but also the entire composition and structure of the painting. It also applies to life: people react and think differently towards the same thing. Unless it is against the law or morally wrong, I do believe those differences need to be recognised and respected. When it comes to business, people make different decisions based on their own understanding towards themselves, their needs and the future. Thus, in order to maximise the chances of uncovering the realities of other people, it is essential to try to understand their unique logics and perspectives. This again greatly influenced me on adopting an interpretivist perspective in this research.

Personal learning and development

Looking back over the past 3 to 4 years, the PhD journey is full of challenges and rewards at the same time. I still remember the time when I first started, that I was in confusion on what I was trying to research on exactly. To make the situation even more

complicated, I had four supervisors, each with their own bags of glories and very willing to help. As helpful as they can possibly be, the different voices I was getting quickly swamped me. That became the **first lesson** that I learned: managing your supervisors. I was fortunate to have very supportive and understanding supervisors who saw the problem and helped me shortly after. For instance, all of them made time out of their busy schedules and met with me together and unified the instructions.

As I finished writing my draft literature review chapters, one of my supervisors stepped down from the panel due to heavy workload. That resulted in a sudden change of research topic and direction. In order to still progress to the next stage, I was then required to write a new draft literature review chapter plus methodology chapter within less than three months' time. Though challenging with a lot of space for improvement, I was proud that I managed to do that. Before the end of second year, two of my other supervisors left the university which resulted in changes in my supervisory team including director of studies. Nevertheless, this became the **second lesson** that I learned: being persistent. I must also thank my supervisors for reassuring me and ensuring the transition period is as smooth as it can be. Other than this, the second year was the year that I enjoyed the most as I was able to go into the field and talk to people in the industry and getting to understand what happens in real life.

As time progresses, the third year was full of stress outside of PhD research. I was working as a full time research assistant for three years starting a bit earlier than my PhD. When that contract coming to the end and my work visa running out of time, I was stressed in finding out ways to secure another job in academia which turns out to be extremely difficult. I then started to work on getting more teaching experiences and research outputs in the hope of enriching my CV in a great rush. It did not turn out well as I left it late. That becomes the **third lesson** I learned: be proactive and do not wait. However once again, I must thank my supervisors for offering their help in various ways during this difficult period of time. Though painful, this experience has particularly helped me grow from career planning perspective.

Overall, my academic side of learning and development is significant during the PhD journey. The extensive academic reading and writing have not only built the crucial foundations for me to advance my career in academia but also further developed my

critical thinking skills. I must thank my supervisors for challenging me in a supportive way. It is for them pushing me according to the highest standard that the thesis can arrive where it is today. In addition, benefiting from the research assistant job, I was exposed to various projects and tasks which expanded my horizons. They are great opportunities to sharpen my academic skills even further. Furthermore, the enjoyment of the journey would have been halved without the great people I know across the world during various visits.

So would I do anything differently? I was always tempted to say yes and always someone who wants to do things better. In hindsight I think some lessons need to be learnt in one way or another. More importantly, what I should be working on is to take the learnings and lessons learned forward and be an improved version of myself.

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Appendix

Appendix 1. A Conceptual Framework of Entrepreneurship Policy (Mirzanti et al 2015)

LEVEL OF ANALYSIS	START	VARIABLES	INTERVENTION	IMPACT
Micro Level	Individual	Skills (Entrepreneurship and Business skills) Opportunity Motivation	GI 1	start-ups business
			Entrepreneurship education/Training	
			Entry barriers/deregulation	
			Access to market	
			Access to finance/soft loan	
			Incubator/mentorship	
			Role model	
Meso Level	Firm	Administrative Burden Incentive toward specific group Business incentive	GI 2	Remain/exit business
			Entry/exit barriers/deregulation	
			Export and import regulation	
			Intellectual Policy Right	
			Technology transfer	
			Technology commercialisation	
			Labor market regulation	
Macro Level	Macro	Entrepreneurship culture Entrepreneurship infrastructure Education	GI 3	Economic growth
			Awareness	
			Information	
			Venture/angel capital	
			Access to internet	
			Entrepreneurship education	

Appendix 2: Participant Information Sheet

Antecedents of Business Growth in UK Digital Gaming Sector

The research looks to investigate factors influencing the digital gaming business growth performance in the UK. This interview is conducted by Zimu Xu from the International Centre for Transformational Entrepreneurship at Coventry University as part of the researcher's PhD thesis.

You have been selected to take part because you are either working at a UK digital gaming company or supporting their businesses operations. Your participation in the interview is entirely voluntary, and you can withdraw at any stage. If you choose to withdraw after the interview is completed, please send formal written request to Zimu Xu at ac2841@coventry.ac.uk before 1 February 2018. If you are happy to participate, you will be asked a set of semi-structure questions in relating to your organisation's background and activities. You will be encouraged to share your views on topics of digital gaming businesses growth measures, contributors and barriers. Your responses will greatly contribute to the current understanding of the digital gaming industry and subsequently influence on any support maybe provided by various stakeholders such as policy makers which may in turn help your organisation's operation.

The interview should take approximately **45mins** to complete. Your answers will be treated confidentially and the information you provide will be kept anonymous in any research outputs/publications. However, you may also choose to allow the researcher reveal your organisation's identity in any research outputs/publications. You can indicate your preferred option in the informed consent form. Your data in paper form will be held securely in offices of International Centre for Transformational Entrepreneurship (ICTE), Coventry University under secure conditions as described in University's data protection policies. The electronic data will be stored in university's encrypted drives. The final research findings will be shared with you upon request. Data collected both in paper and electronic forms will be destructed by **1 Sept 2019**.

The project has been reviewed and approved by senior research fellows and through the formal Research Ethics procedure at Coventry University. For further information, or if you have an queries, please contact the researcher Zimu Xu, ICTE, G41A, Charles

Ward Building, Coventry University, CV1 5LW. If you have any concerns that cannot be resolved through the researcher, please contact the researcher's supervisor Prof Paul Jones, Deputy Director at ICTE G41A, Charles Ward Building, Coventry University, CV1 5LW. Thank you for agreeing and taking the time to participate in the interview. Your help is greatly appreciated.

Appendix 3: Informed Consent Form

Antecedents of Business Growth in UK Digital Gaming Sector

You are invited to take part in this research study for the purpose of investigating influencing factors of digital gaming business' growth performance in the UK. Interview questions will consider the measure, contributors and barriers towards digital gaming business performance.

	Please tick if agree
1. I confirm that I have read and understood the participant information sheet for the above study and have had the opportunity to ask questions.	<input type="checkbox"/>
2. I understand that my participation is voluntary and that I am free to withdraw at anytime without giving a reason.	<input type="checkbox"/>
3. I understand that all the information I provide will be treated in confidence.	<input type="checkbox"/>
4. I understand that I also have the right to change my mind about participating in the study for a short period after the study has concluded (1 February 2018).	<input type="checkbox"/>
5. I agree to be audio recorded and for anonymised quotes to be used as part of the research project.	<input type="checkbox"/>
6. I agree to take part in the research project.	<input type="checkbox"/>

Name of participant:

Signature of participant:

Date:

Name of Researcher:

Signature of researcher:

Date:

Appendix 4: Permission to use companies' and organisations' online information

Dear xx (staff responsible for the online information),

My name is Zimu Xu and I am conducting a research for my PhD on investigating antecedents of business growth in digital gaming sector. As part of the research, the researcher may need to access and use online information (such as website, Facebook page) related to your company/organisation in the final output in order to develop a thorough understanding of the industry and your businesses.

In order to potentially include any public information from online sources, I will need your permission to do so. If you are agree to give permission to use your company/organisation's online information for the research project, please can you sign in the Permission Form (or confirm via email to ac2841@coventry.ac.uk). Any additional conditions that you may feel necessary can be added in the permission form.

Yours sincerely

Zimu Xu

Permission Form

I have read and understood above information letter and agree to give permission to the researcher Zimu Xu to use company's/organisation's online information for the research project autonomously/anonymously (cross as appropriate).

Additional conditions:

Print Name:

Signature:

Date:

Permission to reveal companies' and organisations' Identity

Thank you very much for agreeing to take part in my PhD research on investigating antecedents of business growth in digital gaming sector. Information discussed will be kept strictly confidential. However, you can also choose to give permission to reveal your company/organisation's identity in any outputs/publications resulted from this study. Please indicate your option below. Please note that, upon permission given, the researcher may still choose not to reveal company/organisation's identity where necessary (such as in study involve one or more other company/organisation whom choose not to reveal their identity). Any additional conditions that you may feel necessary can be added in the permission form.

Permission Form

I have read and understood above information letter and AGREE TO/NOT TO (cross as appropriate) give permission to the researcher Zimu Xu to reveal company's/organisation's identity for the research project where appropriate and necessary.

Additional conditions:

Print Name:

Signature:

Date:

Appendix 5: Focus group consent form

Antecedents of Business Growth in UK Digital Gaming Sector

Zimu Xu
Coventry University
International Centre for Transformational Entrepreneurship
Priory Street
Coventry CV1 5LW
Email: ac2841@coventry.ac.uk

Please tick Box

- | | | |
|----|---|--------------------------|
| 1. | I confirm that I have understood the above study (as explained by the researcher and the written information provided) and have had the opportunity to ask questions. | <input type="checkbox"/> |
| 2. | I understand that my participation is voluntary and that I am free to withdraw at any time before 1 Feb 2018, without giving reason. | <input type="checkbox"/> |
| 3. | I agree to take part in the above study. | <input type="checkbox"/> |
| 4. | I agree to focus group discussion being audio recorded. | <input type="checkbox"/> |
| 5. | I agree to the use of anonymised quotes in publications. | <input type="checkbox"/> |

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Name of Researcher	Date	Signature
_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Name of Researcher	Date	Signature

Appendix 6: Sample Transcriptions (Owner-mangers of games development companies)

R: Researcher

I: Interviewee

R: Er... I'm just curious about your.... you know in terms of employing people to do you know, you have the concept and ask people to you know, to finish the concept, you know, the bits, you might cannot do or don't want to do. How, how many hours have you contracted people out for that? Or do you pay hours or do you pay by like

I: I pay by.... it's usually a daily rate. But with some people I have a.... it's a one-time payment for everything.

R: What type of work do you normally pay them for?

I: Yeah so, it's, so it's, so it's.... it's somebody that I'm very good friends with and she..... maybe you met her XXX. She was also at EGX, she's writing the game, and it's a flat fee of £10,000 to write everything. And it's not tied to how much..... how long it's going to take her.

[.....]

R: Er, how long have you been working on this new game?

I: So I've been working on this since..... so I did one year on my own which was like a pre-production year to do the concept. And since January of this year, I started working with other people.

R: Oh okay, so 2016, the pretty much the year you work on your own to make the concept.

I: Yes.

R: And this year you brought on more people. How long does it take you to finish the GameXXX then? Is it 4 years years?

I: Er... three and a half years.

R: Three and a half years. And did you get any funding to make GameXXX?

I: No, it's self-funded.

R: And did you just, you know, all three of you kind of used your own previous savings to work on this game?

I: Yes

R: Okay, er..... just little bit about yourself, I mean you don't feel comfortable to say, that's all right, like, you know, or you can give me a age range. Like, how old are you?

I: I'm 39.

R: Oh really, you don't really look like that old. In terms of starting the business, what is your motive to start the business?

I: Creative freedom.

R: Okay, so there's too much restrictions in the triple A's, I suppose?

I: Yeah, there is lots of restrictions, but it's also not very enjoyable. The working, working conditions aren't very good. And the games that you make are high quality but aren't interesting to me. haha. It's like Hollywood work. If you want to be hollywood.... like hollywood popcorn movies or do you want to go independent. And.... it's, it's more money in Hollywood. But you have a more interesting life being independent.

R: Yeah, yeah, yeah, sure, sure.

I: None of us are really business people, and I guess this is why the company doesn't have a lot of value to us personally. It's more that creative outcomes....

R: Yeah yeah, sure. While you are saying that it seems like.... all 3 of you, you know, as you said, didn't have too much of business background but more in terms of into like a making the game, but it looks like you know the game, the first game, GameXXX has doing quite well. For 3 of you and you know, to be able to invest in the following game.

I: Exactly.

R: How did that happen, how did you make it a.... you know quite successful launch, quite successful sale?

I: Er.... Yes. So GameXXX..... the thing with GameXXX is that it's quite a unique game. Because it has, you know, it takes place in a pop up book. And this kind of games setting doesn't exist yet. GameXXX is the first to do this kind of thing. And it's basically innovation and uniqueness. And because of that, we got a lot of support from Apple. And we also got a lot of support from the industry in that we got recognised at festivals and awards. So it's, it's kind of like a..... in some ways it's a stand out gaming experience because of its uniqueness.

R: When you say you got support from the games industry and Apple, the company. What kind of support have you received? Because you prviously mentioned that there is no money involved.

I: No, it's basically Apple as featuring on the store which obviously translates into money.

R: Oh I see, so they put you on a quite good.... er... store front.

I: Yes, and they gave us the Editors' Choice Award which basically means, you know this is a really good game or this is a really stand out game. And the games industry is the other because they also gave us awards, you know. Like gave us award for art direction or game design. And then basically..... you know now for the second game when I go to people, when I go to the European Union, or the Wellcome Trust, I can say, you know, please give me some money and this is my track record. And I can show that my previous game for us, you know, commercially successful, even though of course there are other games that are more, much more successful. Also.... you know get recognised because of the award. And kind of it has a knock on benefit, it has future benefit.

R: Yeah yeah definitely. So it is..... I mean as I undersand, it's mainly through the Apple's editor's choice, and the industry's several awards that, you know the name of the game started to be, you know recognised by different people.

I: Exactly, yes.

R: And you also get a bit of publicity I guess.

I: Yes

Appendix 7: Sample Transcriptions (Supporting organisations)

R: Researcher

I: Interviewee

R: Actually what type of kind of business do you do? Er... you know, as far as I understand, it's a PR consultancy.

I: That's right. That's right. Yes, so what we do is we, we sort of develop and manage public relations campaigns for game development studios. So most of our clients are, you know, small games businesses, game startups, independent..... independently run companies and things like that. So we specialize in running PR and marketing campaigns specifically tailored to those sort of companies and those sorts of businesses.

R: I see. In terms of you are saying you specifically, you know work with indie or smaller studios, games development studios. Is there any particular reason for that?

I: Yeah, I mean, really. So there's a couple reasons that go into it. One of them is more to the confidence. It's always been my passion, you know, I've always worked in around indie games. I've always been really interested in, in what people are creating away from the kind of mainstream and generally that the types of games that I enjoy and get passionate about tend to the game made by smaller studios. So that's kind of one, one side of it. It's just the passion and interest that I've developed over the years. The other side of it, though, is really to serve a gap in the market. You know, when I was working at XXX, we, we originally set up the agency to help you know smaller studios as well. But the reality is, you know, the bigger the company become as an agency, the more its prices have to increase, the less bespoke it's service becomes, et cetera, et cetera. And what, what I thought was that there was, you know, demographic or a group of kind of game development companies that are still quite small, they can't really afford to pay the, the really high fees that offered by a lot of agencies. So I really wanted to set up a company that was designed to, you know, its entire business model is, is set up to be able to support these, these companies still. To be able to offer, you know slightly lower prices and most of our competition without skipping on the quality of service that we can provide. And, you know, allowing us to provide a really bespoke service that is specific for the types of, kind of operational processes, the types of games, the types of ways of working that a lot of indie game studios have.

R: Okay, while you are saying this, the type of business you supported is solely Indie Games?

I: Correct, yeah. Correct. So entirely kind of small, small games businesses. And, you know, some of them are just one person, for example. Others might be a team of 30, 40 people. But the thing that links them all is, you know, they're all independent, they don't have outside kind of ownership. They're not behold to a publisher. That's also kind of the things that, that link everyone together in terms of our, our client base.

R: I see. How do you determine who you want to work with? Is it on the size, saying below certain number of employees or.....?

I: Yeah, we don't really have a hard and fast rule. To be honest, I think, you know, because we're, because we're a very small company ourselves, we, we can really close to the.... that the prospective clients that we might be working with. And a lot of the time it's it's based on kind of gut feel. You know budget is a part of it as well. We kind of know roughly what, what we can charge and what sort of discounts, we can do and what rates you can get away with. So you know there's, there's an element of like if you..... let's say for example, if you have 5000 pounds to spend on PR, that's kind of perfect for us. That's about where, where we tend to operate. If you've got 500, we probably can't really help you in the way that you want to that, that amount of money. Conversely if you've got 500,000 to spend, we're probably not the right company for you because you probably want a bigger, more established agency. But really, there's a lot of just, kind of, you know, seeing what, what opportunities come through the door and having kind of a gut instinct reaction of is this going to be a good fit for the type of work that we do.